The Broadcaster

RADIO AND GRAMOPHONE TRADE ANNUAL

1933

These are the instruments for those who insist on the BEST

THE W
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RAD
GRAM

R.G.D. Radio Gramophones
highest degree of excellence i
Records, regardless of cost.

They have achieved this exce
is indeed moderate.

To offer your customers an R.
tion and taste, and to increase

MODEL 901 has a nine valve chassis with 9 tuned circuits and tuning is by a single illuminated dial. Fitted with two balanced speakers thus ensuring amazing fidelity of reproduction. Volume control is effective on both radio and gramophone. A tone control is also fitted.

From 80 *gns.*

With Auto Record changer.
From 95 Gns.

£15·00

...ORLD'S ...NEST ...DIO - ...OPHONES

MODEL 701 is a 7 valve superheterodyne, with 7 tuned circuits. Tuning is by a single illuminated dial. This model provides a selectivity and quality of reproduction to satisfy every requirement, but is produced at a somewhat lower price than the Model 901.

From **48 *gns.***

With Auto Record changer. From 63 Gns.

...have been designed and produced to give the ...n the reproduction of Radio and Gramophone

...lence, and yet the selling price of each model

...G.D. is to pay a compliment to their discrimina- ... your prestige.

R·G·D

THE HALL-MARK OF PERFECT REPRODUCTION

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Phone: CENTRAL [illegible]

MANCHESTER: 17, Bridge Street   LONDON: [illegible], Doughty Street, W.C.1

INDEX TO SALES

1 "AERODYNE" BATTERY TWO

Specification includes Single Dial Tuning. B.V.A. Valves. Pick up sockets. Metal Chassis. Four-Pole Balanced Armature Speaker. Three Alternative Aerial Sockets. 108 volt H.T. Battery. 9 volt G.B. Battery. 20 amp. hrs. Accumulator. Beautifully finished Oak Cabinet. Retailed at £4.19.6

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2 "AERODYNE" MAINS TWO

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Or Deferred Terms.

3 "AERODYNE" SCREENED-GRID 3

(VARIABLE MU) Specification includes Single-knob Tuning. B.V.A. Valves. Moving Coil Speaker. Alternate Aerial Sockets. Gramophone Pick-up Sockets. Robust All Metal Chassis. Figured Walnut Cabinet. 120 volt H.T. Battery. 12 volt G.B. Battery 2 volts 40 amp. hrs. Accumulator. Retailed at £9.9.0

Or Deferred Terms

4 "AERODYNE" ALL MAINS S.G.3 (A.C.)

(VARIABLE MU) Specification includes Variable Mu S.G. Valve. (B.V.A.) Power Grid Detector (B.V.A) Pentode Output (3 watt) (B.V.A.) Moving Coil Speaker (energised.) Metal Rectification (full wave voltage doubler). Mains Aerial. Provision for gramophone pick-up. Single knob tuning. Combined Volume Control and Mains Switch. Accessible fuses and voltage regulation. Robust All Metal Chassis. Figured Walnut Cabinet. Retailed at £15.15.0

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Philips equipment has proved triumphantly successful at many important recent events in world history.

For perfect reproduction in large halls and the open air, there are PHILIPS amplifiers up 600 watts.

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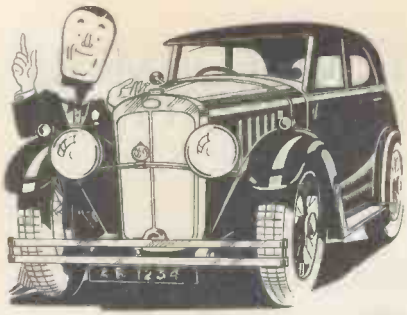
GRAMO, RADIO AND MICROPHONE WITH EITHER 25 OR 50 WATT AMPLIFIER COMBINED IN ONE NEAT CABINET.

GRAMOPHONE AND MICROPHONE (25 OR 50 WATT).

PHILIPS SUPER POWER MOVING COIL SPEAKER FOR PUBLIC ADDRESS WORK.



this is not a car ad.

but the car an "All-British" dealer bought out of profits!

Thousands of dealers have made record sales with the "All-British" valve at 5/6. See that you are not left out—the biggest discounts in the radio trade!

The "All-British" H.F. valve medium impedance, for all H.F. purposes where screened-grid valve is not used.
The "All-British" L.F. valve medium impedance, for detector or L.F. stages.
THE "ALL-BRITISH" POWER OUTPUT VALVE FOR POWER STAGE. A TRIUMPH OF BRITISH VALVE MAKING AT 5/6.

5/6

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6/6

The "All-British" screened-grid valve. This excellent valve gives perfect results wherever a S.G valve can be used. The characteristics will satisfy the most ardent enthusiast. THIS S.G. VALVE AT 10/6 WILL CREATE RECORD SALES.

10/6

The largest discounts in the trade are given with "All-British" Valves.

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EMPIRE HOUSE, PICCADILLY, LONDON.
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Complete range in stock for immediate delivery.
Also the "All-British" L.F. transformer, ratios 3-1 and 5-1 at 3/6

The "ALL-BRITISH" valve

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POWER AMPLIFIERS & ALL EQUIPMENT

IN . . . .

DANCE HALLS
FETES
RESTAURANTS
RINKS ETC.

Write for Particulars

DRC

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And All Components

including: Switches, Chokes, Valve-holders and Valve Strips, Dials, Knobs, Bakelised Formers, Coils.

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All-Electric Radio Grams and Table Models A.C. 100/250 volts, D.C. 200/250 volts. Suitcase Portables and Transportables. Battery type. Chassis supplied complete ready for Mounting in Cabinets.

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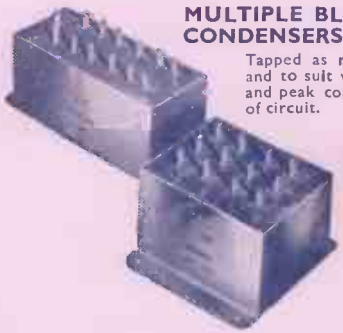
'Phones: Bishopsgate 7322/3.
'Grams: "Padonko, Finsquare, London."

A COMPLETE CONDENSER SERVICE . . . .



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Tapped as required and to suit working and peak conditions of circuit.

INVALUABLE experience accumulated over a quarter of a century of intensive specialisation by T.C.C. has resulted in an ability to meet every possible condenser need. With a really comprehensive range, with a laboratory and factory equipped for any special requirement, T.C.C. offer a condenser service that is unequalled. Avail yourself of this service—consult T.C.C.

Send for latest complete list, and for details of special terms to set makers.

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for chassis mounting.

Cap. Mfd.	D.C. Voltage	
	WORKING	PEAK
4	440	460
7	460	500
8	440	460

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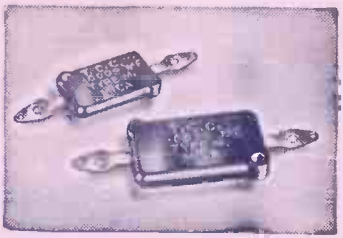
MOULDED MICA, TYPE " M."

.00005 to .01 mfd. Guaranteed within + or — 15%. Closer limits to order



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Sets the Standard for Set Manufacturers

Our extensive range of CONDENSERS meets practically every radio purpose.

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RETAILERS
can rely upon the 1933 Polar range meeting every requirement of the home constructor.

The name "Polar" is a Guarantee of sturdily built, carefully designed and constructed condensers.

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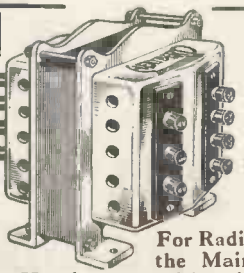

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For Radio Power from the Mains — call in Heayberd, the Mains' *Specialists*. Mains Transformers, Chokes, Condensers and Complete Mains Units or Battery Chargers. Every job a triumph of engineering. Made possible only by using the finest materials, coupled with severe testing A very useful combined Catalogue and Handbook will be sent you FREE, on receipt of your Trade Card or Heading.

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For housing Loud Speakers, Radio-Gramophone, Receivers—you cannot better Camco Cabinets.

There is always a consistent demand for good quality cabinets—satisfy your customers with Camco.

Send for supplies of the new 24-page Camco Cabinet Catalogue.

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HIGH GRADE

SOUND REPRODUCERS

P. A. LOUD SPEAKERS

AND OTHER EQUIPMENT SUITABLE for DANCE HALLS, SPORTS MEETINGS, ETC.

FULL DETAILS & DEMONSTRATIONS

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ALL KINDS OF SHEET METAL, STAMPING & TURNED PARTS.

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EVERY TEST READING with

one complete instrument

The AVOMETER

(Regd. Trade Mark)

D.C. & A.C. Amps., Volts & Ohms

Without External Shunts or Multipliers

. . . Without Calculations

The Avometer saves time, trouble and expense. It is the only combination testing instrument in the world that gives *direct* and accurate readings in Amps., Volts and Ohms without the use of external shunts or multipliers and without calculations.

The UNIVERSAL model is the only instrument of its kind that gives both D.C. and A.C. readings (for use on 50 cycles). The Avometer is the most widely used electrical measuring instrument in the world, and is found indispensable throughout the radio trade.

D.C.
0.1 milliamp to 12 amps.; 1 millivolt to 1200 volts; 0.1 ohm to 1 megohm.

A.C.
10 milliamps to 12 amps.; 100 millivolts to 1200 volts.

D.C. MODEL

£8:8s.

UNIVERSAL A.C & D.C. Model.

12 GNS

Easy Valve Testing with

The AVODAPTER

Patent applied for

The AvoDapter enables valves and valve circuits to be tested externally and disposes once and for all of the difficulty of making tests inside the set. It is instantly convertible for four or five pin valves, and a switch enables anode, screen and grid currents to be measured without change of connections, and filament or heater, screen and anode voltages may be taken simultaneously or separately.

PRICE COMPLETE

25/-

AvoDapter patent Convertible Plug, with 6-way lead, for use with existing testing equipment.

7/6

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The Broadcaster

RADIO AND GRAMOPHONE

TRADE ANNUAL

1933

SECOND EDITION

PRICE Post Free **5s.**

Published by

THE BROADCASTER & WIRELESS RETAILER

Odhams Press Ltd., 93, Long Acre, London, W.C.2

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After the initial outlay there are no subsequent upkeep costs, for no attention or maintenance is required, therefore no provision for upkeep is necessary.
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PREFACE

To the Second Edition

ADDITIONAL chapters and very considerable revision have been carried out to produce the second edition of the *Broadcaster Radio and Gramophone Trade Annual* for 1933.

The more important new sections include comprehensive tabulated data showing market possibilities of mains and battery receivers, new subjects, including a series of Abacs to the service section, the Import Duties (1932) Act and the R.G.2 (radio gramophone) Licence.

Revisions should be noted in the Who's Who in the Trade section, in the various chapters devoted to radio trade organisation, the four directory sections, Industry at law and in regard to facts and figures relating to the exports and imports for the past twelve months.

Sectionalising of the contents of the Annual has been maintained this year, so that reference to the various chapters is facilitated.

The *Broadcaster Annual* is indebted to the courtesy of *Electrical Trading* for permission to reproduce the "Central Station Voltage" tables.

Once again we would extend to our readers a cordial invitation to send us any suggestions for the improvement of the *Broadcaster Annual*.

THE EDITOR.

December, 1932.

A Revolution in Price
A Revelation in Performance

The New 1933 ORMOND MOVING COIL LOUDSPEAKERS

The ORMOND Permanent Magnet Moving Coil CHASSIS

What was a luxury possession becomes purchasable by all! Naturally, it fell to Ormond to produce this marvel of value. This speaker has an excellent frequency response giving natural reproduction with the maximum sensitivity.

It is fitted with a pressed steel chassis and moulded cone, with large permanent magnet, to give reliability with long life. Complete with output transformer.

26/-

Overall size:
Diameter 8 inches,
Depth 5¼ inches.
Cat. No. R/494.

ENGINEERING ORMOND COMPANY LTD.
Brit. Regd. *Trade Mark.*

The ORMOND Moving Coil CABINET LOUDSPEAKER

Contained in a handsome figured Walnut cabinet of modern style, it is fitted with the Permanent Magnet Loudspeaker described above, Cat. No. R/494.

Size:
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Cat. No. R/495.

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THE ORMOND ENGINEERING CO., LTD.,
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Telephones: Clerkenwell 5334/5/6 and 9344/5/6. *Telegrams: Ormondengi, Isling.*

FOR PUNCH · POWER & PURITY !

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Thurs.	5	12	19	26	..		3	10	17	24	31		.	7	14	21	28	
Fri.	6	13	20	27	..		4	11	18	25	..		1	8	15	22	29	
Sat.	7	14	21	28	..		5	12	19	26	..		2	9	16	23	30	

	JULY.						AUGUST.						SEPTEMBER.					
Sun.	1	8	15	22	29		.	5	12	19	26		.	2	9	16	23	30
Mon.	2	9	16	23	30		.	6	13	20	27		.	3	10	17	24	..
Tues.	3	10	17	24	31		.	7	14	21	28		.	4	11	18	25	..
Wed.	4	11	18	25	..		1	8	15	22	29		.	5	12	19	26	..
Thurs.	5	12	19	26	..		2	9	16	23	30		.	6	13	20	27	..
Fri.	6	13	20	27	..		3	10	17	24	31		.	7	14	21	28	..
Sat.	7	14	21	28	..		4	11	18	25	..		1	8	15	22	29	..

	OCTOBER.						NOVEMBER.						DECEMBER.					
Sun.	.	7	14	21	28		.	4	11	18	25		.	2	9	16	23	30
Mon.	1	8	15	22	29		.	5	12	19	26		.	3	10	17	24	31
Tues.	2	9	16	23	30		.	6	13	20	27		.	4	11	18	25	..
Wed.	3	10	17	24	31		.	7	14	21	28		.	5	12	19	26	..
Thurs.	4	11	18	25	..		1	8	15	22	29		.	6	13	20	27	..
Fri.	5	12	19	26	..		2	9	16	23	30		.	7	14	21	28	..
Sat.	6	13	20	27	..		3	10	17	24	..		1	8	15	22	29	..

THE PAST YEAR IN THE TRADE

Between the 1st September, 1931, and the end of August, 1932, much has been done in the trade both politically and commercially.

There have been two National Exhibitions in London during this period of twelve months.

The Fair Trading Agreement has been launched on its way. The Licence situation has altered very considerably, and finally the period has been one of considerable financial anxiety necessitating alterations to the trading policies of a number of firms.

Considering Association matters first, the Fair Trading Agreement, which in reality affects nearly every important manufacturer and wholesaler, was first suggested in September, 1931. Three months later it was a "fait accompli."

The Radio Manufacturers' Association during the period under review was honoured by the attendance of H.R.H. Prince George at its banquet in 1931, and during the year the Association has played a considerable part in the negotiations with regard to patents which have been carried out by the Radio Patents Pool and by the Radio Gramophone Patents Pool.

Importers' Licences Refused.

In September of last year the Radio Patents Pool announced its decision to refuse licences to importers, but importations of foreign radio material continued to enter the country entirely unhindered, although writs were issued against dealers.

The depreciation of the pound forced up foreign set prices in some instances to a considerable extent, and in October the international situation became such that many foreign firms commenced to form British companies, and from then until the end of the year many factories were built or acquired by foreign companies in order to manufacture sets in this country.

The eliminator patent came before the courts in December, when an appli cation was heard for extension over and above the normal life. The petition, however, was dismissed.

In January, 1932, the Radio Gramophone Patents Pool issued details of the R.G.I. licence, but the terms were such that they were not acceptable to the trade and, as a result, in June the revised R.G.I. licence was issued and generally accepted.

The tariff on radio sets which commenced in December contributed considerably to the setting up of manufacturing and assembling parts in this country.

Empire Conference.

Three other events during the year which were connected with the R.M.A. were the organisation of the second Trade Component Show, which took place this year in March ; the sending, in July, of a radio deputation to the Empire Conference at Ottawa, and finally the revising of the R.M.A. Constitution, which took place at the 1932 Exhibition at Olympia in August.

Financially the year has been notable for several outstanding financial successes of well-known radio companies, and 1932 may be labelled as the year in which radio established itself in the opinion of the City and justified the confidence which the public had shown in it.

In June, 1932, it was announced that standardisation of hire purchase agreements was being discussed by a number of leading manufacturers, and in July details of the H.P. standardisation plan were published.

A tendency to increase discounts to the trade also became obvious during July and August.

Both National Radio Exhibitions which come in the period under review, that is, the National Radio Exhibition in September, 1931, and the same Exhibition

YEAR IN THE TRADE

in August, 1932, were notable for the extension of the use to which demonstration arrangements at Olympia were put. From being mere demonstration boxes these arrangements now provide for demonstration theatres.

In October, 1931, the Federation of British Music Industries was dissolved.

The Wireless Retailers Association of Great Britain has continued to show very considerable progress under the twelve months under review; has established a number of new branches and gathered many new members.

Collective advertising amongst dealers has also become a recognised event, while the compiling of local retail registers in an endeavour to distinguish the *bona fide* trader from the dabbler has taken place in various parts of the country throughout the year.

One well-known manufacturer has formed a retail register which is now in full swing.

Death of a Pioneer.

One event which took place during the year and which has to be recorded with regret was the death, in October, of one of the early radio pioneers, Thomas Alva Edison.

Tentative efforts were made to push the radio-gramophone in the 1931-32 season, and this was followed by a general onslaught on this market during and just previous to the 1932 Exhibition.

The electric clock as an adjunct to, and an accessory of, the radio receiver made its appearance for the first time in this country during the past twelve months and is now fairly well established as a recognised radio accessory.

The interest in export has increased considerably during the year, and this interest is reflected by the fact that the R.M.A. has decided to issue regularly export information in the form of a loose-leaf publication.

Television from a trade point of view has made little or no progress during the year, although some improvement from the broadcasting end of television has been made.

Television.

One of the most comprehensive statements with regard to television as a public entertainment was made by the American R.M.A. in March, 1932. The Association gave its official opinion that television was not ready for home use.

Service has engaged the attention of all sections of the industry and several interesting retail service plans have been evolved.

Generally speaking, the past twelve months have shown steady but not startling progress on the technical side, and a tendency towards the betterment of trading conditions in general on the commercial side.

The holding of the Exhibition for 1932 a month earlier than usual will, it is hoped, do much to solve the vexed question of late deliveries, and this fact, together with increased and improved manufacturing facilities, will undoubtedly make 1932-33 an excellent radio year.

THE TREND OF DEVELOPMENT

A Twelve Months' Technical Review

During the last twelve months interest has chiefly been centred in the development of the Radiogram ; in the design of improved selective receivers utilising the superheterodyne principle or band-pass tuning ; and in the production of low-priced all-mains sets of the two- or three-valve type, both being designed primarily to meet the demand for a high-class musical response, the extra valve of course giving a wider choice of stations.

The Superhet Receiver.

The Superhet is admittedly one of the most satisfactory circuits now available for long-distance selective reception. The difficulty associated with double-tuning has been removed by ganging the local oscillator valve to the signal-input circuits, giving a perfectly satisfactory uni-control.

In many models a band-pass filter is inserted before the first valve (and sometimes in the intermediate-frequency stage) in order to cut-out background noise and second-channel interference. Another feature is tone correction on the low-frequency side.

Similarly the old possibility of bringing in two different stations at the same point on the tuning-dial has been removed by throwing such second-channel interference outside the tuning-range of the instrument, partly by raising the intermediate frequency and partly by sharp tuning on the input side.

In some instances two-valve " frequency-changers " are being used, whilst push-pull detection is another innovation particularly suitable for the superhet, since it eliminates all trace of high-frequency or unrectified energy from the post-detector circuits.

The widespread demand for short-wave reception is being met by the provision of an " adapter " or converter capable of tuning down below 60 metres.

Band-pass Amplifiers.

The " straight " circuit, fitted with band-pass tuning, offers a sound alternative to the superhet for long-distance reception, as it combines the merit of selectivity with a well-balanced musical response. The advantage of band-pass tuning is that the circuits are designed to pass not only the carrier but also the associated side-bands, thereby preserving the proper balance between high and low notes in the detector and L.F. stages.

At the same time, band-tuning gives a sharp cut-off outside the regulation 9 K.C. " gap " between different transmitting stations, and so ensures an adequate degree of selectivity.

The difficulty of combining band-pass tuning with a ganged control on two different wave-bands has now been satisfactorily solved, the modern receiver being designed to give a constant width of band over the whole tuning range.

In certain cases provision is made to control the band-width so as to give high quality when no interference is present, though when required the side-bands can be cut to the extent necessary to avoid severe interference. In this way maximum quality can be secured on certain stations, whilst on others it is possible to get the highest quality consistent with the congested state of the ether.

This improvement is applicable both to superhets and " straight " receivers. It is secured in the former case by varying the coupling between the tuned circuits through the medium of a small adjustable screen between the coupling-coils, and, in the case of a straight circuit, by adjusting the coupling condenser.

Tone-compensated Sets.

Another interesting type of circuit is that in which a highly tuned input is combined with automatic " tone compensation " on the low-frequency side. Here no attempt is made to pass the whole of the side-bands into the set. The razor-edged tuning of the H.F. circuits results in a severe " cutting " of the outer side-bands, which would in ordinary circumstances reduce the high-note response in the speaker.

The deficiency is, however, made good by inserting a " correcting " circuit usually of resistance and inductance across the L.F. amplifier which emphasises the high notes more than the low and so restores the proper musical balance.

Constant-coupling.

A noticeable feature in modern high-frequency amplification is the use of " mixed " capacity and inductive couplings designed to give uniform amplification at all points on the tuning dial. Attempts to solve this problem, which is inherent in all tuned circuits, were first made some years ago, but the more important improvements are of recent date.

In the ordinary type of receiver it is well known that although sensitivity may be quite good on the shorter wave-length it

TREND OF DEVELOPMENT

usually tends to fall off as the tuning condenser is opened out. The reason is that the reactance of the coupling-coils diminishes as the wave-length increases, and with it the transfer of energy from one valve to the next.

If the stages are capacity-coupled the opposite effect occurs. By a judicious combination of magnetic and capacity coupling, one effect is made to offset the other and a straight-line response—giving uniform amplification—is obtained throughout the whole tuning range.

Elimination of stray reaction by the use of more thorough screening, and the reduction of inter-electrode capacity-coupling due to improvements in the screen-grid valve, have both assisted the designer in his efforts to secure constant-coupling, particularly on the shorter wavelengths where the increasing energy-transfer between successive circuits is often a frequent cause of self-oscillation.

Automatic Volume Control.

Automatic volume control has long been recognised as a desirable addition to the modern receiver. In the first place it prevents fading on distant stations, and in the second place it simplifies the operation of the set.

The use of the variable-mu valve, in itself, goes some way towards solving the problem, since the amplification factor of the valve automatically falls off as signal strength increases, and vice versa.

A more effective method is to pass the output current from the detector valve, or from an auxiliary valve, through a resistance, the potential fall across which is then used to bias the grid of the input or other H.F. stage.

The current through the biasing resistance naturally varies with the strength of the received signal, so that as the latter increases the additional bias automatically reduces the sensitivity of the input valve. In the same way, for a weak signal the amplification factor is automatically increased, and so the output volume is held at constant strength.

"Visual" Tuning.

One of the minor problems introduced by automatic volume control arises from the fact that tuning to maximum signal strength is no longer possible, since the "control" effectively prevents any increase over a definite volume strength. The difficulty has been met by the "visual" tuning indicator, which may take the form of a milliammeter inserted in the detector output.

Visual tuning is in practice more accurate than ordinary tuning, as can be confirmed by adjusting an ordinary receiver by ear, and then retuning by means of a milliammeter in the detector circuit.

The latter setting will usually result in an increase of signal strength up to as much as 50 per cent. Inaccurate tuning is responsible for a certain amount of distortion produced by working the receiver on the slope of the resonance curve.

Valve Characteristics.

The action of the valve manufacturers in reducing the price of the 2-volt type, relatively to the 4- and 6-volt types, should tend to popularise the former, and eventually lead to its being adopted as the standard for battery-driven sets. Modern methods of electrode assembly designed to allow of closer spacing and the adoption of multi-point suspensions and mica bridges, top and bottom, give a particularly favourable and constant operating curve, free from microphonic noise.

Spring-cushioning of the filament is another recent improvement designed to remove the latter defect. The general use of metallised coatings, inside and outside the bulb, serves as an additional screen to prevent stray coupling, and also assists the action of the screening grid in reducing residual capacity effects inside the valve.

The new Micromesh valves are distinguished by a remarkably high mutual-conductance or "slope"—an advantage which has been secured by the provision of special cooling means for the grid.

Variable-Mu Valves.

The general adoption of the variable-mu valve is one of the most noticeable features of the past year—so much so that it threatens to supersede the ordinary screen-grid valve. The outstanding merit of this valve is that its characteristic curve falls away gradually as the grid bias is increased, thus allowing it to handle large input-voltages without giving rise either to distortion or to cross-modulation.

The new valve is particularly useful in imparting a certain degree of automatic volume control to any set in which it is fitted, and it does this without introducing any damping-effect likely to reduce selectivity, or, in fact, without affecting the tuning in any undesirable way.

Because the variable-mu valve eliminates cross-modulation the full signal input can be applied, and optimum aerial coupling used, even when near the local transmitter. This reduces valve "hiss," as compared with an ordinary screen-grid valve, because the latter will only take a smaller input, and greater amplification is accordingly required to get the same signal, with a corresponding tendency to more valve "noise" and greater distortion.

The new pentode valves are an invaluable asset to the battery-driven set, particularly portables, in their struggle to keep pace with the superior advantages of the all-mains receiver. For a given high-tension consumption the pentode will give an undistorted output several times greater than the ordinary power amplifier.

"Automatic" Tuning.

Newcomers to wireless who may be inclined to jib at the apparent difficulty of tuning-in this station or that—out of the large number available—will find the "automatic" set the simplest of all solutions.

In one model the ordinary tuning dial is replaced by a rotary switch having a certain limited number of positions, each bringing in a definite programme. This result is obtained by arranging a number of different input circuits, each pre-tuned to a selected station, the correct circuit being chosen by the movement of the control switch.

Another "automatic" tuner works on a plan using a number of press-buttons to operate a selector switch which serves to rotate the ordinary tuning condenser to the proper setting to bring in any selected station. Once the press-button selector has been fitted to the set, subsequent tuning becomes absolutely automatic.

Speakers.

The moving-coil instrument is again well to the front, especially the permanent-magnet type, which is designed in most cases to produce a heavier flux than before. Improved "floating" suspensions for the cones are responsible for a freer swing and a more full-toned response. Amongst the magnetic movements, the balanced-armature and "Inductor" speakers are still noticeably in evidence. The electro-static speaker is beginning to make its mark, and there are developments afoot which promise to bring this instrument into more effective competition with its older rivals.

It is interesting to note the appearance of sets provided with two separate speakers instead of one. By using one instrument to cover the upper audible range, and another the lower notes, a more satisfactory overall response is secured at very little more cost.

Dry-contact Rectifiers.

The increasing popularity of the dry-metal or copper-oxide type of rectifier is due no doubt to the saving effected on the mains transformer. Full-wave valve rectifiers necessitate two different voltage windings, while the metal rectifiers require only one. This allows fewer turns and avoids the necessity of special leading-out wires, whilst the use of a heavier gauge winding makes for ease in handling. The smoothing-circuit may be protected from heavy surge voltages, whilst the indirectly-heated valves of an all-mains set are warming-up, by the use of a thermo-static switch or a directly heated output valve.

In spite of mass production and falling prices, the demand for home-made sets still continues and is reflected in the obvious prosperity of the component market, as well as in the number and variety of kit sets still available. Amongst the latter one may note "conversion" kits for changing-over from batteries to the mains, for modernising old-fashioned circuits by equipping them with band-pass tuning, and even for building a radio-gram. Short-wave adaptors are another flourishing side-line.

"Gadgets."

Each year the number and variety of new radio gadgets are legion, whether fitted as accessories to existing sets or produced for separate sale. Those intended to facilitate tuning are specially in evidence, particularly a wide range of coil-units for band-pass coupling, coils with various intermediate tappings, astatically wound coils, and others specially designed for short-wave working. Dials are more conveniently arranged and are enlarged and illuminated, the names of the stations being marked either on a disc or strip, so that one has no longer to remember the condenser-setting in degrees.

Controls are now so simplified that one knob may serve for volume-control, for on-and-off switching, for wave-band switching and for changing over from wireless to gramophone reproduction.

Radiogram Sets.

The all-mains set, apart from eliminating the "battery problem," has the outstanding advantage of using adequate filament supply and constant H.T. mains-driven valves are, in general, superior both in amplification and power-handling capacity to the battery-driven type. For this reason they are particularly suitable for gramophone reproduction, where it is essential that the L.F. amplifiers should be operated well within their capacity so as to be free from any trace of distortion.

Most of the sets in this category are fitted with an electrically driven turntable, whilst some are provided with automatic record-changers and remote-control switches, the L.F. stages being arranged in push-pull, using either class A or class B amplification.

Television.

A certain speculative interest attaches to the new Baird Televisor, which produces a moving picture 4 inches wide and 9 inches high. The picture is thrown directly on a screen of this size and is not viewed through a lens, as in the older model.

The increased size of reproduction and also the improved "brilliance" of the picture is due in part to the use of a "mirror drum" in place of the original perforated disc, and also in part to the introduction of a special type of Kerr cell.

THE B.B.C. YEAR

THE BRITISH BROADCASTING CORPORATION.

The chief event of the year has been the completion of the move of Headquarters from Savoy Hill to its new building in Portland Place, London, W.1. The settling-in may be said to have been completed by July 7, 1932, on which date Their Majesties the King and Queen visited Broadcasting House.

Another milestone has been passed in the carrying out of the scheme for twin-wave high-power stations, the Scottish Station at Westerglen, near Falkirk, having been put into operation in May, 1932. The usual process of "sliding-in" was employed, the change-over to the Regional transmitter being consolidated before public testing was begun on the National wavelength.

West Regional.

The Aberdeen and Newcastle transmitters were converted to the exclusive wavelengths of 214.3 metres and 211.3 metres respectively, in order to give them greater facilities for the type of programme which they can radiate.

West Regional has been under construction during the past year and is likely to be completed by the end of March, 1933.

During the year an important decision was made in regard to the long-wave transmitter, 5XX, at Daventry, which also involves the medium-wave transmitter, 5GB. As part of a scheme of modernisation of 5XX, it was decided that both transmitters should be transferred to a site in the neighbourhood of Droitwich and rebuilt for better quality reproduction and with an increase of power.

This does not mean the abandonment of the Daventry site, which is to be devoted to the new Empire short-wave station.

The B.B.C., in co-operation with Messrs. Marconi's Wireless Telegraph Company, Limited, will shortly start experiments on the use of ultra-short wavelengths of the order of 7 metres. An ultra-short wave transmitter has been installed on the roof of Broadcasting House, London, and reception tests will shortly commence.

An important programme development of the year was the extension of the hours of Sunday broadcasting. Transmissions now begin at 12.30 p.m. and are carried on continuously until the usual break after 6 p.m.

Another outstanding development of the year has been the B.B.C.'s decision to co-operate more closely with the Baird Television Company in broadcasting television, the B.B.C. itself taking over the conduct both of the programmes and of the transmissions.

Licence Figures.

Since October, 1931, the monthly total licence figures have shown a progressive increase. The figures are :—

Month.	Paid.	Free.	Total.
1931			
September ..	3,904,361	26,216	3,930,577
October ..	4,074,408	27,284	4,101,692
November ..	4,185,023	28,212	4,213,235
December ..	4,301,754	28,981	4,330,735
1932			
January ..	4,444,820	29,972	4,474,792
February ..	4,526,073	30,667	4,556,740
March ..	4,592,640	31,513	4,624,153
April ..	4,654,702	32,089	4,686,791
May ..	4,699,367	32,676	4,732,043
June ..	4,731,164	33,024	4,764,188
July ..	4,760,101	33,281	4,793,382
August ..	4,787,939	33,497	4,821,436

B.B.C. ADDRESSES.

Below is given a list of addresses of the various B.B.C. offices :—

Headquarters.

Head Office and National and London Regional Offices	Broadcasting House, London, W.1. Telephone : Welbeck 4468.

Regional Centres.

Belfast	31, Linenhall Street.
Birmingham (Midland Region)	282, Broad Street.
Cardiff (West Region) ..	39, Park Place.
Edinburgh (Scottish Region)	5, Queen Street.
Manchester (North Region) ..	Broadcasting House, Piccadilly.

Relay Stations.

Aberdeen ..	15, Belmont Street.
Bournemouth ..	72, Holdenhurst Road.
Glasgow ..	21, Blythswood Square.
Leeds	Broadcasting House, Albrecht Buildings, Woodhouse Lane.
Newcastle ..	54, New Bridge Street.
Plymouth ..	Athenæum Chambers, Athenæum Arcade.
Swansea ..	Oxford Buildings.

LESLIE McMICHAEL, A.M.I.E.E.

Chairman of the Radio Manufacturers' Association, 1932.
Managing Director of L. McMichael, Ltd.

THE RADIO MANUFACTURERS' ASSOCIATION

The R.M.A. Coat of Arms.

HERALDIC INTERPRETATION.

"Azure a bend indented or, cottised indented argent, between in chief a thunderbolt of the second and in base a terrestrial globe proper all within a bordure ermines, charged with eight stars of eight points of the third. And for the Crest On a wreath Argent and Azure A bezant charged with a pair of wings conjoined in base and encircled by a wreath of laurel fructed proper."

Astor House, Aldwych, W.C.2.
Telephone: Holborn 3346 & 3347.

OFFICERS:

President:
Lt.-Col. J. T. C. Moore-Brabazon, M.C., M.P.

Vice-Presidents:
Capt. J. W. Barber, C.B.E., R. Milward Ellis, Capt. Ian Fraser, C.B.E., M.P., Sir Hugo Hirst, Bt., H.E. Marchese Marconi, G.C.V.O., J. T. Mould, S. R. Mullard, H. M. Pease.

Chairman:
Leslie McMichael.

Vice-Chairman:
W. W. Burnham.

Trustees:
J. Joseph, Leslie McMichael, J. T. Mould.

Executive Council:
Belling & Lee, Ltd., Brownie Wireless Co. of Great Britain, Ltd., Chloride Electrical Storage Co., Ltd., Climax Radio Electric, Ltd. E. K. Cole, Ltd., Edison Swan Electric Co., Ltd., Ferranti, Ltd., General Electric Co., Ltd., Igranic Electric Co., Ltd., Kolster-Brandes, Ltd., L. McMichael, Ltd., Marconiphone Co., Ltd., Mullard Radio Valve Co., Ltd., Pye Radio, Ltd., Radio Instruments, Ltd., Standard Telephones & Cables, Ltd., Ultra Electric, Ltd., Varley (Oliver Pell Control, Ltd.), Wingrove & Rogers, Ltd.

Secretary:
D. Grant Strachan.

The membership of the R.M.A. at the beginning of September, 1932, was 147.

Following the success of the first Trade Exhibition of Components in 1931, a second Trade show was organised at the Central Hall, Westminster, from March 16 to 18, 1932. This Show was representative of the component manufacturers, sixty-one firms taking stands. The Exhibition aroused considerably more interest amongst manufacturers of complete radio instruments than the 1931 show had done and the attendance was greater by more than 60 per cent.

A tenancy of the Central Hall has been taken for the period February 6 to 11, 1933, and arrangements are being made to hold a Components Show probably from February 8 to 10 next.

The National Radio Exhibition, organised by the R.M.A., was this year, for the first time, held in the Grand Hall, Olympia, the date of the Show being August 19 to 27, a month earlier than heretofore. The stand area was greater at this Show than at any of its predecessors, as was also the number of exhibitors. Two hundred and forty-one firms occupied 93,522 square feet of space. In 1931—the largest at that time—210 exhibitors occupied 86,122 square feet. The paid attendance at the 1932 Exhibition was 180,776.

Manchester Show.

The R.M.A. again co-operated with Provincial Exhibitions Ltd., in the organisation of the Northern National Radio Exhibition at Manchester, which surpassed in size any radio show held previously in that city.

The Association has been active throughout the year in the development of export trade, and with that end in view has issued to members a comprehensive survey of the radio export markets throughout the world. A preliminary pamphlet dealing with this matter was prepared towards the end of 1931, but the survey issued in July, 1932,

was much wider in its scope and gives much useful information concerning those overseas markets likely to be of interest to British manufacturers.

In conjunction with the W.R.A., the R.M.A. was instrumental in securing a modification of the law concerning the covering by a wireless licence of sets sent out for demonstration purposes to the homes of prospective customers. As a result of negotiations with the G.P.O. arrangements were made whereby a trader may supply a wireless set "on approval" for a period not exceeding 14 days without covering it by a wireless licence, provided he keeps a record—which must be open to inspection, when required by an authorised officer of the Post Office—showing the name and address of the prospective purchaser, with the date of supply and of recovery or sale.

In the early part of the year the issue of the Radio Gramophone Licence by the Licensing Pool caused the R.M.A. to approach the licensing authorities with a view to securing certain modifications in the licence in question. As a result of the negotiations between the two parties a new radio-gramophone licence was prepared (the R.G.2 licence), on terms more favourable to radio manufacturers than those contained in the licence originally offered.

On the technical side, as a result of representations made to the B.V.A. by the Association, it has been arranged that mains valves manufactured by the members of the B.V.A. will be fitted with resilient instead of with solid pins. This step has been taken with a view to overcoming the troubles arising from faulty contact between the valve pin and its socket—and it is anticipated that the use of a resilient pin as well as a resilient socket will go far towards solving this difficulty.

The Association has had under its consideration during the year the preparation of applications in respect to imported radio apparatus for (*a*) an increased tariff and (*b*) a marking order. At the time of going to press such applications had not been lodged.

Two representatives were delegated to attend the Imperial Conference held at Ottawa, such representatives being charged to watch the interests of British radio manufacturers and particularly to secure an increase in the "Empire Content" figure of 25 per cent., which applied to radio in common with other goods imported into this country from Canada.

An extraordinary general meeting of members of the association was held at Olympia on August 26, 1932, for the purpose of modifying the Constitution, Regulations and Bye-Laws of the Association in such a way as to define more particularly the application of the regulation governing the foreign content percentage in apparatus marketed by members and also to give the Council powers to determine, from time to time, the qualifications which must be possessed by applicants before they are elected to membership.

RADIO EXHIBITIONS.

PROMOTED BY THE R.M.A. OR ITS PREDECESSORS.

Year	Promoter.	Venue.	Date.	No. of days.	No. of Exhibitors.	Stand area sq. ft.	Dem. Rm. area sq. ft.	Paid attendance.
1924	N.A.R.M.	Royal Albert Hall	Sept. 27 Oct. 8	10	56	11,700	—	46,000
1925	N.A.R.M. A.T.	Ditto	Sept. 12 Sept. 23	10	70	15,000	—	54,500
1926	N.A.R.M. A.T. & S. R.M.	Olympia New Hall	Sept. 4 Sept. 18	13	182	34,053	—	116,570
1927	R.M.A.	Ditto	Sept. 24 Oct. 1	7	184	34,642	—	99,315
1928	R.M.A.	Ditto	Sept. 22 Sept. 29	7	184	40,445	—	123,593
1929	R.M.A.	Ditto	Sept. 23 Oct. 3	10	185	42,177	7,006	140,627
1930	R.M.A.	Ditto and 1st floor, Empire Hall	Sept. 19 Sept. 27	8	186	54,464	8,769	161,128
1931	R.M.A.	Olympia, Nat. and Empire Halls	Sept. 18 Sept. 26	8	210	70,993	15,129	198,070
1932	R.M.A.	Olympia, Grand and Nat. Halls	Aug. 19 Aug. 27	8	241	74,154	19,368	180,750

THE BRITISH RADIO VALVE MANUFACTURERS' ASSOCIATION

59, Russell Square, London, W.C.1.

Museum 1206—Bradval, Westcent, London.

Members—

A. C. Cossor, Ltd.
Edison Swan Electric Co., Ltd.
Ferranti Ltd.
General Electric Co., Ltd.
Marconiphone Co., Ltd.
Mullard Wireless Service Co., Ltd.
Philips Lamps, Ltd.
Six-Sixty Radio Co., Ltd.

Associate Members—

Cryselco, Ltd.
Siemens Electric Lamps and Supplies, Ltd.

Chairman :—W. W. Burnham.

Secretary :—H. Howitt.

Objects.—To promote, encourage, foster, develop and protect the interests of the public, the trade and the manufacturers of British-made thermionic valves and to impose such conditions on the conduct of the valve trade as in the opinion of the Association may be conducive to that object; to enter into agreements with and/or procure or promote agreements between members and wholesale and retail dealers in valves relating to the manufacture, supply and sale thereof, and particularly for the maintenance and protection of manufacturers' retail list prices and discounts and of the rules and bye-laws of the Association for the time being in force.

General Regulations.—These cover the strict maintenance of established list prices, and state that agreement holders may have no dealings of any kind with any make of valves unless authorised in writing by the Association. *This regulation applies to valves whether sold in sets or separately.*

These also cover allowances; consignment stocks; contracts; invoices, etc. A "Stop List" is operated by the Association.

DEFINITIONS OF PURCHASERS AND TERMS.

Users.—Any private or trading individual, firm or company purchasing valves but not reselling them as bona fide wireless dealers. The terms to users are list prices, nett with no cash discount. Wireless societies, staff associations and clubs are not entitled to any discounts.

Retailers—Any individual, firm or company having business premises, trading on their own account as dealers in wireless apparatus and/or valves who carry a reasonable stock appertaining to such industries, and who purchase such goods on their own order forms for resale to users. The terms to retailers are 25 per cent. off English list prices or 22½ per cent. off Irish Free State list prices.

Terms to Retail Agreement-holders.—A special bonus of 7½ per cent. on the nett invoice value of valves purchased is paid direct by the Association in cash at the end of each six months to retail agreement-holders subject to observance of the agreement.

Wholesale Distribution.—Certain individuals, firms or companies approved and specified by the Association, and whose business includes the distribution of valves and/or wireless apparatus to the trade and who carry and maintain on their own account for purposes of distribution a specified minimum stock of valves, who do not sell to the user, and who enter into specific obligations with the Association. The Association has a limited list of authorised Wholesale Distributors.

Set Makers.—Manufacturers of receiving sets, approved and specified by the Association, who enter into specific obligations with the Association.

Limited Licence.—All valves made by the Members are sold subject to a limited licence under the patents owned by the respective manufacturers.

E. W. HOUGHTON

President of the Radio Wholesalers' Federation, 1932/33.
Managing Director of Ensign Ltd. (Houghtons, the Wholesalers).

RADIO WHOLESALERS' FEDERATION

Bloomsbury Mansions, 26, Hart Street, London, W.C.1.
Holborn 2488.

The Officers and Council of the Federation for 1932-33 are as follows :—

President : E. W. Houghton (Ensign Ltd.)
Vice-President : B. R. Banks (Brown Bros. Ltd.)
Hon. Treasurer : A. G. Beaver (Sun Electrical Co., Ltd.)
Secretary : J. Macfarlane.

Council :

T. Beadle ..	.. T. Beadle & Co., Ltd.
F. Brewerton	.. Ecco Radio Ltd.
E. H. Burris	.. Fred Burris & Sons Ltd.
E. J. Collier	.. East London Rubber Company.
P. L. Davies	.. Downes & Davies.
A. J. Dew ..	.. A. J. Dew & Co., Ltd.
A. F. Hitchcock	.. Flinders (Wholesale) Ltd.
C. H. G. Hobday	.. Hobday Brothers, Ltd.
W. A. Hunt	.. L. E. S. Distributors, Ltd.
E. U. Redway	.. Southern Factors Ltd.
J. W. Riddiough	.. Frank Riddiough & Son.
J. Robertson	.. James Robertson.
A. C. Robinson	.. Robinson & Hands Electric Co., Ltd.
R. Gordon Willis	.. Dulcetto-Polyphon, Ltd.

North Midland Section—
Chairman : J. Sanderson (Arthur Jones & Company).
Vice-Chairman : E. M. Hillman (Hillman Brothers).
Hon. Secretary & Treasurer : J. Hirst (Hirst, Ibbetson & Taylor Ltd.), 9, Blackfriar's Street, Manchester.

South Western Section—
Chairman : E. H. Burris (Fred Burris & Sons, Ltd.).
Vice-Chairman : H. R. Hurst (Southern Factors, Ltd.).
Hon. Secretary & Treasurer : R. Dinham (Fred Burris & Sons, Ltd.), 7-16, Redcliffe Street, Bristol.

Midlands Section—
Chairman : A. C. Robinson (Robinson & Hands Electric Co., Ltd.)
Vice-Chairman : J. Priestly (Priestly & Ford).
Hon. Secretary & Treasurer : H. S. Poole (Gothic Electrical Supplies, Ltd.), Athlone, Robinhood Croft, Hall Green, Birmingham.

Scottish Section—
Chairman : J. Robertson (James Robertson
Vice-Chairman : R. Adam (Ross & Adam.)
Hon. Secretary & Treasurer : C. G. Tideman (Charles G. Tideman), 111, Renfrew Street, Glasgow.

Founded in 1928, the Radio Wholesalers' Federation was instituted to establish and preserve in the Radio Industry the best traditions of Wholesale trading. Primarily its objects are to secure that those engaged in this department of the business shall be "Wholesale only" and so not in conflict with the interests of their customers the Radio Retailers ; the recognition by Manufacturers as Wholesalers solely of those firms or companies equipped to provide that service to Radio Retailers which is the *raison d'être* of their usefulness, and the prevention of breaches in Manufacturers' Terms and Conditions of Sale as applied to the Wholesale trade.

Operations.

The operations of the Federation are necessarily of a private character, but it may be said that in the three years of its existence its work has resulted in the mitigation of many trade abuses, the engendering of a sound spirit of trust and goodwill among wholesalers themselves and many instances of helpfulness to manufacturers in the formulation of their policies and in the practical operation of these.

Questions such as members of the public dabbling in Retail selling have been substantially met by an intercommunication amongst members of the names of such endeavouring improperly to obtain trade terms on radio goods.

The Federation has steadily maintained cordial relations with other trade organisations, its policy being to co-operate with each or any Association if thereby its objects may be assisted and furthered.

The method of the Federation is to proceed by conference, and many valuable meetings of this character have been held which have produced both a practical outcome and an increased atmosphere of understanding on various aspects of the Trade.

Among the publications of the Federation is a List of Members alphabetically arranged under towns, which has proved of much value to manufacturers in arranging their schemes of wholesale distribution.

The members, with their branches, constitute a chain of wholesale establishments throughout the country numbering 232.

E. BRINSMEAD GOUGH

President of the Gramophone and Radio Dealers' Association.
Proprietor of E. Brinsmead Gough, music dealers.

GRAMOPHONE AND RADIO DEALERS' ASSOCIATION

17, Wigmore Street, London, W.1.—Langham 1423.

Executive Committee :—Mr. E. Brinsmead Gough (London), President ; Messrs. J. H. Bainbridge (Oldham) ; A. E. Ball (Bath) ; H. E. Dale (Torquay) ; W. J. East (Brighton); H. R. Felton (Harrow) ; G. C. Forty (Birmingham) ; J. F. Hardy (Stockport) ; A. E. Hider (London) ; F. J. Hooke (Guildford) ; C. H. Hutchence (Liverpool) ; E. J. Marshall (London) ; S. E. Moon (Plymouth) ; C. J. Price (Birmingham) ; G. H. Russell (London); E. E. Squire (London) ; F. T. Stokes (London) ; J. Trapp (London) and A. W. Whelpdale (London).

Secretary : Frank Ayliffe.

Divisional Secretaries :—

North Western—S. S. Jack, 20, St. Ann's Square, Manchester.

Midlands—G. Squiers, 115, Colmore Row, Birmingham.

The Gramophone Dealers' Association was founded in 1920 and incorporated under the Companies Acts in 1930. The name was changed in 1931 to The Gramophone and Radio Dealers' Association. Its presidents have included some of the best-known men in the Trade, such as Mr. Ernest Marshall, of London ; Mr. S. E. Moon, of Plymouth ; Mr. John Trapp, of Crouch End ; Mr. A. E. Ball, of Bath ; Mr. A. E. Hider, of London ; Mr. F. J. Hooke, of Guildford ; and Mr. E. Brinsmead Gough, of Streatham.

A scheme of registration for authorised dealers has been introduced into the North Western Division.

Coupon Schemes.

Some measure of success has attended the Association's action against coupon "gift" schemes. Some tobacco companies have gone to the length of publishing monthly lists of records to be obtained for a prescribed number of coupons. As a result of the action taken it has been ascertained that the manufacturers of the records were bound by contract. Assurances have been obtained that these contracts, on expiry, will not be renewed, and the Association is also giving all possible support to the Bill now before Parliament, the object of which is to render coupon trading illegal.

As the outcome of discussions with the Gramophone Company, Ltd., as to the reduction they made in the prices of records, the Company have agreed in future to confer with delegates from the Association before bringing similar reductions into effect.

In 1924 the Association had negotiated an agreement relative to the terms upon which gramophones should be supplied to schools by manufacturers. One of these gave notice of withdrawal from the agreement. The Association called a conference with manufacturers, who took the opportunity of re-asserting their loyalty to the dealers and giving an assurance that they would place all possible pressure upon Education Authorities to make their purchases of gramophone goods through the dealers ; failing this, that they would do their utmost for the observance of the standard rate of discount.

The Association is relentless in its opposition to the supply of proprietary gramophone goods to co-operative societies, seeing that their method of business inevitably constitutes them price-cutters. Successful action in this direction is on record this year.

Surplus Gramophone Records.

The present "covering order" conditions governing the return of unsaleable and surplus records are in dire need of revision. The Association is pressing this question upon the manufacturers with a view to an early conference for the settlement of conditions more equitable to the dealer.

Hire purchase terms for gramophone and radio goods have also received attention ; twelve months is regarded as the limit over which such agreements should extend and beyond that, purchase by deferred payment would be prudent.

The servicing of radio sets and radio gramophones is a matter of increasing importance, and the Association appointed a Sub-Committee to consider and report upon it. A pamphlet has been prepared which dealers can distribute amongst their customers pointing out the necessity of regular overhaul of these instruments. Supplies of these pamphlets are available at an economic price and provision is made for over-printing with the dealer's name and address and advertising matter, if desired.

Hire purchase finance schemes have been scrutinised to determine whether they could be recommended to members. The only advice possible was to enjoin cautious study of any such so as to ascertain (1) the rate per cent. per annum charged, and (2) the risk which the dealer carries should the hirer default.

WIRELESS RETAILERS' ASSOCIATION

OF GREAT BRITAIN AND NORTHERN IRELAND.

1, MITRE COURT, FLEET STREET, LONDON, E.C.4.
Tel.: Central 6838.

President :
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Mr. J. CLIFFORD TODD.
Mr. H. F. TRUMAN.
Mr. B. TURNER.
Mr. E. WILLARD.
Mr. S. WELLER.
Mr. C. W. WILLMOTT.
Mr. F. WINTER.
Mr. C. F. YATES.

Delegates to the National Council have yet to be appointed by the branches at Wolverhampton and West Bromwich.

Aims, Objects and Policy.

The Association was formed in 1923 at the special request of many retailers who felt that a live oganisation was a necessity to their interests and the future good of the industry.

Since that date rapid strides have been made with the work of organisation throughout the country, and the membership of 2,300 is increasing daily at a rapid pace.

The chief aim of the Association is to secure "Clean Trading" in industry, and towards this end a strong sound and comprehensive policy is being pursued.

The subscription is one guinea per annum.

The Association has now fifty-six branches, and others are in the process of formation.

ACCRINGTON.
Mr. R. A. Haworth, Steinway House, Whalley Road.
BARNSLEY.
Mr. F. Howard, 28, Day Street.
BATH.
Mr. S. Miell, 17, Argyle Street.
BIRMINGHAM.
Mr. A. G. Wright, 393, Dudley Road, Rotten Park.
BLACKPOOL.
Mr. F. X. Smith, 191A, Central Drive.
BOLTON.
Mr. R. W. Proffit, 49, Knowlesley Street.
BRIGHTON.
Mr. A. J. S. Russell, 27, Ditchling Road.
BRISTOL.
Mr. W. Sutton, Barr Street.
MID. BUCKS.
Capt. Rice, High Street, Amersham.
N. BUCKS.
Mr. J. Bold, 30, Aylesbury Street, Bletchley.
S. BUCKS.
Mr. H. Ransley, 54, Frogmore, High Wycombe.
BURNLEY.
Mr. W. Smith, 97, Coalclough Lane.
BUXTON.
Mr. F. E. Watson, 16, Terrace Road.
CAMBRIDGE.
Mr. J. Harvey, John Harvey & Sons, Aylestone Road.
CANTERBURY.
Mr. A. Johnson, 11, Butchery Lane.
CARDIFF.
Mr. A. E. Price, 112, Whitchurch Road.
CHELTENHAM.
Mr. R. W. Fletcher, 4, Bayshill Terrace.
COLCHESTER.
Mr. S. W. Hull, 109, High Street.
DUNDEE.
Mr. J. Clifford Todd, 87, Commercial Street.
EASTBOURNE.
Mr. E. W. Willard, 48, Grove Road.
EXETER.
Mr. W. D. K. Phillips, 143, Sidwell Street.
GLOUCESTER.
Mr. Mitchell, Eastgate Street.
HARROW.
Mr. C. F. Yates, 136, High Street, Wealdstone.
IPSWICH.
Mr. S. G. Keeble, 66, Norwich Road.
LIVERPOOL.
Mr. F. J. Melser, 8, Griffen Avenue, Moreton.
LUTON.
Mr. R. J. Stearn, 7, Manchester Street.
MANCHESTER.
Mr. H. Nightingale, 436, Wilbraham Road, Chorlton-cum-Hardy.
MID. NORTHANTS.
Mr. L. Jessop, 2A, Midland Road, Wellingborough.
N. LONDON.
Mr. S. Weller, 508, Hornsey Road, Hornsey.
NORWICH.
Mr. C. C. Fisher. 18, Bridewell Alley.
NEWPORT (MON.).
Mr. F. Winter, 3, Dock Street.
NOTTINGHAM.
Mr. L. Hall, 99, Derby Road.
OXFORD.
Mr. J. M. Taphouse, 3, Magdalen Street.
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Mr. G. W. Palmer, Queensborough, Hartley Road.
PLYMOUTH.
Mr. R. W. F. Gibson, 94, Tavistock Road.
PRESTON.
Mr. R. E. Danson, 38, Fishergate Hill.

Officials of the Association: (1) Mr. F. S. HORSEY, Vice-President; (2) Mr. A. E. BETAMBEAU, Vice-President; (3) Mr. H. A. J. SHEARMAN DYER, Chairman; (4) Capt. H. A. BAIN, General Secretary; and (5) Mr. F. L. WOODBRIDGE, Vice-Chairman.

READING.
Mr. M. Edwards, 8, Gosbrook Road, Caversham.

ROCHDALE.
Mr. J. Sugden, 2, Water Street.

SCARBOROUGH.
Mr. H. Moore, 4/6, Nelson Street.

SOUTH LONDON.
Mr. E. Mayhew, 60, Sydenham Road, S.E.26.

SOUTHPORT.
Mr. J. D. Gibson, 31, Liverpool Road, Birkdale.

SOUTH WALES.
Mr. H. T. Morgan, 218, Oxford Street, Swansea.

SWINDON.
Mr. W. J. Moran, 153, Victoria Road.

TAUNTON.
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TORBAY.
Mr. R. Batten, 174, Union Street, Torquay.

WALSALL.
Mr. E. G. Lenton, 16, Bradford Street.

WALLASEY.
Mr. F. S. Salisbury, 71, King Street.

WEST BROMWICH.
Mr. E. Mills, Messrs. Leeks, W. Bromwich.

WEST HERTS.
Mr. G. Harry Gray, 57, Queen's Road.

WEST MIDDLESEX.
Mr. A. A. Gurney, 2, Station Parade, Greenford.

WESTON-SUPER-MARE.
Mr. Kitchen, 2, Magdala Buildings.

WOLVERHAMPTON.
Mr. G. Butler, Cleveland Street.

SCOTTISH RADIO RETAILERS' ASSOCIATION.
Mr. W. Hood Stewart, 156, St. Vincent Street, Glasgow.

ULSTER RADIO TRADERS' ASSOCIATION.
Mr. Ralph S. Neilson, 43, Chichester Street, Belfast.

INSTITUTE OF WIRELESS TECHNOLOGY

Founded 1925. *Incorporated* 1932.

72, Oxford Street, London, W.1.

Telephone :—Museum 0582.

OFFICERS AND COUNCIL, 1932-33.

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W. E. Miller, B.A. (Cantab.).
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Harry A. Woodyer.

A résumé of the Institute's activities over the last twelve months shows that remarkable progress has been and is being made. In October, 1931, the first number of the "Proceedings" was published, the same month saw the inauguration of the Yorkshire Section under the Chairmanship of Mr. George W. Bagshaw and Hon. Secretaryship of Mr. Richard H. Morgans.

The Section has held regular meetings at which lectures and papers have been given by a number of well known Engineers. A particularly comprehensive syllabus has been prepared for the 1932-33 Session, ten meetings have been arranged at which lectures will be given.

A number of additions have been made to the Institute Panel of Official Representatives, both at home and Overseas and there are 23 representatives in various parts of the country and 13 overseas.

Dr. F. T. Fawcett.

The Institute meetings in London were recommenced and Dr. Francis Thomas Fawcett was elected First President of the Institute. During December, 1931, and the following January the Memorandum and Articles of Association were completely revised and the Regulations respecting admission again strengthened. A Special Brochure giving in detail the advantages of membership was published.

A further edition of the Examination Syllabus in a new and improved form has been issued. The 1932 examinations were held at the Polytechnic, Regent Street.

Mention must also be made of the Employment Register which was opened in October, 1931, and also the Institute Benevolent Fund, inaugurated in July, 1932. The most important event in the history of the Institute is the fact that in August, 1932, it was Incorporated. This means that membership automatically increases in value, as the Institute is now the only Incorporated British Institution of a professional nature which is devoted entirely to the interests of wireless engineers. Further, it has a particular significance to those whose main interests are concentrated on the technical aspects of a wireless retail establishment.

Sections of the Syllabus are devoted entirely to the technical requirements of owners of wireless retail establishments, service managers and service engineers. 75 per cent. of the candidates taking the 1932 examination were either service managers or service engineers.

A Special Sub-Committee has been formed to deal with applications from wireless retail establishments. The members of this Sub-Committee are all men who are in constant touch with the retailer and his special needs as it is realised that the technical aspects of wireless retailing are becoming increasingly important.

Dr. Fawcett, the President, is a brilliant Physicist who has done much to forward the objects of the Institute.

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SONOCHORDE REPRODUCERS LTD.

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'Phone : Maida Vale 6066

WHO'S WHO IN RADIO

ALLEN, Charles Gilbert.—Sales Manager, L. McMichael, Ltd., Danes Inn House, 265, Strand, London, W.C.2. A.M.I.R.E. Joined Callenders Cable Co., Ltd., 1914; Marconi International Marine Communication Co., Ltd., 1917; one of first employees of McMichael, Ltd., 1923, traveller 1924, London sales manager 1927. Born August 17th, 1900. Recreations: motoring, tennis. Private address: Home Lea, Nightingale Lane, Bromley, Kent.

ALLIGHAN, Garry.—Journalist, 310-312, Regent Street, London, W.1. Official publicist to the Radio Manufacturers' Association, since 1929; Press manager of Radio Exhibition, 1929–30–31–32. Born 1895. Recreation: motoring. Private address: 4, Dewhurst House, Upper Rupert Street, London, W.1.

ANGIER, Ralph Birt.—132, Bury Park Road, Luton, Beds. Chairman, W.R.A., Luton District. A.M.I.R.E. Agricultural engineering, 1899; electrical engineering (Cromptons), 1902; shipbuilding (Thornycrofts), 1914; commercial motor engineering, 1928. Born March 31st, 1877. Recreations: bowls, motoring. Private address: 39, Claremont Road, Luton, Beds.

ARBIB, Richard.—Manager of Press Department, The Gramophone Co., Ltd., 363–7, Oxford Street, London, W.1. After sales experience in various export firms, joined The Gramophone Co., Ltd., in 1928, Electrical Reproducer Dept.; after conducting H.M.V.'s publicity for Maurice Chevalier's English visit in 1930, took up present position in 1932. Recreations: motoring, swimming. Private address: 99, Brondesbury Road, London, N.W.6.

ASHBRIDGE, Noel.—Chief Engineer, B.B.C., Broadcasting House, London, W.1. B.Sc., A.M.I.C.E.

AUCKLAND, George Frederick.—Manager, Radio Division, Decca Gramophone Co., Ltd., Warner-Brunswick, Ltd., 1-3, Brixton Road, London, S.W.9; Sterling Telephone Co., Ltd., 1912; G.H.Q. Wireless, B.E.F., 1915; founded Auckland's Wireless, Ltd., 1919. Works Manager, "Rollo" Portable, 1927; Lissen, Ltd., 1930. Joined Decca, 1931. Was on original Commission for the formation of central B.B.C. Born May 16th, 1897. Recreations: radio development, old call signs 2PA, 2XB, 5BX, motoring. Private address: Shakespeare Lodge, Canonbury Grove, London, N.1.

BACHMAN, Robert Abraham.—Managing Director, Britannia Batteries, Ltd., 233, Shaftesbury Avenue, London, W.C.2. Gold medalist, World's Fair, San Francisco, for designing automatic machinery. In charge of tool room, Bethlehem Steel Co., U.S.A., for 5 years. First Vice-president and General Manager, Thomas A. Edison Works and Laboratories, 1900-1918. Since been in charge of 14 factories. Born 1876. Recreations: research and organisation, has taken out 59 patents in connection with hobby. Private address: Oldcrest, South Street, Redditch.

BAGGS, John.—Radio Sales Manager's Chief Assistant, Ferranti, Ltd., Hollinwood, Lancs.; Metropolitan-Vickers Electrical Co., Ltd., 1914-21, serving apprenticeship; Ferranti, Ltd. Meter Sales Dept., 1923; since then from commencement attached to Radio and Clock Sales Dept. Born November 20th, 1898. Recreations: literature, boating, fishing. Private address: 67, Northfield Road, New Moston, Manchester.

BAIN, J.P. Herbert Alexander.—General Secretary, W.R.A., 1, Mitre Court, Fleet Street, London, E.C.4. Ministry of Labour, 1919; The Federation of British Music Industries, 1925-30; Secretary The Pianoforte Manufacturers Association, Ltd. 1926-1931; Secretary The Music Trades Benevolent Society, 1930-31; Secretary The Music Trades School Advisory Committee, 1929–31. Recreation: golf, music. Private address: Deepdene, Snaresbrook, London, E.11.

BAIRD, John Logie.—Managing Director, Baird Television, Ltd., 133, Long Acre, London, W.C.2. Born August, 1888. Private address: 84, Lawn Road, Belsize Park, London, N.W.

BAKER, Arthur.—Proprietor, Bakers Selhurst Radio, 42, Cherry Orchard Road, East Croydon. Made the first electromagnet moving coil speaker, with floating

WHO'S WHO IN RADIO

cone, January, 1925; manufactured the first cross type permanent magnet speaker with floating cone, March 1926. Born January 25th, 1895. Private address: 89, Selhurst Road, South Norwood, London, S.E.25.

BAKER, Harold.—Wireless Correspondent and Broadcast Critic. The "Daily Mirror," Geraldine House, Fetter Lane, London, E.C.4. From 1918–9. O.C. Exhibitions; Photographic Section of Ministry of Information, and Imperial War Museum. 1926–7, Manager of Publicity and Trade Section of the Wireless Association of Great Britain. Joined "Daily Mirror" 1927. Born December 18th, 1889. Recreations: motoring, golf, photography.

BAKER, Percy William.—Director, Climax Radio Electric, Ltd., Haverstock Works, Parkhill Road, Hampstead, London, N.W.3. Member of Council R.M.A. Was with Cambridge Instrument Co. 1908-14; Charge of Testing Dept., R. W. Paul, until end of War. Proprietor of Scientific Electrical Co. prior to amalgamating with Climax. Holds many international electrical patents. Born October, 1891. Recreations: gardening, fishing, badminton, swimming, walking. Private address: 53, Forty Lane, Wembley Park, Middlesex.

BAKER-BEALL, Alfred.—Managing Director The Lithanode Co., Ltd., 190, Queen's Road, Battersea, London, S.W.8; 30 years' connection with mechanical and electrical engineering, with the manufacture of accumulators and primary batteries. Born 1875. Recreation: motoring.

BALL, Arthur Leslie.—Accountant, The Marconiphone Co., Ltd., 210, Tottenham Court Road, London, W.1. Joined present company, 1923; assistant accountant 1924; accountant 1930. Born May 24th, 1901. Recreations: music, gardening. Private address: 28, The Vale, Coulsdon, Surrey.

BARRETT, Ferberd Sessions.—Advertisement Manager "The Broadcaster and Wireless Retailer," Odhams Press Ltd., 93, Long Acre, London, W.C.2. Born February 27th, 1896. Recreation: golf. Private address: 59A, Abbey Road, St. John's Wood, London, N.W. 8.

BATTEN, Ronald.—Proprietor, 174, Union Street Torquay. Treasurer, Torquay W.R.A. Started in wireless in 1910 by fitting out the airships "Gamma" and "Eta" with wireless. Born December 7th, 1891. Recreation: motoring. Private address: 174, Union Street, Torquay.

BEARDSALL, Charles Poynter.—Radio Sales Manager, Ferranti, Ltd., Hollinwood, Lancs.; member of council, R.M.A. from January, 1929; trained for journalism, which forsook for engineering; joined Ferranti, Ltd., 1907; sales dept., 1910; sales manager, meter dept., 1926; associated with radio from commencement and appointed sales manager, radio dept., 1929. Born January 19th, 1886. Recreations: tennis, gardening, motoring. Private address: Alton, Sheepfoot Lane, Heaton Park, Manchester.

BENSON-DARE, Walter Horace.—Sales Representative (South Eastern Counties) Ferranti, Ltd., Hollinwood, Lancs. Founder and Chairman, W.R.A., Eastbourne Branch, 1930-31; has served Gilbert's, Lincoln; Southern Factors, Ltd.; Selectors, Ltd.; joined Ferranti, Ltd., 1930; Journalist, public speaker and lecturer in economics. Born September 8th, 1892. Recreations: amateur walking and running, has held army marathon championship. Founder and organiser, "Dick Whittington" Society for Boys. Private address: 52, Ceylon Place, Eastbourne.

BETAMBEAU, Albert Edward.—Proprietor A. E. Betambeau & Co., 101a, High Street, Penge, London, S.E.20, and 20–22, Anerley Station Road, S.E.20. Member of Council W.R.A. since August, 1923; Chairman W.R.A. 1929–31; Vice-President, 1932; after 17 years' practical experience, including apprenticeship, opened present business 1920. Rotarian, Penge Rotary Club; member of Penge Chamber of Commerce. Born August 30th, 1887. Private address: Anerley Lodge, Anerley Road, London, S.E.20.

BETTERIDGE, William George.—Partner Betteridge Bros., Weston-super-Mare. Chairman, Weston-super-Mare W.R.A.; Vice-chairman, Western Area W.R.A. Established 1905. Wireless from inception. Born March 19th, 1885. Recreation: philately.

BIRD, Sydney Sam.—Managing Director Sydney S. Bird & Sons, Ltd., Cyldon Works, Sarnesfield Road, Enfield Town, Middlesex. R.S.G.B., A.M.I.R.E.; has served with Edison Swan; United Electric Light Co., Ltd.; Bray Markham & Reiss, Ltd.; British Thomson-Houston Co., Ltd.; Ferranti, Ltd., and Johnson & Phillips, Ltd. Born March 21st, 1885. Recreations: tennis, golf, travel and kinematography including natural colour. Private address: Walfield Close, Great North Road, Whetstone, London, N.20.

BOON, H.—Advertising Manager, Chloride Electric Storage Co., Ltd., 137, Victoria Street, London, S.W.1. On Advertising Committees of S.M.M.T. & A.M.A. Born January 3rd, 1898. Recreations: golf, boxing. Private address: Oakbank, Hampton Grove, Ewell, Surrey.

BORROWMAN, Cyril Edwin. Works Manager, E. K. Cole, Ltd., Ekco Works, Southend-on-Sea. Born April 7th, 1900. Private address: Royston, Merilies Gardens, Westcliff-on-Sea.

BOWERS, Ernest Victor.—Managing Director, Delta Radio Distributors, Ltd., 1, Soho Square, London, W.C. Telsen, Ltd., 1927; Lotus Radio, Ltd., 1930. Director of Cameron's Surgical Specialities, Ltd., and Chromium and Nickel Plating Co., Ltd. Born December 17th, 1904. Recreations: riding, tennis, fishing, shooting. Private address: Chapel Fields, Addlestone, Surrey.

BOWYER - LOWE, Albert Edwin, M.J.Inst.E.—Managing Director, Bowyer-Lowe & A.E.D., Ltd., Diamond Works, Brighton. Vice-chairman R.M.R., 1926; Chairman R.M.A., 1927; Vice-president R.M.A., 1928-30; Trustee R.M.A., 1927-30; designed cycles, motors, etc., 1900-22, joined present firm, 1932. Born February 27th, 1883. Recreations: motoring, photography, clock-making. Private address: Veloce, South View, Letchworth, Herts.

BRADLEY, Robin Heath.—Director, Woburn Advertising, Ltd., 30, Bouverie Street, London, E.C.4. During War Chief Engineer, Northern Ireland, R.E. Radio Section. Born October 1st, 1896. Recreations: golf, gardening. Private address: 1, The Spring, Hanwell, London, W.7.

BRITTAIN, Sir Harry, K.B.E., C.M.G., LL.D., M.A. (Oxon).—President, W.R.A. Director of D. Napier & Son, Ltd.; Provincial Newspapers, Ltd.; Illustrated London News and Sketch Co., Ltd.; trained for business, after Oxford, in Sheffield; represented London at Washington International Chambers of Commerce, also represented Great Britain on Air Transport, 1930; has taken interest in wireless, from national viewpoint since he founded the first Imperial Press Conference in 1909, at which conference Marconi took part, and also the second Conference in 1920. Author of the "A.B.C. of the B.B.C." Recreations: shooting, ski-ing, golf, caravanning. Private address: 2, Cowley Street, London, S.W.1, and 13, King's Bench Walk, Temple, London, E.C.4.

BRIXEY, Albert Edward.—Managing Director, C. Brixey & Co., Ltd., 9, Cold-Harbour Lane, Hayes, Middlesex. Chairman W.R.A. West Middlesex Branch; W.R.A. Council. Born May 19th, 1902. Recreation: swimming.

BROCKES, Edward Herbert.—Manager Radio Dept., Tungsram Electric Lamp Works (Gt. Britain) Ltd., 72, Oxford Street, London, W.1. Born April 2nd, 1896. Recreations: cricket, golf, tennis. Private address: Greenbank, Earley, Reading.

BROWN, Harold Ernest.—Assistant Sales Manager, The British Blue Spot Co., Ltd., Blue Spot House, 94-96, Rosoman Street, Rosebery Avenue, London, E.C.1. Sales Dept., Pell, Cahill & Co., 1924; Sales Dept., M.P.A. Wireless Ltd., 1926; assistant to works manager, A. J. Dew & Co., 1927; F. A. Hughes & Co., Ltd.; later developed into the British Blue Spot Co., Ltd., 1929. Born January 5th, 1905. Recreation: photography. Private address: 30, Brantwood Avenue, Isleworth, Middlesex.

BROWNE, Rupert Pollard.—Assistant Secretary R.M.A. (since inception, 1926), Astor House, Aldwych, London, W.C.2, B.Sc.: assistant secretary N.A.R.M.A.T., from its inception, 1924. Born December 18th, 1897. Private address: 15, Clarence Road, Kew Gardens, Surrey.

BRUTY, Percy Edwin.—Manager Publicity Dept., National Accumulator Co., Ltd., 35a, Bessborough Place, London, S.W.1. Born December 31st, 1892. Private address: 40, Wallasey Crescent, Ickenham, Uxbridge, Middlesex.

BRYCE, N. Dundas.—Sales Manager, Belling & Lee, Ltd., Cambridge Arterial Road, Enfield, Middlesex. Served in the R.F.C. and R.A.F., 1914-19; Lever Bros., Ltd., 1919; Advertising manager Burndept, Ltd., 1921; Advertising manager, A.J.S. Radio, 1925; Joint manager Hugh Paton & Sons, Ltd., 1928. Born 1897.

BULGIN, Arthur Frederick, M.I.R.E., F.R.S.A.—Governing Director, A. F. Bulgin & Co., Ltd., Abbey Road, Barking, Essex. Engaged in experimental spark transmission and reception 1913; R.F.C. and R.A.F., 1919; entered radio industry 1921; founded A. F. Bulgin & Co., 1924; converted to Limited Company, 1930. Has invented many radio patents. Born January 23rd, 1899. Recreations: motoring, tennis, kinematography. Private address: 12a, Christchurch Road, Ilford, Essex.

BURNE-JONES, David.—Managing Director, Burne-Jones & Co., Ltd., Magnum House, 296, Borough High Street, London, S.E.1. Apprenticed to Westminster Engineering Co., Ltd.; worked 9 years in India, 1905-6 engineer-in-chief of H.M. The King and Queen's fleet of cars, during their Indian Tour; worked in kinematograph industry 1913-20; since manufactured radio apparatus. Born December 18th, 1885. Recreations: motoring, fishing, tennis, shooting. Private address: Hollycroft, Brunswick Road, Sutton, Surrey.

WHO'S WHO IN RADIO

BURNHAM, Walter Witt.—Manager, Radio Division, Edison Swan Electric Co., Ltd. (Associated Electrical Industries, Ltd.); Vice-Chairman, R.M.A.; Chairman, Management Committee, B.V.A.; for three years was Chairman N.A.R. M.A.T., F.I.R.E., C.I.E.E., F.R.S.A., F.Z.S.; Director of B.B. Co., Ltd., Burndept., Ltd., and Burndept Wireless, Ltd., etc. Born April 12th, 1880. Recreations: motoring, poultry, bees. Private address: The Plateau, Sundridge, near Sevenoaks, Kent. Phone: Ide Hill 41.

CALKIN, Alan Bernard, M.A., Grad. I.E.E.—Chief Radio Engineer, Philips Lamps, Ltd., 145, Charing Cross Road, London, W.C.2. Company's representative on Technical and Works Committee, B.R.V.M.A. Born March 6th, 1905.

CAMPBELL, Guy.—Chairman and Managing Director, The Benjamin Electric, Ltd.; Chairman, The Magnavox (Great Britain), Ltd; The Majestic Electric Co. (I.F.S.), Ltd. Majestic Electric de France. Private address: Brantwood Works, Tariff Road, Tottenham, N.17.

CARTER, Harley Autton.—Diplomatist City and Guilds Technical College, Finsbury, London. Technical liaison with press, Mullard Wireless Service, Ltd., Mullard House, Charing Cross Road, London, W.C.2. Commercial Depts., various electrical manufacturers, 1910-1914; Publicity Dept., G.E.C., Ltd., 1919; Technical Editor, "British Engineers Export Journal," 1925. Joined Mullards, 1929. Born May 29th, 1889. Recreation: gardening. Private address: 6, Swakeleys Road, Ickenham, Uxbridge.

CARTER, John Reginald.—Principal, Tom Cash Radio Service Depot, 30, Regent Road, Salford, Lancs. N.W. Area Delegate to Council. Was secretary, W.R.A. Manchester Branch 1930–1932; Member of National Council W.R.A. 1930 onwards; for 12 years worked in drawing office of an electrical company, now principal of outfitting and sports stores, founded by father 70 years ago; Member of Manchester Radio Experimental Society. Born May 13th, 1893. Recreations: tennis, motoring, scouting. Is District Scoutmaster and Cubmaster and Examination Controller.

CLAYTON, Charles Lawrence.—Director Bower Lowe & A.E.D., Ltd., 10, Prince Albert Street, Brighton. A.R.I.B.A.; practising in architecture and surveying and interested in motor engineering. Born 1892. Recreations: motoring, gardening. Private address: Badger Wood, Henfield, Sussex.

COBB, Frederick Arthur, A.I.E.E., M.I.R.E.—Manager Radio Merchanising Dept., Standard Telephones & Cables, Ltd., 364, Gray's Inn Road, London, W.C.1. Senior Maintenance Engineer 2LO, 1924; Assistant Chief Engineer, Indian Broadcasting Co. from inception, 1927; Manager Valve and Amplifier Dept., Philips, 1932. Born February 11th, 1901. Private address: 28, Manor Gardens, Purley, Surrey.

COHNREICH, Alfred.—Director and General Manager Loewe Radio Co., Ltd., Fountayne Road, Tottenham, London, N.15. Born February 26th, 1893. Recreation: motoring. Private address: 22, The Meadway, Southgate, London, N.14.

COLE, Eric Kirkham.—Technical and Works Director, E. K. Cole, Ltd., Ecko Works, Southend-on-Sea. Private address: Leeways, Marine Parade, Leigh-on-Sea, Essex.

COLE, Stanton Wilding, O.B.E.—Chairman of S. Wilding Cole Ltd., 62, Moor Street, Birmingham. Deputy-Chairman Kolster-Brandes, Ltd., Cray Works, Sidcup, Kent; Vice-President International Radio and Electric Corporation; Merchandise Director International Standard Electric Corporation; Executive Council R.M.A. and N.U.M.; Managing Director Burney and Blackburn, Ltd., 1918-1921; Chairman, S. Wilding Cole, Ltd. 1921 onwards; Director, Kolster-Brandes, Ltd., 1927 onwards. Born February 14th, 1880. Recreations: golf, tennis. Private address: The Turrett, Footscray Lane, Sidcup, Kent.

COLE, Thomas Noah.—Managing Director, Lissen, Ltd., Lissenium Works, Worple Road, Isleworth, Middlesex.

COLLINGS, Lewis Herbert.—Senior partner in L. H. Collings & Sons, and sole proprietor N. R. Collings & Co., Market Place, Biggleswade, Beds. A.M.Inst.B.E.; Member of W.R.A. Council from 1929-31. Born April 7th, 1873. Recreation: cricket. Private address: Thremabe, London Road, Biggleswade, Beds.

COLLINSON, Richard Francis.—Managing Director, Colvern Ltd., Mawneys Road, Romford, Essex, and Collinson's Precision Screw Co., Ltd. Born July 26th, 1901. Private address: 70, The Avenue, Highams Park, Essex.

COURSEY, Philip Ray, B.Sc. (Eng.).—Technical Director, Dubilier Condenser Co. (1925), Ltd., Ducon Works, Victoria Road, N. Acton, London, W.3. Chairman of Committee of British Standards Institution and of Committee on Mains Radio Apparatus. Member of Technical Committee of R.M.A.; past Member of Committee of Wireless Section of the Institu-

tion of Electrical Engineers; Secretary Radio Society of Great Britain, 1923-4. Research Physicist, H.M. Signal School, 1918-9. Editor "Radio Review," 1920-1. From 1922 with present company. Born May 7th, 1892. Recreation: authorship. Private address: 67, Queens Road, Richmond, Surrey.

COWAN, Arthur.—Manager, Glasgow Branch, Ward & Goldstone, Ltd., 50, Wellington Street, Glasgow, C.2, since 1923. Born 1897. Private address: 23, Arden Place, Thornliebank, Glasgow.

CRACROFT - AMCOTTS, Major Weston.—Managing Director, Vee-Cee Dry Cell Co. (1927) Ltd., Northwold Road, Stoke Newington, London, N.16. Born 1888. Private address: 12, Wetherby Place, London, S.W.7.

DANSON, Robert Eccles.—Radio Retailer, Radio House, Fishergate Hill, Preston. Secretary W.R.A., local branch.

DARBY, Lawson Alfred.—London Manager, The Chloride Electrical Storage Co., Ltd., 211-229, Shaftesbury Avenue, London, W.C.2. Member of Council, R.M.A.; member of Research and Standardisation Committee, Institute of Automobile Engineers. Private address: 8, Leopold Road, Ealing Common, London, W.5.

DAY, Wilfred Ernest Lytton.—Managing Director, Dayzite, Ltd., Will Day, Ltd., Musikon, Ltd., 17, 18, 19, Lisle Street, Leicester Square, London, W.C.2. Past-President, Veterans of Kinematography. F.R.P.S. F.R.S.A. President of Society of Model and Experimental Engineers. Spent most of his time since 1896, when he started showing kinematograph pictures, in the development of kinematography accompanied by sound. Has invented and patented television apparatus and loaned to the South Kensington Museum collection of kinematograph apparatus. Recreations: motoring, fishing, model steamboats. Private address: Hollydene, 15, Cholmeley Park, Highgate, London, N.6.

De LATTRE, Maurice, B.Sc. (Hons.).—Director and Secretary, S. A. Lamplugh Ltd., Little Park Street, Coventry.

DISNEY, B.A. (Cantab.), Henry Anthony Patrick.—E. K. Cole & Co., Ltd., late Director Kolster Brandes, Ltd., Standard Telephones and Cables, Ltd.; Standard Radio Relay Services, Ltd., 63, Aldwych, London, W.C.2. Council R.M.A. Born September 9th, 1893. Private address: Uphanger, Shepherds Lane, Chorley Wood, Herts.

DOBIE, Arthur John Douglas.—Area Sales Manager, South of Thames & South Wales, Wingrove & Rogers, Ltd., 188/9, Strand, London, W.C.2. Marine work with Siemens Bros. & Co., Ltd., 1915; R.F.C. and R.A.F., 1918; The Marconi International Marine Co., Ltd., 1918; The Radio Communication Co., Ltd. (Marine & Broadcasting Dept.) 1927. Born February 18th, 1897.

DOHERTY, Harold Alfred.—Director, Edward Doherty & Sons, 700/710, Seven Sisters Road, London, N.15. Member of Committee of British Radio Cabinet Manufacturers' Association. Manufacturer of leather and wood sundries to dental and surgical trades. Born February 27th, 1902. Recreations: Swimming, gardening. Private address: "Stoke Gabriel," Townsend Avenue, London, N.14.

DONISTHORPE, Horace St. John de Aulâ.—Valve Sales, General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. Member of Sales Grading Committee, B.V.A. Wireless operator, Marconi International Marine Communications, Co., Ltd., 1912-13. During the war was Captain R.E.; Director and engineer, R. M. Radio, Ltd., 1919-21; American Representative, Marconi International Marine Communication Co., Ltd., 1924; B.E.C., 1925; Broadcast work in New York, U.S.A.; B.B.C., London, Oslo, and contributions to radio press in Britain and America, 1930. Author of several radio handbooks. Born December 18th, 1896. Recreations: tennis, riding, swimming. Private address: 42E, Courtfield Gardens, London, S.W.5.

DUNNE, Daniel Patrick.—Managing Director, The Chloride Electrical Storage Co., Ltd., 137, Victoria Street, London, S.W.1. Born November 26th, 1875.

DYER, Carleton L.—Managing Director, Philco Radio and Television Corporation of Great Britain, Ltd., 1, Argyle Street, London, W.1. Born August 12th, 1901. Recreation: sailing. Private address: 7, Graham Road, Hendon, London, N.W.

DYER, Henry Alfred James Shearman.—Junior partner, Shearman, Dyer & Son, 298-300, Camberwell Road, London, S.E.5., Vice-chairman W.R.A., 1929–31; Chairman W.R.A., 1931–32; Member Executive Committee National Council, W.R.A., 1931. A.M.I.R.E. Interested in house furnishing trade. Born July 5th, 1895. Recreation: music. Private address: Highlands, Champion Hill, Brixton, London, S.E.5.

DYER, Herbert John.—Press Representative, The Marconiphone Co., Ltd., 210, Tottenham Court Road, London, W.1. Editorial Staff "Wireless Trader" 1925-29. Born, July 19th, 1897. Private address: Rectory Cottage, Hanwell, London, W.7.

WHO'S WHO IN RADIO

EASTICK, John Clare Newlands.—Manager J. J. Eastick & Sons, Eelex House, 118, Bunhill Row, London, E.C.1. Private address: 137, Upper Clapton Road, London, E.5.

ECKERSLEY, Peter Pendleton.—Consulting Engineer Standard Radio Relay Services, Ltd., Bush House, London, W.C.2; Marconi Wireless Telegraph Co., Ltd.; Rediffusion, Ltd.; and Broadcast Relay Services, Ltd. M.I.E.E., F.I.R.E. Head of Designs Section Marconi's Wireless Telegraph Co., Ltd., 1919; Chief Engineer, B.B.C., 1923; Gramophone Co., Ltd., 1929-1930; has written "All about your Wireless Set" (Hodder & Stoughton), many B.B.C. publications and technical papers in the I.E.E. and I.R.E. proceedings. Born January 6th, 1892. Private address: 82, Swan Court, Chelsea, London, S.W.3.

EDWARDS, Maurice, 8, Gosbrook Road, Caversham, Reading. Secretary Reading W.R.A. Born January 17th, 1903. Recreation: motoring. Private address: 30, Star Road, Caversham, Reading.

ELLIS, Richard Milward.—Joint Managing Director and Sales Director, Pye Radio, Ltd., Paris House, Oxford Circus, London, W.1, and Climax Radio Electric, Ltd., Haverstock Works, Parkhill Road, Hampstead, London, N.W.3. Vice-President R.M.A. 1932; Chairman, 1931; Vice-chairman, 1930; previously Member of Council R.M.A.; Member of Committee of Radio Industry Luncheon Club; has occupied executive positions on N.A.R.M.A.T.; served with Everett, Edgcombe & Co., R. W. Paul; Edison Swan; Engineering Publicity, Ltd.; Chellis, Ltd.; City and Guilds College (Electrical Engineering Dept); was a Drapers' Company scholar and research student at the East London College; is a director of J. Darnell & Sons, Ltd. (Boot & Shoe Distributors), and Chairman of Consolidated Securities, Ltd. (Investment Trust). Private address: 33, Cumberland Terrace, Regent's Park, London, N.W.1.

ELLISON, Michael Chetwynd, B.A. Cantab.—Proprietor Coates & Co., 17, Princes Street, Harrogate; and Chairman Northern Hire Purchase and Finance Co., Ltd., 11, Princes Square, Harrogate. Born 1901. Recreations: shooting, fishing, tennis. Private address: 32, Queen's Road, Harrogate.

EMERY, Ernest John.—Service manager, The Columbia Graphophone Co., Ltd., The Gramophone Co., Ltd., The Marconiphone Co., Ltd., The British Zonophone Co., Ltd., Radio House, Tottenham Court Road, London, W.1. Joined Marconi International Marine Communication Co., Ltd., 1915; Marconi's Wireless Telegraph Co., Ltd., 1919; The Marconiphone Co., Ltd., 1922-1931. Born October 24th, 1897. Private address: 5, Grosvenor Gardens, Upminster, Essex.

EVANS, Selborne.—General Manager, Ward & Goldstone, Ltd., 5, Percy Street, London, W.1. Gold medallist, City and Guilds. Born September 11, 1890. Recreations: cricket, football, tennis, swimming, gardening. Private address: Havenfield Cottage, Great Missenden, Bucks.

FAWCETT, Francis Thomas, M.A., Ph.D., D.Sc.—Chief Examiner, Electrical Engineering Subjects, International Correspondence Schools, International Buildings, 71, Kingsway, London, W.C.2. President, M.I.W.T., Member, Mathematical Association. Technical Editor, Journal of the Institute of Wireless Technology from its inception; articled with Edison & Swan, and subsequently with W. T. Henley's Telegraph Works Co., Ltd.; sometime demonstrator in Electrical Engineering in the University of London; contributor to technical journals and author of scientific textbooks. Born May 17th, 1880. Recreation: photography. Private address: Rostrevor, Fairlight Avenue, Woodford Green, Essex.

FELTON, Lionel Bernard.—Joint Managing Director, Lectro Linx, Ltd., 254, Vauxhall Bridge Road, London, S.W.1. B.A. (Cantab). Director, Autoveyors, Ltd., 1925-27. Recreations: tennis, motoring. Private address: 9, Kensington Hall Gardens, London, W.14.

FERRANTI, Vincent Ziani de.—Chairman, Ferranti, Ltd., Ferranti Electric, Ltd. (Canada), Ferranti Inc. (U.S.A.). Hollinwood, Lancs. Member of Council B.E.A.M.A. Born February 16th, 1893.

FÉVRE, Auguste Jean.—Managing Director, Impex Electrical, Ltd. 538, High Road, Leytonstone, London, E.11. Director, Electrical Measuring Instrument Co., Ltd. Has worked in the interest of wireless in many European and South American countries.

FILBY, Thomas Charles.—Sales Manager, Arthur Preen & Co., Ltd., & Formo Co, 23, Golden Square, London, W.1. Was Captain in Army since before war, and has served in most parts of the Empire. Born July 16th, 1888. Recreations: golf, tennis, motoring. Private address: 256, Monks Drive, West Acton, London, W.3.

FLETCHER, Robert William.—Radio Department Manager, Dale, Forty & Co., Ltd., The Promenade, Cheltenham; Secretary, Cheltenham W.R.A., 1932; Ensign,

Ltd., 1919; Rolls Caydon Sales, 1928; present company since 1930. Born March 14th, 1904. Private address: 4, Bayshill Terrace, Cheltenham.

FORD, Cyril Herbert.—Assistant Service Manager, The Columbia Graphophone Co. Ltd., The Gramophone Co., Ltd., The Marconiphone Co., Ltd., and The British Zonophone Co., Ltd. Joined Marconi's Wireless Telegraph Co., Ltd., 1914; The Marconiphone Co., Ltd., 1922-1931. Born May 4th, 1896. Private address: 43, Grosvenor Gardens, Upminster, Essex.

FOUNTAIN, Guy Rupert.—Founder and Sole Proprietor, Tannoy Products, 1-7, Dalton Street, West Norwood, London, S.E. 27. Born November 26th, 1899. Recreations: yachting, motoring. Private address: 25, Lancaster Road, West Norwood, London, S.E.27.

FREEMAN, A. H. Desmond.—Sales Director, H. Clarke & Co. (Manchester), Ltd., Bush House, Aldwych, London, W.C.2. Has been deputy member R.M.A. representing Kolster Brandes, with whom he served for three years, followed by a year at Mullards. Born January 14th, 1897. Recreations: tennis, football, bridge. Private address: 4, Ellington Gardens, Taplow, Bucks.

FREEMAN, Horace.—Managing Director, Parrs Advertising, Ltd., Craven House, Kingsway, London, W.C.2. Late A.M.I.E.E. A.A.I.E.E. Secretary of the Electrical Engineering Institute of Correspondence Instruction, 1908-15. After active war service in France, joined Bertram Day & Co., Ltd., 1920, as representative for radio newspapers; took an active part in the first All-British Wireless Exhibition and Convention, 1922, and Manchester Exhibition, 1932. Recreations: swimming, motoring.

FRENCH, Cyril.—Managing Director, Celestion, Ltd., Kingston-on-Thames. Director of Eto. Constable - Celestion. Director of Freedman Valve Co. Responsible for designs of all types of speakers and cabinet work marketed by Celestion since 1926. Apprenticed to Scientific Instrument Co., Cambridge, 1903–10. G. Kent & Co., 1914. Walters Electrical Mfg. Co., 1918. J. E. Jaccard, 1919. Founded Celestion, 1926. Recreations: motoring, flying, golf. Private address: 64, Lingfield Avenue, Kingston-on-Thames.

FRESHWATER, George John.—Publicity and Sales Promotion Manager, The Marconiphone Co., Ltd., 210-212, Tottenham Court Road, London, W.1. Born August 2nd, 1898. Recreations: golf, cricket, tennis. Private address: Brambledene, Long Lane, Hillingdon, Middlesex.

FROGGATT, Albert Dawson. — Sales Manager, Britannia Batteries, Ltd., 233, Shaftesbury Avenue, London, W.C.2.

GAMBRELL, Horace William.—Radio Publicist and Exhibitions Organiser. The Edison Swan Electric Co., Ltd., 123, Queen Victoria Street, London, E.C.4. M.I.W.T., M.I.R.E., F.R.S.A. (Radio Communications). 1st Class, Grade I, and Final C., G. 1. Served with the British Thomson-Houston Co., Ltd., until 1929. Born November 18th, 1898. Recreations: yachting, fishing. Private address: 13, Park Road, Chiswick, London, W.4.

GIBSON, James Donald.—Director, R. B. Gibson, Ltd., 31, Liverpool Road, Birkdale. Secretary, Southport W.R.A. from 1930. Born 1901. Recreations: tennis, bridge. Private address: 27, Dunkirk Road, Birkdale.

GIBSON, Ralph William Frederick.—Proprietor Gibson's, Radio Specialists, 94, Tavistock Road, Plymouth. Secretary, Plymouth W.R.A., and Delegate Western Area, W.R.A. Council. Started radio in Plymouth 1922. Born 1902. Recreations: swimming, fishing, football. Private address: Woodside, Berrow Park Road, Peverell, Plymouth.

GILBERT, Ernest Richard.—Advertising Consultant. Gilbert Advertising Ltd., 14, Holborn, London, E.C.1.

GILBERT, Josiah William.—Managing Director, Woburn Advertising, Ltd., and "Bookletism," 30, Bouverie Street, London, E.C.4. A.I.P.A. Born February 10th, 1902. Recreations: golf, tennis. Private address: 8, Whitefriars Crescent, Westcliff-on-Sea, Essex.

GOLDSTONE, Sampson. — Director, Ward & Goldstone, Ltd., Pendleton, Manchester. Private address: 80, Promenade, Southport.

GOODFELLOW, Magnus.—Chairman and Managing Director, The Ever-Ready Co. (Gt. Britain) Ltd., Hercules Place, Holloway, London, N.7. Chairman, Lissen, Ltd., and The Ever Ready Trust Co., Ltd.

GOODMAN, William Henry.—Managing Director, Dubilier Condenser Co. (1925), Ltd., Mansbridge Condenser Co., Ltd., High Frequency Engineering Co., Ltd., Ducon Works, North Acton, London, W.3. Also Director of Isenthal & Co., Ltd.; and Société des Condensateurs de Trevoux, France. Founded Dubilier Co. in 1912. Born April 23rd, 1884. Recreations: rowing and tennis. Private address: Burcott Cottage, Aylesbury.

GORRINGE, Rupert Clement.—Sales Manager, Dry Battery Dept., The Edison-Swan Electric Co., Ltd., 155, Charing Cross

WHO'S WHO IN RADIO

Road, London, W.C.1. Born March 30th, 1898. Private address: 32, Compton Road, Wimbledon, London, S.W.19.

GRAY, Arthur.—Director, Arthurs (Prop. Arthur Gray), Ltd., Franklin Electrical Co., Ltd., 150, Charing Cross Road, London, W.C.2. Born June 12th, 1890. Private address: 214, Hendon Way, London, N.W.4.

GRAY, George Alan.—Radio Manager, G. Harry Gray, 57, Queen's Road, Watford. Secretary, Watford W.R.A. Born May 3rd, 1896. Recreations: cycling, swimming. Private address: 317, St. Albans Road, Watford, Herts.

GRAY, John Willis.—82, Westborough, Scarborough. Chairman, Scarborough W.R.A. Born July 4th, 1891. Private address: 23, Valley Road, Scarborough.

GREATREX, Richard George.—Managing Director, R. G. Greatrex & Co., Ltd., 184, Regent Street, London, W.1. Served in the Royal Tank Corps during War. Founded present company 1928. Born July 20th, 1897. Recreations: tennis, swimming, football.

GREEN, George Frederick.—Publicity Manager, The Mullard Wireless Service Co., Ltd., 111, Charing Cross Road, London, W.C.2. Life interest and work in publicity. Recreations: motoring. Private address: 3, Alma Square, St. John's Wood, London N.W.8.

GURNEY, Albert Arthur.—2, Station Parade, Greenford, Middlesex, Secretary, W.R.A., West Middlesex. A.M.I.R.E. On outside staff London Electrical Stores, Ltd., 1923; L.E.S. Distributors, Ltd., 1924; started on own account, 1930. Born May 20th, 1906. Private address: Kenmore, Copthall Road, Ickenham, Middlesex.

HALL, Arthur Lewis.—Manager, C. Hall & Sons, 68, High Road, Beeston; Secretary, Nottingham W.R.A. Born 1901. Recreation: golf. Private address, 39, Derby Grove, Nottingham.

HALPIN, John Albert.—Principal, J. A. Halpin & Sons, 69, London Road, Southampton. Secretary, Southampton W.R.A.; Member of Council W.R.A., M.E.C.A.; on Committee, Southampton Chamber of Trade; has served with Linde British Refrigerators, Ltd.; Manchester Corporation's Engineering Dept.; opened present business, 1923.

HAMBLING, Arthur William.—Managing Director, A. W. Hambling, Ltd., 15-16, Alfred Place, Tottenham Court Road, London, W.C.1; Technical Director, National Radio Service Co.; Member (1922) Institute Radio Engineers, New York. After serving in the War, was with F. O. Read & Co., Ltd., 1919-20; Hambling Clapp, Ltd., 1921-29. Owned and operated station G.2.M.K. since 1919. Served on R.S.G.B. Council; was Assistant Secretary, 1921. Born March 1st, 1898. Recreation: aviation. Private address: 80, Brondesbury Road, London, N.W.6.

HARDY, Charles Graham.—Secretary, E. K. Cole, Ltd., Ekco Works, Southend-on-Sea, Essex. M.A. (Hons. in Economics), B.Com. Recreation: golf. Private address: 25, Harley Street, Leigh-on-Sea, Essex.

HARRIS, Herbert Reginald.—Sales Organiser, Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C.2. With British Thomson-Houston Co., Ltd., 1922-29. Born November, 1889. Recreation: motoring. Private address: 44, Woodside Park Road, North Finchley, London, W.12.

HARRISON, Donald Frederick.—Sales Manager, The Mullard Wireless Service Co., Ltd., 111, Charing Cross Road, London, W.C.2. Born November 27th, 1899. Private address: 40, Gyllyngdune Gardens, Seven Kings, Essex.

HART, David.—Sales Manager, E. K. Cole, Ltd., Southend-on-Sea. A.C.I., M.S.M.A. Nominated Deputy Member R.M.A. Executive Council. Has served with Marconiphone and linked up with E. K. Cole, Ltd., in 1926. Born December 6th, 1891. Recreations: motoring, golf. Private address: Vermont, Aldermans Hill, Hockley, Essex.

HART-COLLINS, Cyril.—Managing Director, Hart-Collins, Ltd., and General Manager E.R.P., Ltd., 38a, Bessborough Street, London, S.W.1. Executive Council R.M.A. until 1930. Was Radio Sales Manager, Westinghouse Electrical Manufacturing Co., New York. Born August 10th, 1896. Recreations: golf, fishing. Private address: 123, Clarence Gate Gardens, London, N.W.1.

HARVEY, Grinnell Strong.—Manager, Exide Service, The Chloride Electric Storage Co., Ltd., Clifton Junction, nr. Manchester. Born July 16th, 1893. Private address: 17, Circular Road, Sedgley Park, Prestwich, Lancs.

HARVEY, Jack Thorogood.—Partner and sole charge of electrical and radio dept., John Harvey & Son, Aylestone Road, Cambridge. Secretary, W.R.A. Cambridge Branch; worked as electrical contractor in 1921; Father joined him 1923; original name of family business then revived; Radio added in 1925. Born July 7th, 1898. Recreation: motoring. Private address: 174, Mill Road, Cambridge.

[*Continued on page* 67.]

WHO'S WHO IN RADIO ADVERTISING

Mr. Horace Freeman, Managing Director of Parr's Advertising, Ltd., has had over 12 years' experience in radio publicity, and established his own agency in February, 1926.

WHO'S WHO IN RADIO

[*Continued from page* 64.]

HAWORTH, Roland Armitage.—Partner of J. E. Haworth & Co., Steinway House, Whalley Road, Accrington; Secretary, Accrington W.R.A.; President, Accrington Chamber of Trade, 1930-2. Born May 1st, 1900. Recreation: amateur theatricals. Private address: Forest Beek, Livingstone Road, Accrington.

HAYNES, Frederick Henry.—Proprietor Haynes Radio, 57, Hatton Garden, London, E.C.1. Acted as Assistant Editor to "Wireless World" and "Wireless Engineer." Born October 1st, 1893. Private address: 38, Sittingbourne Avenue, Enfield, Middlesex.

HEATHORN, Frank Leslie.—Advertising Manager, The Gramophone Co., Ltd., 363, Oxford Street, London, W.1. Articled and qualified as structural engineer, 1909-15; in 1914 became interested in advertising; after war service joined the *Times*, passing through Lever Bros., Ltd., to Gramophone Co., Ltd., 1931. Recreations: motoring, music, literature, carpentry and light mechanics. Private address: One Oak, Radlett Road, Boreham Wood, Herts.

HEAVER, Ernest Frank.—Sales Manager and Publicity Manager of The Rothermel Corporation, Ltd., and Sonochorde Reproducers, Ltd., 1, Willesden Lane, London, N.W.6. Connected with importation of American hardware and tools, 1912–1915; R.F.C. and R.A.F. wireless operator and observer, 1916–1919; hardware and tool trades, 1919–1923. Joined Rothermel Corporation, Ltd., as Sales Manager in 1923. Born July 19th, 1897. Private address: 37, Circle Gardens, Merton Park, London, S.W.19.

HESKETH, Benjamin.—Director L. McMichael, Ltd., Wexham Road, Slough; B.Sc. Power Station Engineer, 1906, Power Station and Construction Engineer, 1910-14; Manufacturing Engineer, 1919-20 to present date, during which period formed B. Hesketh, Ltd., which company later amalgamated with L. McMichael, Ltd., to form the existing concern. Born February 15th, 1884. Recreations: golf, tennis, yachting, music, photography. Private address: Three Hollies, Farnham Royal, Bucks.

HILLMAN, Charles.—Partner, Hillman Bros., 123-5, Albion Street, Leeds.

HILLMAN, Edgar Martin.—Partner, Hillman Bros., 123-5, Albion Street, Leeds. A.C.G.I., Int. B.Sc. (Engineering).

HITCHCOCK, Alan Flinders.—Managing Director, Flinders (Wholesale), Ltd., East Stockwell Street, Colchester. Co-opted member of Council R.W.F. Born January 2nd, 1888.

HOCKLY, Alan.—Sales Manager, The Gramophone Co., Ltd., 363, Oxford Street, London, W.1. Manager, Kohler Co., Ltd., 1924–29. Born September 6th, 1894. Recreations: golf, fishing. Private address: 467, Princes Gardens, London, W.3.

HODSON, John Curran.—Sales Superintendent, United Radio Manufacturers, Ltd., 63, Lincoln's Inn Fields, London, W.C.2. Valve sales manager of Mullard Wireless Service Co., Ltd., 1924–1931; sales manager, Andiovisor, Ltd., 1931–1932. Born June 1st, 1900. Recreations: golf, cricket, swimming. Private address: Cooneen Cottage, Orchehill Avenue, Gerrards Cross, Bucks.

HOLMES, Herbert.—Managing Director, Holmes Bros. (London), Ltd., Howard Works, Billet Road, Walthamstow, London, E.17. Vice-Chairman and Founder, British Radio Cabinet Manufacturers' Association, 1932. President, Walthamstow Rotary Club, 1931–2. Born September 12th, 1875. Recreations: motoring, gardening. Private address: Heathcote, Chelmsford Road, Woodford, London, E.18.

HOLMES, Ronald Herbert.—Director and Sales Manager, Holmes Bros. (London), Ltd., Howard Works, Billet Road, Walthamstow, London, E.17. Born: March 17th, 1903. Recreations: motoring, walking, shooting, fishing. Private address: 115, Chelmsford Road, Woodford, London, E.18.

HORSEY, Frederick Samuel.—Proprietor, E. G. Wood, 2, Queen Street, Cheapside, London, E.C.4. Vice President W.R.A., Chairman W.R.A. 1924-29; Vice President City of London Retail Traders' Association; interested in Ophthalmic practice, optical projection as mechanical aid to learning, photography, gramophones. Born 1869. Recreations: bowls. Private address: 44, King's Hall Road, Beckenham.

HOUGHTON, Edgar William.—Chairman and Managing Director, Ensign, Ltd., 88-89, High Holborn, London, W.C.1. President of the Radio Wholesalers' Federation, 1932-3; Chairman since its formation, 1928. Born February 6th, 1870. Private address: Denehurst, West Heath Road, Hampstead, London, N.W.

HOWITT, Harry.—Secretary of British Radio Valve Manufacturers Association, 59, Russell Square, London, W.C.1.

HULL, S. W.—Joslin's, Ltd., 108-9, High Street, Colchester. Secretary and Treasurer, Colchester W.R.A.

WHO'S WHO IN RADIO

HULME, Arnold Barnett.—Head of Hulme & Son, 8–9, Sadler Gate, Derby. Local Secretary of the Electrical Contractors' Association. Born 1890. Recreations: cricket, golf. Private address: The Orchard, Rowditch, Derby.

HUNT, Cyril Harvey.—Manager Director, Hellesens, Ltd., Hellesen Works, Morden Road, South Wimbledon, London, S.W.19; also Director, A. H. Hunt, Ltd., Born 1897. Recreations: tennis, golf, badminton, football.

HUNT, William Arthur.—Director, L. E. S. Distributors, Ltd., 9, St. Martin's Street, Leicester Square, London, W.C.2. Director National Radio Service Co. Secretary London Section N.A.R.M.A.T., 1925–26; Member Council R.W.F., 1930–31. Recreations: golf, motoring. Private address: 11, Alexander Place, Thurloe Square, London, S.W.7.

HUSTLER, Ivor William Ernest.—Managing Director, Ready Radio, Ltd. Eastnor House, Blackheath, London, S.E.3. Born June 26th, 1899. Private address: Yarrawonga, Woldingham, Surrey.

HUXLEY, George Arthur, B.A. (Eng.) Cantab.—Director and Secretary, Wright & Weaire, Ltd., and George Nissen, Ltd., 740, High Road, Tottenham, London, N.17. Carried rank of Major R.E. during War, has travelled the five Continents. Prior to War, represented Henry Simon, Ltd., in South America. Since War with present firms. Born January, 1888. Recreations: golf, fishing, motoring. Private address: Whithern, Cheshunt, Herts.

ILIFFE, Alfred Eldred.—Director and General Sales Manager, The Benjamin Electric, Ltd., Brantwood Works, Tariff Road, Tottenham, London, N.17.

JENKINSON, Henry G.—Director, Trojan (Manchester), Ltd., 8–12, Alexandra Road, Manchester. Joint Secretary, W.R.A. North-Western Area; Member of W.R.A. Council since 1929. Born 1902. Recreations: golf, motoring. Private address: 23, Erlington Avenue, Old Trafford, Manchester.

JESSOP, Leonard Sampson, A.M.Inst. B.E.—Proprietor, Jessops Radio Stores, 2A, Midland Road, Wellingborough. Secretary, Mid. Northants W.R.A. Born August 23rd, 1894. Private address: Eskdale, Northampton Road, Wellingborough.

JOHNSON, Albert Ernest.—Joint Managing Director, J. B. Manufacturing Co. (Cabinets), Ltd., Gainsford Road, Walthamstow, London, E.17. Secretary, British Radio Cabinet Manufacturers' Association Member of Rotary International. Born February 23rd, 1908. Recreations: riding, shooting, motoring. Private address: Woodvale, Great Parndon, Essex.

JOHNSON, Douglas Heather.—Solicitor, partner in Stanley Johnson & Allen, 426, Salisbury House, London Wall, London, E.C.2. Director of Vickery's, Ltd. Inventor and patentee of Johnson Loud Speaker. Owner-operator of G6DW, in operation since 1923. Born November 19th, 1907. Recreation: yacht cruising. Private address: Coombe Pines, Kingston Hill, Surrey.

JOHNSON, William Henry.—Managing Director, Riversdale Radio Co., Ltd., Tee-Kay Radio, Ltd.; Beltone Supply Co., Ltd., 43, Thames Street and 24, Thames Street, Kingston-on-Thames, and 26, Langham Street, London, W.1. Motor and Electrical Engineering, 1912-14; Sales manager, Electrical Devices, 1919; General manager. Leverlite Lamp Co., 1922; Sales director, Everett (S'ton), Ltd., 1924; Managing director, Johnson Ross & Co., Ltd., 1925; joined present companies 1928; from 1914-1919 served with the London Irish Rifles, 19th London Regt., and R.A.F. Born August 10th, 1898. Recreations: tennis and golf. Private address: The Stump, Thames Ditton.

JONES, Archibald George.—Sales Manager, London Branch. Ward & Goldstone, Ltd., 3-6, Alfred Place, Tottenham Court Road, London, W.C. Interested in electrical installation schemes for better household services. Born January 4th, 1892. Recreations: cricket, football.

JONES, Bernard Edward.—Managing Director, Bernard Jones Publications, Ltd., 58-61, Fetter Lane, London, E.C.4. Editor, "Amateur Wireless and Wireless Magazine"; from 1909-26, technical editor, Cassell & Co., Ltd.; founded "Amateur Wireless and Wireless Magazine" for Cassell's. In 1926 acquired these publications for his own company.

JOSEPH, Henry.—Representative, W. T. Lock, Ltd., Sole Representative, Grawor, and H. Vesshoff Co., 11, Red Lion Square, London, W.C.1. Managing Director, Vessco, Ltd. After serving apprenticeship in electrical engineering 1911-14 did journeyman work until 1925, when present organisation was founded. Born October 27th, 1885. Recreation: bowls. Private address: 76, Highlever Road, North Kensington, London, W.10.

JOSEPH, Joseph.—Managing Director, Radio Instruments, Ltd., Purley Way, Croydon. Trustee and member of Council since its inception, R.M.A., M.I.E.E., M.I.R.E.

KAY, Barry.—Assistant Sales Manager, E. K. Cole, Ltd., Ekco Works, Southend-on-Sea. Born May 21st, 1904. Recreations: tennis, golf, swimming, yachting, walking. Private address: 44, Meteor Road, Westcliff-on-Sea.

KAY, Henry Graeme Aytoun.—Director and General Sales Manager, Magnavox (Gt. Britain) Ltd., 89, Kingsway, London, W.C.2. Member of Council of N.A.R.M.A.T. and R.M.A. 1924-28 and various committees of these associations; was manager radio department, Metropolitan-Vickers Electrical Co., Ltd., 1924; Sales Manager Wireless Pictures (1928) Ltd., 1928; Secretary, The Twenty Six Trust, Ltd., 1929-1931.

KEELING, Charles Horace, A.M.I.R.E.—General Representative, British Radiophone Co., Ltd., Aldwych House, Aldwych, London, W.C.2. Seagoing Wireless Telegraphist Marconi Corporation, Ltd., 1917; Technical Adviser, Comparri Wireless Control Syndicate, Ltd., 1919; Technical Salesman, Leslie McMichael, Ltd., 1922-4. Born January 17th, 1900. Recreations: motoring, camping. Private address: Alladulla, Victoria Road, Buckhurst Hill, Essex.

KENDALL, Godfrey Paul, B.Sc.—Chief Engineer, Ready Radio, Ltd., Eastnor House, Blackheath, London, S.E.3. From 1923-31 attached to Radio Technical Press; joined Ready Radio, Ltd., 1931. Born July 8th, 1898. Private address: Coombe Cottage, Oaklands Avenue, Esher.

KENT, George Gordon.—Joint Managing Director, Johnson Talking Machine Co., Ltd., 96, Clerkenwell Road, London, E.C.1.

KING, Harrie John.—Consultant, 48, Mountview Road, North Chingford, London, E.4. Founder member of the Institute of Wireless Technology, Assistant Secretary 1925, Secretary 1927 to date; Editor of Institute's publications 1926 to date; F.C.C.S., F.R.Econ.S., M.I.W.T. Interested in research and investigation of sound reproduction and acoustics from 1908 to date, which has included lecturing, writing, examining and organising work furthering the interests of wireless. Recreations: music, dietetics, psychology, eugenics, economics, engineering.

KLEIN, Rene Henri.—Joint Managing Director, L. McMichael, Ltd., 265, Strand, London, W.C.2; M.I.R.E Vice-President Radio Society of Great Britain; Founded Wireless Society of London. Private address: 18, Crediton Hill, West Hampstead, London, N.W.6.

KOHN, Lewis.—Manager of Leeds Branch, Ward & Goldstone, Ltd., 49a, Briggate, Leeds.

LATHAM, Charles, F.L.A.A.—Secretary and Accountant of The Radio & Gramophone Trades Guardian Association, Ltd., 78, New Oxford Street, London, W.C.1. Alderman of The London County Council; Member of The Public Works Loan Board; Member of The London and Home Counties Joint Electricity Authority; Director and Accountant of The Automobile Trades Guardian Association, Ltd. Born 1889. Private address: 30, Sunny Gardens, Hendon, N.W.4.

LEE, Edgar Morton., B.Sc., London.—Director and General Manager, Belling & Lee, Ltd., Cambridge Arterial Road, Enfield, Middlesex. Director, Insulators, Ltd. Member R.M.A. Council; Radio Industry Luncheon Club, Committee. Interested in Bakelite Moulding and Brass and Casein Turning; prior to jointly founding Belling & Lee, Ltd. 1922, was Physics and Physical Chemistry research worker and student demonstrator. Born March 31st, 1902. Recreations: gymnasium, swimming, tennis, golf.

LENTON, Ernest George.—Partner G. Lenton & Son, 16, Bradford Place, Walsall, Staffs. Secretary, Walsall W.R.A.; Wireless Telegraphist R.N.V.R. during War; Entered radio 1923. Born September 24th, 1899. Recreations: motoring, billiards, swimming. Private address: "Brynhilda," Orwell Road, Walsall.

LEVER, Edward Anthony, B.Sc., B. Com.—Sales & Publicity Manager, Pye Radio, Ltd., Paris House, Oxford Circus, London, W.1. Born February 25th, 1900. Recreations: photography, authorship; has written a book, "A Primer of Taxation." Private address: Hillmount, Thicket Road, Sutton, Surrey.

LEVER, Eric Joseph.—Director, Eric J. Lever (Trix) Ltd., 8-9, Clerkenwell Green, London, E.C.1.

LEWIS, Harold Victor.—Sales Manager, Philco Radio and Television Corporation of Great Britain, Ltd., 1, Argyle Street, London, W.1. Born August 20th, 1897. Recreations: golf, shooting. Private address: 21, Meadway Court, Hampstead Garden Suburb, London, N.W.

LITCHFIELD, Gordon Arthur.—Managing Director, The Nottingham Radio Supplies, Ltd., Sherwood Buildings, South Sherwood Street, Nottingham. A.M.I.R.E. A.M.I.B.E. Born Dec. 29th, 1890. Recreations: golf, amateur cinematography. Private address: Cropweell Road, Radcliffe-on-Trent, Notts.

LLOYD, Sidney.—Sales Manager in Southern Counties, Ward & Goldstone, Ltd., 40, Ashton Road, Moordown, Bournemouth.

WHO'S WHO IN RADIO

LONGMIRE, Albert.—Manager for Sales Enquiries, Ward & Goldstone, Ltd., Frederick Road, Pendleton, Manchester. Born May 25th, 1894. Private address: 163, Fairfield Street, Ardwick, Manchester.

LYONS, Claude Lipman.—Joint Managing Director, Claude Lyons, Ltd., 40, Buckingham Gate, Westminster, London, S.W.1. B.Sc., M.I.R.E., Fellow Physical Society (London), R.S.G.B. Born September 21st, 1896. Recreations: reading, photography, motoring, billiards, chess.

McCREA, Frederick Harold.—Technical Director of Sales, Dubilier Condenser Co., (1925), Ltd.; Mansbridge Condenser Co., Ltd.; Manchester Radio Co., Ltd., Ducon Works, Victoria Road, North Acton, London, W.3; Member of R.M.A. Council, 1929-31; also Sales Director Isenthal & Co., Ltd. In 1922 formed Manchester Radio Co., Ltd.; joined Dubilier 1929 as sales manager. Born October 5th, 1895. Recreation: golf. Private address, 26, Sedgecombe Avenue, Kenton, Middlesex.

MACFARLANE, James.—Secretary, Radio Wholesalers Federation, 26, Hart Street, London, W.C.1. From 1898-1928 connected with motor trade press; Appointed to present position 1928. Recreations: golf, literature. Private address: Guildford Lodge, Clarendon Road, Watford, Herts.

McKENZIE, James Patrick, A.M.I.E.E., M.I.R.E.—Managing Director, Sifam Electrical Instrument Co., Ltd., York Works, Browning Street, London, S.E.17. Works Manager, C. F. Elwell, Ltd., 1921; Standard Telephone & Cables, Ltd., 1923; Founded Sifam Co., 1925. Born January 14th, 1889. Recreation: shooting. Private address: 2, Osberton Road, Lee, London, S.E.12.

McMICHAEL, Leslie.—Managing Director, L. McMichael, Ltd., 265, Strand, London, W.C.2. A.M.I.E.E., F.I.R.E., Vice-President Radio Society of Great Britain; Chairman R.M.A. Apprenticed to electrical engineering, 1900; held transmitting and receiving licence for 1911; call sign 2F.G.; helped form the Wireless Society of London, since extended to Radio Society of Great Britain; during the war served in the Wireless Experimental Section of the R.A.F.; for several years Secretary of the Radio Society of Great Britain; founded present firm in conjunction with Messrs, R. H. Klein and B. Hesketh in 1920; a founder member of the National Association of Radio Manufacturers, serving on the Council until R.M.A. formed, and has been on Council of R.M.A. since inception. Born November 17th, 1884. Private address: Everest, Prince's Park Avenue, London, N.W.11.

MACNAMARA, Arthur William.—Managing Director, Telsen Electric Co., Ltd., Aston, Birmingham. Commenced Telsens in May 1924. Prior to this in business on own account as electric contractor; estate agent; manufacturers' agent; has worked as electrician, civil servant, picture house manager, professional dancer, clothier, and travelled in hardware and food. Born September 10th, 1899. Recreations: tennis, golf, cricket, swimming, billiards, chess. Private address: Miradene, Hayfield Road, Moseley, Birmingham.

MACQUEEN, Montague, M.—Manager, Wireless Dept., General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. On Council and committee, R.M.A.

MAHONEY, Henry Charles.—General Wireless Manager, Edison Bell, Ltd., Glengall Road, London, S.E.15. Joined Edison Bell, Ltd., in 1924 after varied scientific career in many parts of Europe. During War was sentenced to death as spy in Germany; in 1926 was made Wireless Sales Manager and promoted in 1928 to General Wireless Manager. Lectures and writes on wireless and allied sciences. Born March 17th, 1887. Recreations: motoring, photography, carving. Private address: 28, Wyatt Park Road, Streatham Hill, London, S.W.2.

MARCONI, Guglielmo, Hon.G.C.V.O., Hon.D.Sc. Oxford, Hon.LL.D. Glasgow.—A Senator of Italy, Marconi House, Strand, London, W.C.2. Educated at Bologna, where he was born 1874 of Italian and Irish parents and where first experiments in wireless were conducted. In 1899 established wireless between France and England. In 1901 sent messages from Cornwall to Newfoundland, 1902 extended to America. His system practically in universal use. Amongst honours Nobel Prize, 1909; Albert Medal, Royal Society of Arts; Grand Order of Alphonso XII. Recreations: hunting, motoring, yachting. Private address: Villa Griffone, Pontecchio, Italy.

MARKS, Lord, George Croydon, C.B.E., J.P.—Chairman Columbia Graphophone Co., Ltd., Director Electrical and Musical Industries, Ltd., 58, Lincoln's Inn Fields, London, W.C.2. M.I.M.E., A.M.I.C.E. Senior partner and founder of Marks & Clerk, Patent Agents and Consulting Engineers, practising in London, Birmingham, Manchester, Glasgow, New York, Washington, Chicago, Ottawa, Toronto, San Francisco. Private address: Carrick Grange, Sevenoaks, Kent.

MARRIOT, Edward Jonathan.—Assistant Managing Director, Celestion, Ltd., London Road, Kingston-on-Thames. Private address: 186, Gunnersbury Avenue, W.3

MARRIOTT, George Armstrong, B.A. (Cantab).—Manager Osram Valve Dept., The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. Joined G.E.C. Osram Lamp Dept., 1921; took over valves 1922 in addition to lamps, and sole charge of valves, 1927. Born 1892. Recreations: tennis, shooting, rock climbing. Private address: 5, Pitt Street, Kensington, London, W.8.

MARTIN, Anthony Wyard.—Assistant Chief Engineer, E. K. Cole, Ltd., Southend-on-Sea. Wireless manager, Bexhill Motors, Bexhill, 1926-28. Born September 26th 1907. Recreations: yachting, football, tennis. Private address: Clun, Thames Close, Leigh-on-Sea.

MAZDON, James Frederick, A.M.I.W.T.—Technical Expert, The Chappell Piano Co., Ltd., 50, New Bond Street, London, W.1. The Edison Swan Electric Co., Ltd, 1922; The British Brunswick, 1927; Warner-Brunswick, Ltd., 1930. Joined Chappells' 1931. Born April 23rd, 1908. Recreations: boxing, shooting, football. Private address: 31, Andalus Road, Stockwell, London, S.W.9. 'Phone: Brixton 4641.

MELSER, Francis J.—Manager, Radio and Gramophone Depts., James Smith & Sons (Music Sellers), Ltd., 70-76, Lord Street, Liverpool. Secretary, Liverpool W.R.A. Born February 6th, 1897. Recreations: motoring, music. Private address: 8, Griffin Avenue, Upper Moreton, Cheshire.

MICHELL, Philip Claud.—Managing Director, Trelleborg Ebonite Works, Ltd., Union Place, Wells Street, London, W.1. Private address: Kingswood Court, Maidenhead.

MIDDLETON, Arthur.—London Manager, Ferranti, Ltd., Bush House, Aldwych, London, W.C.2. A.M.I.E.E.

MIELL, Stanley.—17, Argyle Street, Bath. Secretary, Bath W.R.A. Born 1895. Recreation: motoring. Private address: 1, Perrymead Place, Bath.

MILLER, Nora Evelyn.—Manager, Publicity Dept., The Edison-Swan Electric Co., Ltd., 123-5, Queen Victoria Street, London, E.C.4. Started in Edison-Swan Drawing Office 1916. Took over present work 1927. Born March 11th, 1899. Recreation: motoring. Private address: 10, Manorway, Bush Hill Park, Enfield.

MILLER, William Edward, B.A. (Cantab).—Technical Editor, "The Wireless and Gramophone Trader," St. Bride's House, Salisbury Square, London, E.C.4. Member of Council, Institute of Wireless Technology. With the Cambridge Instrument Co. Ltd., 1924. Joined "Wireless Trader," 1925. Born June 5th, 1902. Private address: 42, Hunters Grove, Kenton, Middlesex. 'Phone: Harrow 2803.

MITCHELL, Herbert.—Publicity Manager, Kolster-Brandes, Ltd., Cray Works, Sidcup, Kent. Joined firm 1924; appointed present position 1928. Born September 30th, 1903. Recreations: tennis, bridge. Private address: 76, Longlands Park Road, Sidcup.

MONTAGUE, David.—Director and Technical and Research Adviser, Montague Radio Inventions and Development Co., Ltd., Beethoven Works, Great College Street, Camden Town, London, N.W.1.

MONTAGUE, Sidney.—Director and Sales Manager, Montague Radio Inventions and Development Co., Ltd., Beethoven Works, Great College Street, Camden Town, London, N.W.1.

MOODY, Alexander Edmund. Exhibitions Organiser to the R.M.A., Astor House, Aldwych, W.C.2. Born April 12, 1886. 1906-1914 Chief Engineer, Jury's Imperial Pictures and Imperial Playhouses, Ltd. Shortly after war, Managing Director Moody's Ltd., electrical engineers. 1922-1928 joint radio sales manager, British Thomson-Houston Co., Ltd. Joined R.M.A. in 1928. War Service. Paravane Section R.N.V.R. 14th Destroyer Flotilla. Private address: 86, Augustines Avenue, Wembley, Middlesex.

MOORE-BRABAZON, Lt.-Col. J. T. C., M.C., M.P.—President R.M.A., 38, Eaton Square, London, S.W.1. Educated at Harrow and Cambridge; early pioneer in motoring, aviation and radio; held a transmitting licence on the spark system before the war; Conservative M.P. for Rochester, 1918–29; Wallasey, 1931; was Parliamentary Secretary to the Ministry of Transport, 1923–7, during which time was largely responsible for passing the Electricity Act; is a director of Associated Equipment Co., Ltd., and Kodak, Ltd. Born February 8th, 1884. Recreations: yachting, golf, Swiss ice sports. Clubs: White's, Carlton, R.Y.S.

MORGAN, Herbert, T.—Partner, Dan Morgan, 218, Oxford Street, Swansea. Founder and Secretary W.R.A., South Wales Branch; founder Swansea Radio Society, 1922; organised the first Wireless Exhibitions in Wales in Swansea, 1923 and 1925; joined his father's motor and cycle business in 1912, adding radio in 1922; Inventor of the Electrical Violin. Born August 14th, 1895. Recreations: tennis, swimming, gardening, music. Private, address: 50, Beechwood Road, Swansea.

WHO'S WHO IN RADIO

MORRIS, James R., B.A.— European Representative, National Carbon Co., Inc., 15, Kingsway, London, W.C.2. Has represented his firm and affiliated companies in Europe for 20 years. Born September 7th, 1890. Private address: 49, Eton Court, London, N.W.3.

MORRISON, L. Claude.—Director, Kolster-Brandes, Ltd., 163-165, Great Portland Street, London, W.1. Recreation: tennis.

MOSELEY, Sydney Alexander.—Director Baird Television, Ltd., 505, Cecil Chambers, Strand, London, W.C.2. Chairman and Director, Television Press, Ltd.; F.R.G.S.; connected with journalism since 1910; written extensively on radio. Born, March 9th, 1888. Recreations: swimming, golf: travelling.

MULLARD, Stanley Robert.—Chairman The Mullard Wireless Service Co., Ltd., Director, The Mullard Radio Valve Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2.; Vice President, R.M.A. from 1928 to date; Member, Grand Council Federation of British Industries, 1931; holds various directorships in manufacturing companies in electrical and sound recording industries; from 1910-15 head of Research Dept., Ediswan; during war, Lieut., R.N.V.R. and Capt. R.A.F.; after war founded Mullard Companies.

MULVEY, R. G.—Advertisement Manager, "The Wireless and Gramophone Trader," St. Bride's House, Salisbury Square, Fleet Street, London, E.C.4.

MURPHY, Frank, B.Sc., A.M.I.E.E., A.I.Rad.E., M.B.E.—Managing Director, Murphy Radio, Ltd., Welwyn Garden City, Herts. Founded present company 1927, after service in Engineering Dept. P.O.; Wireless Officer R.A.F. during War and later O.C. Officers Wireless School R.A.F. Born June 16th, 1889. Recreations: tennis, walking. Private address: 25, Brockswood Lane, Welwyn Garden City, Herts.

MUNNS, Thomas Leonard.—Proprietor, Hillside Lighting Accessories, South Hill Avenue, South Harrow. President, Harrow and District Branch W.R.A. Born February 8th, 1895. Private address: 91, Kingsley Road, South Harrow.

NAYLOR, William Slater, M.I.E.E.—Chairman and Managing Director, Chloride Electric Storage Co., Ltd., Clifton Junction, near Manchester.

NECK, Leslie T.—Managing Director, Columbia Graphophone Co., Ltd., 98-108, Clerkenwell Road, London, E.C.1. Chairman of Executive Federation of British Music Industries, 1930-32. Formerly Manager, Gramophone Co., Ltd., up to 1931.

NELSON, James.—In charge of upkeep of communications, transmission lines, sub-stations and their contents, Central Electricity Board (Central England Area), 53, Wake Green Road, Moseley, Birmingham. M.I.E.E., M.I.S.E., M.I.R.E. (America), M.I.W.T.; Chairman and one of the founders of same; Member of the Wireless Section of I.E.E. (England); Sometime a Fellow of the Radio Association, as well as vice-president and member of council; has experimented with mechanically rectified currents up to 300,000 volts; was electric specialist afloat with Fleet during war, this included early valve work, C.W. and spark; experimental work 1919-20 on Rectified A.C. by means of valves for producing high D.C. pressure for cable testing, 1924-6; experimental work in connection with radio active "cold" valves and German patents using "Resinators" instead of valves; has actually worked on wireless since 1910; radio communication by means of Canns wires of particular interest in connection with present occupation. Born June 4th, 1881. Recreations: motoring, photography, electrical experimental work. Private address: 26, Cotton Lane, Moseley, Birmingham.

NIGHTINGALE, Harold. — Proprietor Nightingales, 436, Wilbraham Road, Chorlton-cum-Hardy, Manchester. Secretary, Manchester W.R.A. Added radio to music business, 1928. Born July 29th, 1892. Recreations: golf, cricket and football. Private address: 22, Stamford Road, Chorlton-cum-Hardy, Manchester.

NUNN, Robert Henry.—Managing Director, Regentone, Ltd. Proprietor of Regent Radio Supply Co., 21, Bartlett's Buildings, London, E.C.4. Born March 26th, 1901. Private address: Tetherdown, Courtlands Avenue, Hampton, Middlesex.

O'CONNELL, Henry.—Director, Climax Radio Electric Ltd., 59, Parkhill Road, London, N.W.3. With Belling Lee, Ltd., 1923; Regentone, Ltd., and Regent Radio Supply Co., 1926. Joined Climax, 1931. Born July 16th, 1891. Recreations: fishing, golf. Private address: Coverdale, Harcourt Road, Wallington, Surrey.

OLDHAM, John.—Managing Director, Oldham & Son, Ltd., Denton, Manchester. Born, 1895. Recreations: golf, riding. Private address: The Gerrards, Gee Cross, Hyde, Manchester.

OLIVER, Charles.—Chairman and Managing Director, Oliver Pell Control Ltd. (Varley), Cambridge Place, Burrage Road, Woolwich, London, S.E.18. A.I.E.E. Founded company in 1898.

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WHO'S WHO IN RADIO

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OSBORNE, Gerald Robert.—Sales Manager, Marconiphone Co., Ltd., 210-212, Tottenham Court Road, London, W.1. Wireless operator M.I.M.Co., Ltd., 1917. From 1922 with present company. Born November 4th, 1900. Recreation : golf. Private address : 42, Chalkhill Road, Wembley Park, Middlesex.

OZANNE, Guy Durand, M.C.—Manager, Wingrove & Rogers, Ltd., 188-9, Strand, London, W.C.2. M.I.E.E. Joined Indian Army, 1909. Entered Sandhurst 1908 ; Member of Council, R.M.A. ; served during war in East Africa, mentioned in dispatches ; retired 1923 with major's rank ; since November, 1930, Lt.-Col. Commanding 56th (First London) Divisional Signals, T.A. ; joined Radio Communication, Co., Ltd., 1924 ; manager, Broadcasting Dept., 1925 ; joined Wingrove & Rogers, Ltd., 1927. Born April 2nd, 1889. Recreations : tennis, golf, riding. Private address : 18, Woodlands Road, London, S.W. 13. Club : Junior United Service.

PANKHURST, Frederick Thomas.—Director, Ready Radio (R.R., Ltd.), Eastnor House, Blackheath, London, S.E.3.

PARTRIDGE, Clifford Arthur Frank.—Managing Director, Partridge & Mee, Ltd., 74, New Oxford Street, London, W.C.1. Born February 21st, 1900. Private address : 50, Litchfield Way, Hampstead Garden Suburb, London, N.W.11.

PATON, George.—Works Manager, National Radio Service Co., Ltd. ; late Managing Director, The Electrical Trading Association, Ltd., Aldwych House, Aldwych, London, W.C.2. A.M.I.E.E. Served 5½ years apprenticeship, W. E. Allen Son & Co., Bedford ; until 1914 worked in China ; served during War in Macedonia, India, etc. ; left army 1921 with Captain's rank ; Director, Harley Conyngham & Watt, Ltd. ; Works manager, The Crown Cork Co., Ltd. ; chief assistant, Radio Sales Manager, British Thomson-Houston Co., Ltd. ; sales manager, National Electric and Symphony Gramophone Co. ; manager, Lionel Stuart & Co', Ltd. Private address: 80, Temple Sheen, East Sheen, London, S.W.14.

PAYMAN, Herbert Saul, B.Sc. (London), B.Sc.Tech. (Manchester), A.Inst.P.—Chief Engineer, Radio Division, Igranic Electric Co., Ltd., 149, Queen Victoria Street, London, E.C.4. Was with B.T.H., Rugby, 1919-26 ; Marks & Clerks, 1926 ; War Office (Signals Experimental Establishment, Woolwich), 1926-9. Joined Igranic, 1929. Born August 29th, 1891. Recreation : golf. Private address : 73, Brighton Road, Purley, Surrey.

PAYNE-GALLWEY, Reginald Frankland.—53-54, Haymarket, London, S.W.1. B.R.V.M.A. With Mullards 1922-32, now acting as agent. Born April 15th, 1889. Recreations : shooting, golf. Private address : 28, Millbank, London, S.W.

PERKS, Frederick William.—Sales Manager, Columbia Graphophone Company, Ltd., 98-108, Clerkenwell Road, London, E.C.1. Born November 22nd, 1891. Private address : 20, Woodchurch Road, West Hampstead, London, N.W.6.

PETTYFER, Percy Hale.—Commercial Manager, Radio Division, Igranic Electric Co., Ltd., 194, Queen Victoria Street, London, E.C.4. Has served with Radio Communication Co., Ltd., 1919-22 ; Sterling Telephone & Electric Co., Ltd., 1922 ; and from 1923 has been with present company. Born August 29th, 1891. Recreation : golf. Private address : 73, Brighton Road, Purley, Surrey.

PHILIPS, Dr. Anton Frederick.—Managing Director, N. V. Philips' Radio, 29, Emmasingel, Eindhoven, Holland. Doctor L.C. Handelshoogeschool, Rotterdam. Born March 14th, 1874. Private address : Huize de Laak. Eindhoven, Holland.

PHILLIPS, William Donald Knowles.—143, Sidwell Street, Exeter. Secretary, Exeter W.R.A. Born March 6th, 1906.

PINKHAM, Charles, M.A. (Cantab).—Publicity Manager, The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

POCOCK, Hugh Shellshear.—Editor "The Wireless World," Dorset House, Tudor Street, London, E.C.4. Born 1894.

PREEN, Arthur Harvey.—Managing Director, Arthur Preen & Co., Ltd., Crown Works, Southmill Road, Regents Park, Shirley, Southampton. A.M.I.M.E.

PRICE, Albert Edward.—Proprietor, 130, Whitchurch Road, Cardiff. Secretary: Cardiff W.R.A. With Edison Swan Electric Co., Ltd., 1913-30. Born 1897. Recreations : bowls, cricket, swimming. Private address : 130, Whitchurch Road, Cardiff.

PRINCE, Herbert Stanley.—Director, The National Radio Service Co., Ltd., A. W. Hambling, Ltd., 15-16, Alfred Place, London, W.C.1. During War attached to R.E. Signals, awarded Chevalier le Ordre de l'Couronne, and Croix de Guerre. Entered radio 1922. Service manager Philips Lamps, Ltd., 1928-9, and Selectors (1931), Ltd., 1931. Born 1895. Recreations : tennis, motoring. Private address : 229, Green Lanes, London, N.4.

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WHO'S WHO IN RADIO

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PROFFITT, Robert William, F.B.O.A. (Honours).—Managing Director, R. W. Proffitt, Ltd., 49-51, Knowsley Street. Bolton, Lancs. Secretary, Bolton W.R.A, Treasurer, North Western Area W.R.A. Entered radio 1924. Born May 31st, 1904. Private address: 46, Lakeside Avenue, Great Lever, Bolton. 'Phone: Bolton 1883.

PURVIS, Archibald Richard Fortescue.—Lt.-Commander, R.N. (Retd.). Technical Radio Correspondent "Daily Express," Fleet Street, London, E.C.4. Recreation: tennis. Private address: 13, Lancaster Street, London, W.2.

QUARRINGTON, Cecil Albert George.—Technical Service and lecturer, A. C. Cossor, Ltd., Cossor House, Highbury Grove, London, N.5.

RANSLEY, Henry Albert.—Proprietor, Service Radio, 54, Frogmoor, High Wycombe, Bucks. Secretary, South Bucks W.R.A. Born June 27th, 1902. Private address: 5, Totteridge Hill, High Wycombe.

REES, John M. G.—Director, Varley (proprietors Oliver Pell Control, Ltd.), 103, Kingsway, London, W.C.2. A.M.I.E.E. R.M.A. Council. Recreations: gardening, motoring. Private address: 79, Woodside, Wimbledon.

REITH, Sir John Charles Walsham.—Director General, B.B.C. Broadcasting House, London, W.1. A.M.I.C.E., M.Sc. (Lafayette). Served five years engineering apprenticeship in Glasgow; engineer, S. Pearson & Son, Ltd., London, 1913; during war, Major R.E. 1914-15, wounded; munition contracts for Great Britain in America, 1917; Admiralty 1918; Ministry of Munitions, 1919. General Manager, Wm. Beardmore & Co., Ltd., Coatbridge, 1920; General Manager, B.B. Co., Ltd., 1922; Managing Director, 1923. Clubs: Athenaeum, Royal Automobile. Born 1889.

RICE, Bernard Curtis, M.C.—Partner, Rice & Blackmore, Amersham. Secretary, Mid. Bucks W.R.A. Born June 10th, 1891. Recreation: aviation (R.A.F. Reserve of Officers, made squadron leader 1931). Private address: Griffin Hotel, Amersham.

RIDDIOUGH, John William.—Proprietor, Frank Riddiough & Son, 8-12, Simes Street, Bradford. Councillor Radio Wholesalers' Federation 1928 to date. A.I.R.E., A.M.I.B.E. Born February 12th, 1889. Recreations: motoring, short wave transmission and reception. Private address: Greenway, Tranmere Park, Guiseley, Yorks.

RIDGEWAY, John Whinfrey.—Assistant Manager, Radio Division, Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C.2. A.M.I.R.E. Engaged in electrical research work, 1918-24; joined Metro-Vick Supplies, Ltd., 1924; sales manager Radio Dept., 1928, since 1929 with present company. Born February 13th, 1903. Recreations: shooting, photography. Private address: Threeways, Ockley, Surrey.

RIDOUT, Herbert C.—Advertising Manager, Columbia Graphophone Co., Ltd., 98-108, Clerkenwell Road, London, E.C.1. Recreation: motoring.

ROBERTS, Harry Charles.—Northern Sales Superintendent, Mullard Wireless Service Co., Ltd. Marine Wireless Operator R.N.R. and Mercantile Marine for Marconi International Co., Ltd., from inception of service. Worked with Marconi till 1926, then joined Mullards'. Born November 5th, 1899. Private address: Willow Bank, Greasby Road, Upton, Cheshire.

ROBERTS, Hugh Wynne.—Director and Sales Manager, The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. Joined G.E.C. 1901, straight from school. Born September 12th, 1883. Private address: 52, Castle Bar Road, Ealing, London, W.5.

ROBERTSON, Arthur Albert George.—Manager and Buyer, Radio Dept., Dulcetto Polyphon, Ltd., 2-3, Newman Street, London, W.1 Born November 1st, 1900. Recreations: tennis, cycling, swimming. Private address: 1a, East Dulwich Road, London, S.E.15.

ROBINSON, Thomas Allen White.—Joint Managing Director, Pye Radio, Ltd., Radio Works, Cambridge. Member of Council R.M.A. Born August 28th, 1886. Private address: Woodlands, Long Road, Cambridge.

ROSEN, Edward E.—Chairman and Managing Director Ultra Electric, Ltd., Erskine Road, Chalk Farm, London, N.W.3. Member R.M.A. Council; entered Marconi's Wireless Telegraph Co., Ltd., before the war; served in Flying Corp, Radio Section, 1915-18; founded firm of Edward E. Rosen & Co. in 1919; converted to limited company 1927; has invented and patented many improvements in radio and gramophone amplifiers.

ROTHERMEL, Royden Albert.—Managing Director, The Rothermel Corporation, Ltd., and Sanocharde Reproducers Ltd.. 1, Willesden Lane, London, N.W.6. With various American manufacturing companies as export sales manager and manager until 1913; organised exporting business to Europe 1913; opened office

in London 1914; engaged in sale of motor car accessories and components until the beginning of the radio industry in Great Britain and has been part of it since, trading as R.A. Rothermel, Ltd. and latterly as The Rothermel Corporation, Ltd. Born May 13th, 1879. Recreations: golf, tennis. Private address: 23, Orchard Court, Portman Square, London, W.1.

ROYDS, George Dawson, B.Sc., A.I.P.A.—Managing Director, E. Walter George, Ltd., Advertising Consultants. Director Arts Publicity, Ltd., 1923; Sales Development Manager, Phillips Rubber Soles, Ltd., 1929. Present company, 1931. Born June 2nd, 1899. Recreations: farming, minx ranching. Private address: Olde Butterbox, Scaynes Hill, Sussex.

RUSSELL, Alexander John Sinclair.—27, Ditchling Road, Brighton. Secretary W.R.A. Brighton and District Branch; Secretary, Electrical Trades Union, Brighton Branch, 1918–20. Introduced Radio in 1922 into Electrical business founded in 1920, following 17 years' practical work in the electric and allied trades. Born May 26th, 1889. Private address: 26, Carlyle Avenue, Brighton.

SALAMAN, Walter John.—Sales Manager, Carrington Manufacturing Co., Ltd., 24, Hatton Garden, London, E.C.1. Staff Capt. R.A.F. during War. Connected with radio since 1911. Chairman British Radio Cabinet Manufacturers Association. Born February 18th, 1890. Recreation: motoring. Private address: 26, Queens Court, Hyde Park, London, W.2.

SHEPPARD, Arthur Henry.—Assistant Managing Director, The Ever-Ready Co. (Great Britain), Ltd., Hercules Place, Holloway, London, N.7. Director of the Ever Ready Trust Co., Ltd.

SHORE, George Charles.—Sales Manager, Reproducers and Amplifiers Ltd., Frederick Street, Wolverhampton. A.M.I.R.E. Member of Council of N.A.R.M. and N.A.R.M.A.T., 1923-27; sales manager, Burndept, Ltd., 1921; proprietor, G. C. Shore & Co., Newman Street, London, W.1, 1928; general sales manager, Symphony Gramophone Co., Ltd., and National Electric Co., Ltd., 1929-30. Was Sales Manager of Flinders (Wholesale), Ltd., up to 1932. Born August 26th, 1899. Private address: Straight Road, Lexden, Colchester.

SIMPSON, Adrian Francis Hugh Sibbald, Lt.-Col. R.E., C.M.G.—British Radiostat Corporation, Ltd., 29, George Street, Hanover Square, London, W.1. Stenode Corporation of America. A.M.I.E.E. Amalgamated Radio Telegraph Co., 1907; managing director of Russian Company of Wireless Telegraphs and Telephones of Petrograd and Dynamo Construction Works of Moscow, 1910-1914; attached to Russian General Staff for wireless duties, 1915; Chief of Wireless Intelligence Section, War Office, 1919; Director of Wireless to the Government of India, 1921; Deputy Managing Director, Marconi Wireless Telegraph Co., Ltd., and Marconi International Marine Co., Ltd., 1927; Director of various wireless companies, 1922-27, including: M.O. Valve Co., Ltd., Svenska Radioaktiobolaget, Radio Austria, Nederlandsche Seintoestellen Fabrick; Norsk Marconikompani; Radioromana. Born 1880. Recreations: shooting, fishing. Private address: Windham Club, 13, St. James Square, London, S.W.1.

SMITH, Edward Charles Scott.—Managing Director, Portadyne Radio, Ltd., 41, The Broadway, Ealing, London, W.5, and partner in Whittingham, Smith & Co. Interested in radio since 1925. Recreation: motoring. Private address: Florellen, Clitherow Avenue, London, W.7.

SMITH, M.—Radio Sales Manager, Oldham & Son, Ltd., Hyde Road, Denton, Manchester. Foreman in accumulator assembly, Oldham & Son, Ltd., 1921. Designs Dept., 1924; Sales Section, 1926; charge of Radio Sales Section, 1928. Born June 16th, 1890. Private address: 28, Haughton Green Road, Denton, Manchester.

SMITH, Robert George.—Managing Director, Smith's Cabinets, Ltd., 18-19, Hertford Road, Kingsland, London, N.1. Member British Radio Cabinet Makers' Association. Born April 22nd, 1896. Private address: 28, Merton Road, Leyton, London, E.10.

SMITH, Sydney.—Managing Director, W. D. Houghton & Co., Ltd., Sankey Mills, Warrington. Manager, Wire Sales Dept., British Ropes, Ltd., 52, High Holborn, London, W.C.2; Director, Cleckheaton Engineering & Motor Co., Ltd. F.R.S.A.; Capt. 4th Battn, The Duke of Wellington's Regt. (T.A.); member of Spenborough Urban District Council; Chairman, Spen Valley Voluntary Migration Committee. Born 1900. Private address: Hill Top House, Gomersal, nr. Leeds.

SMITH, William.—97, Coal Clough Lane, Burnley. Secretary, Burnley W.R.A. Born June 17th, 1900. Recreations: hockey, swimming, cricket.

SOBEL, Michael.—Managing Director, Kenneth Brooks (Radio & Television). Ltd.; Director, Zetavox Radio & Tele vision, Ltd., 72-86, Oxford Street, London, W.1.

WHO'S WHO IN RADIO

SPENCER, Arthur Thomas.—Sales Manager, M.P.A. Wireless (1930), Ltd., 62, Conduit Street, London, W.1. Born August 24th, 1880. Private address: 6, Lansdown Road, London, S.E.13.

SPINK, John Ronald.—Managing Director, Reliance Manufacturing Co. (Southwark), Ltd., Westbury Works, Westbury Road, Walthamstow, London, E.17. Founded company in 1911. Also Director of T. A. Harris, Ltd., & C. J. Baylis & Son, Ltd. Born March, 1888. Recreations: tennis, gardening, fishing. Private address: Ravenswood, Gordon Avenue, Highams Park, Essex.

STANLEY, Charles Orr.—Managing Director Arks Publicity, Ltd., 63, Lincoln's Inn Fields, London, W.C.2.; Director of Irish Radio Publicity, Ltd., and United Radio Manufacturers, Ltd. Recreations: yachting, hockey, golf, fishing. Private address: Mayfair Court, Stratton Street, London, W.1.

STANLEY, Edward James Walker, M.A., B.Sc.—Director, Climax Radio Electric, Ltd., Haverstock Works, Parkhill Road, Hampstead, London, N.W.3. Prior to joining Climax, was five years Managing Director, E. Walter George, Ltd., Radio Advertising Specialists. Born April 6th, 1896. Recreations: tennis, golf, yachting, swimming. Private address: Devonshire Club, St. James Street, London, S.W.1.

STEARN, Robert John.—Partner, R. J. Stearn & Co., 7, Manchester Street, Luton. Beds. Secretary, Luton W.R.A.; Member National Council, W.R.A., 1931-2; President Luton Chamber of Trade, 1928. Born November 9th, 1886. Recreations: bowls, motoring. Private address: 38, Westbourne Road, Luton, Beds.

STRACHAN, David Grant.—Secretary, Radio Manufacturers Association, Astor House, Aldwych, W.C.2. Secretary, National Association of Radio Manufacturers, 1923-1924, and of National Association Radio Manufacturers and Traders, 1924 to 1926. Born, July 26th, 1866. Recreation: gardening.

SWINEY, Douglas Herbert William.—Area Sales Manager, Wingrove & Rogers, Ltd., 188, Strand, London, W.C.2. During war R.F.C. and R.A.F. Wireless Section; Radio Communication Co., Ltd., 1922-27. Born April 23rd, 1898. Recreations: golf, yachting. Private address: 88, Thames Drive, Leigh-on-Sea. Phone: Leigh-on-Sea 7358.

TAFHOUSE, John Milner.—3, Magdalen Street, Oxford. Secretary, Oxford W.R.A.

TANTON, John Howard.—Managing Director, Montrose Garages, Ltd. (Wireless Section), 47a, Akerman Road, Brixton, London, S.W.9. Founder member of I.W.T.; Member of Council, 1925; Treasurer 1927 onwards, A.M.I.R.E.; Articled in 1898 to chartered accountant, has worked in West Africa and British North Borneo; during War served Ministry of Munitions and R.A.F., 1917-25, Rank: Captain; 1925-27 engaged in private wireless experimental work; founded Montrose Garages, 1927. Born April 26th, 1881. Recreations: swimming, tennis, hockey, rowing. Private address: 14, Durand Gardens, London, S.W.9.

TAYLOR, J.—The Cheshire Wireless Co., 98-100, Brighton Street, Wallasey. Secretary, W.R.A., Wallasey Branch.

TAYLOR, William Arthur.—Proprietor of H. Taylor & Son, Bridge Street, Walsall. Chairman, Birmingham M.T.A. 1926, and Walsall Chamber of Commerce, Retail Section, 1928-31. Born April 1st, 1880. Private address: 10, Mellish Road, Walsall.

TEBB, Charles William.—The Marconiphone Co., Ltd., 210-212, Tottenham Court Road, London, W.1. Has represented Siemens and Mullards. During War, Lieutenant R.F.A. Born November 18th, 1892. Recreation: golf. Private address: 790, Sidcup Road, New Eltham.

THOMAS, John Henry.—General Manager, A. C. Cossor, Ltd., Cossor House, Highbury Grove, London, N.5. M.C., M.I.E.E.

TODD, John Clifford.—87, Commercial Street, Dundee. Secretary, Dundee W.R.A. Born October 7th, 1895. Recreation: kinematography (is Secretary of Dundee Kine Society). Private address: 5, Newington Terrace, Broughty Ferry, Angus.

TURLE, Edgar Harold.—Chief Electrical Engineer, H. J. Cash & Co., Caxton House, Westminster, London, S.W.1, M.I.E.E., M.I.R.E., A.M.I.Mech.E.; Vice-Chairman I.W.T. 1926; President, 1932 onwards; pupil to G. F. Ratcliff 1903; Chief Assistant Engineer 1909; Resident Electrical Engineer new works (E.H.T.) Billingham, 1918; Chief Electrical Engineer since 1919; Lecturer in Electrical Engineering, Tottenham Polytechnic, 1924–31; Special Lecturer in Mechanical Power Equipment, Croydon Polytechnic, since 1930, now Senior Lecturer in Electrical Engineering, Croydon Polytechnic; author of many articles on radio and allied subjects. Born December, 1887. Recreation: camping, Private address: Deerhurst, Beckenham.

VERRELLS, Henry Victor.—Export Manager, E. K. Cole, Ltd., Ekco Works, Southend-on-Sea. Recreations: golf, motoring.

VERRELLS, William Streatfield.—Chairman and Managing Director, E. K. Cole, Ltd., Ekco Works, Southend-on-Sea. Private address: 89, King's Road, Westcliff-on-Sea.

VOIGT, Paul Gustavus Adolphus Helmuth.—Research laboratory, Edison Bell, Ltd., 62, Glengall Road, London, S.E.15. B.Sc., A.M.I.E.E.; has been with present firm since 1922. Born December 9th, 1901. Recreations: motor cycling, tennis. Private address: 53, Church Road, London, S.E.19.

WALKER, George Leonard.—Manager, portable accumulator section, National Accumulator Co., Ltd., 50, Grosvenor Gardens, London, S.W.1; trained at Edmundson's Electricity Corp., Ltd.; has served Siemens, Armstrong Whitworth; Chloride Electrical Storage, and Pritchett & Gold, whose portable sales were taken over by National Accumulator Co. Born December 4th, 1890. Recreation: tennis, Private address: Lawnswood, Grimwade Avenue, Addiscombe, Surrey.

WATES, Frank Stanley Spooner, B.Sc.—Managing Director, Wates Radio, Ltd. Proprietor, Standard Battery Co.; Managing Director, Shaftesbury Radio Sales Co., Ltd., and Electrical Measuring Instruments Co., Ltd., 184-188, Shaftesbury Avenue, London, W.C.2. Trained at British Westinghouse; served in R.A.F. during War; sold crystal sets prior to B.B.C. Recreations: golf, yachting, tennis.

WATKINS, A. E.—Managing Director, Watmel Wireless Co.,Ltd., Imperial Works, High Street, Edgware, Middlesex.

WATKINS, Harold.—Radio Correspondent, "Daily Mail," Northcliff House, London, E.C.4. Born October 17th, 1896. Private address: 27, Clareville Grove, South Kensington, London, S.W.7.

WELLER, Sam Robert John Thomas.—Hornsey Rise, London, N.19. Secretary W.R.A. North London Branch 1931–2; Council Delegate W.R.A., 1932; A.I.W.T.; served in Royal Navy 1914–1919; motor engineer 1922; garage proprietor and engineer, opening radio department 1923. Born January, 1889.

WELLINGS, John.—Sales Manager, Telsen Electric Co., Ltd., Aston Road, Birmingham. Chairman W.R.A. Birmingham Branch 1930; Vice-Chairman 1931; National Chairman W.R.A. 1931; apprenticed to mechanical engineering; opened on own account 1921; radio department 1924. Born June 12th, 1897. Recreations: fencing, amateur transmitting (call sign, G2MU). Private address: 86, Stamford Road, Handsworth, Birmingham.

WHEELDON, Douglas Parker.—Manager, Six-Sixty Radio Co., Ltd., 17-18, Rathbone Place, London, W.1.

WHEELER, Ralph Edmund,—Director and Secretary, Hart Collins, Ltd., 38a, Bessborough Street, London, S.W.1. On Executive Council R.M.A. 1930; Assistant Works Manager and Organiser, British School of Motoring 1913; Machine Gun Corps 1916; since 1920 present company. Born March 18th, 1886. Recreations: billiards, motoring. Private address: Not the Towers, Manor Road, Mitcham.

WHITAKER, Alfred, M.A., F.Inst.P.—Director of Electrical and Musical Industries, Ltd., The Gramophone Co., Ltd., The Marconiphone Co., Ltd., and The Columbia Graphophone Co., Ltd., Hayes, Middlesex.

WHITELEY, Alfred Harold.—Managing Director, Whiteley Electrical Radio Co., Ltd., Radio Works, Mansfield, Notts. Born June 15th, 1893. Private address: 100, Forest Road, Mansfield, Notts.

WHITTINGHAM, Robert Buxton,—Chairman and Managing Director, Portadyne Radio, Ltd., Gorst Road, North Acton, London, N.W.10. Founder of Whittingham, Smith & Co.; pioneer of portable radio receivers, and claims to be producer of first radio portable incorporating a loudspeaker. Born 1900. Recreation: flying. Private address: Oakdene, Manor Road, Hinchley Wood Esher, Surrey.

WILLBY, Stanley George.—Editor "Wireless & Gramophone Trader" and associated publications, St. Bride's House, Salisbury Square, London, E.C.4. Lifelong association with journalism; joined "Wireless Trader," 1924. Born November 22nd, 1900. Private address: 2, Sunnyside Drive, Chingford, Essex.

WILLIAMS, John Harold.—Director, Marconiphone Co., Ltd., 210, Tottenham Court Road, London, W.1. Management and General Committee, B.R.V.M.A. Council, R.M.A. Has served with Marconiphone Co., Ltd., since 1922, as Sales Representative, Assistant Branch Manager, Assistant Sales Manager, Sales Manager. Born May 4th, 1896. Recreations: golf, motoring. Private address: 20, Blenheim Gardens, Wembley Park, Middlesex.

WILLIS, Robert.—Chairman & Joint Managing Director of Dulcetto Polyphon, Ltd., 2 & 3, Newman Street, London, W.1,

WILLIS, Robert Gordon.—Joint Managing Director, Dulcetto-Polyphon, Ltd., 2-3, Newman Street, Oxford Street, London, W.1.; also Managing Director of Radio and Allied Sales, Ltd., and Park Electric Radio Productions, Ltd.

WHO'S WHO IN RADIO

WILLMOTT, Charles William.—Director, W. & G. Public Address Co., Ltd., 43-51, Prince of Wales Road, Norwich; Proprietor of Willmott's, Norwich; Chairman Eastern Branch W.R.A.; Member W.R.A. Council.

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RADIO SERVICING

Fundamental Testing Methods

As the technique of broadcast reception advances and becomes more involved, the dealer must increase his general technical knowledge. It is now almost an axiom that the dealer who can give good technical service is the dealer who is regarded as the "live" man in his district. Many dealers are, perhaps, a little apathetic in the matter of remaining abreast with technical developments. They feel that things are now so complicated that they are definitely beyond their capabilities. But this is certainly not the case.

Even the most complicated all-mains multi-valve superheterodyne receiver is simple in its mode of operation. If a dealer has a proper understanding of a few fundamental principles, he will experience no more difficulty in checking over every part of such a receiver than he does with a one-valve set.

These few fundamental ideas are briefly described in the following pages, and it is also shown how they can be applied to logical, systematic testing. This alone, however, would not be quite sufficient, and some space is given to brief descriptions of the chief components used in broadcast reception. Their good and bad points, the troubles they may cause and the identification and elimination of these troubles are dealt with. The idea is further extended in dealing with complete receivers.

Fundamental Testing Methods.

A receiver is composed entirely of a number of separate circuits. Any particular receiver can only operate correctly when the correct number of circuits exist, and *only* the correct number exist. When a receiver fails, apart from valve trouble, which will be dealt with later, it is either because one of the circuits has become incomplete, or because a new circuit has developed.

Fault testing is, therefore, almost entirely a matter of testing for continuity. It consists of looking for continuity where it is required and of finding if continuity exists where it is not required. This is the basic and fundamental idea underlying every servicing or testing operation which a dealer will ever be called upon to perform.

All tuning coils, high-frequency chokes, low-frequency chokes, and resistances, must be electrically continuous in the circuits in which they are included. If they are not, then a fault exists. In the case of a condenser, there must be no continuity in so far as direct currents are concerned. If there is continuity then the condenser is faulty.

In the case of a resistance, choke or transformer which consists of a winding of a large number of turns, there must still be continuity but there must be what is called a high-resistance path. The value of this resistance, which can be measured extremely simply, and can be regarded as the extent or degree of continuity, is an indication of the correct condition or otherwise of a particular component.

For radio testing, then, some simple means must be devised for discovering (1) continuity or complete circuit, (2) discontinuity or open circuit, (3) extent of continuity or resistance. There are certain minor modifications which will be dealt with later, in addition, of course to the matter of valve testing.

Testing Instruments.

Continuity or the existence of a complete circuit can be determined by either aural or visual means. Aural means include telephone receivers and buzzers. Visual means include flash lamps and meters. Both need, of course, a source of power.

Fig. 1 shows three alternative test devices with a pair of leads. When these leads are joined, the indicator operates. It may be necessary to test for continuity from a filament battery terminal to a valve holder socket. All that has to be done is to connect one lead of the test arrangement to the terminal and the other to the valve socket. If the circuit is perfect, the indicator will work. If a short circuit across a condenser is suspected only the two leads from the condenser have to be removed and the leads from the test set connected in their place. If a complete short circuit has developed, the

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indicator will work. If it does not, the condenser is not completely short circuited.

So far only complete circuits containing no resistances and totally incomplete circuits have been considered. Sometimes, however, a complete circuit will contain a resistance which cannot be found by the indicators seen in Fig. 1. For this reason it is preferable to use the simple arrangement shown in Fig. 2, which consists of a voltmeter and a battery.

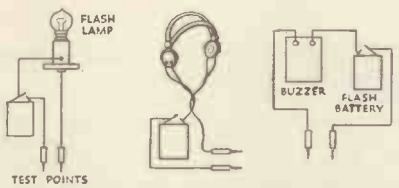

FIG. 1.—How a flash lamp, headphones and a buzzer can be used for circuit testing. Only a click is obtained in the headphones, but the lamp and buzzer give continuous indication.

If these are used, when a complete circuit exists across the leads a full voltage reading is obtained.

It frequently happens that a resistance is developed in a set, due perhaps to a "dry joint" caused by bad soldering. The indicators in Fig. 1 probably would not show the presence of a bad contact. The voltmeter arrangement will.

For example, if a six-volt battery and a low reading voltmeter is being used, a complete circuit will always give a reading of six volts. If, however, a joint has developed a high resistance a reading of less than six volts will be obtained. Obviously this method makes possible the location of somewhat obscure sources of trouble, which practically any other test method would not reveal.

Invaluable Ohm's Law.

The arrangement of Fig. 2 gives a clue to a method of measuring resistances.

If a set requires a 50,000 ohms anode resistance, and a fault develops so that the resistance becomes 10,000 ohms or, perhaps, 200,000 ohms, the set obviously will not operate properly. Accordingly, it is desirable to be able to determine approximately the value of any resistance which is used in a set.

There is a fundamental rule, known as Ohm's law, which makes this very easy to do. It holds good under all conditions. Whatever the voltage or electrical pressure that exists, the current which flows is dependent upon the resistance. The law is only a matter of arithmetic. The resistance is always given by the voltage divided by the current.

Obviously if a battery is connected in series with an unknown resistance and a meter for measuring the current, the resistance can be found by dividing the battery voltage by the current.

This simple law is, of course, all the more valuable because all the factors are interdependent. If two are known, the third can always be calculated. If the resistance and the current flowing are known, so is the voltage. If the resistance and the voltage are obtainable what current must flow can be found.

$$I = \frac{E}{R} \qquad R = \frac{E}{I} \qquad E = RI$$

where I is current, R resistance and E voltage

Meters.

All circuit testing, then, can be carried out with a voltmeter and a battery. Resistance measurements require only a battery and an arrangement for measuring voltages or currents. Where valves are concerned, all that has to be measured is the amount of anode current at various anode and grid voltages. On occasions it may be necessary to check the actual filament consumption. This means that complete testing can be carried out with a very small number of meters. The suggested minimum are tabulated below.

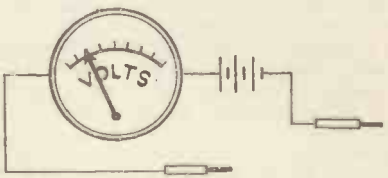

FIG. 2.—A voltmeter and battery form a circuit tester which enables resistance to be measured.

Meters for Universal Testing.

D.C. Meters.		A.C. Meters.	
Meter.	Suggested Range.	Meter.	Suggested Range.
Volts ..	0–8	Volts ..	0–5
Volts ..	0–250	Volts ..	0–300
Amps. ..	0–3	Amps. ..	0–8
Milliamps	0–10	Milliamps	0–100
Milliamps	0–50	NOTE.— Meters bracketed together may be combined.	
Microamps ..	0–10		

FIG. 3.

Dealers are advised to use first grade instruments. Meters are frequently classified by the resistance per volt reading on the scale. The lowest reading which is satis-

factory for general work is 200 ohms per volt. For testing accurately the output of high-tension eliminators, a 1,000 ohms per volt instrument is best, because a 200 ohms per volt instrument imposes a load of 5 m.a. at full scale on a 150 volt supply.

Combined testing instruments are very attractive, and they save money. They are however, more limited in their application than a number of separate meters. There are many occasions when it is required to read simultaneous currents and voltages, and this, of course, cannot be done by a universal meter without disconnecting or using special switching arrangements.

With the aid of the meters shown in Fig. 3, the dealer will be able to test anything from a single-valve battery set to an all-mains radio-gramophone.

It is now necessary to consider in detail the various components used in receivers and to see how the fundamental testing methods can be applied in each case. Accumulators, valves and gramophones are dealt with under separate comprehensive headings, after we have considered components and sets in general.

TESTING COMPONENTS.

Aerial and Earth Circuits.

The increased efficiency of the valve and the use of multi-valve receivers has resulted in considerable neglect of the aerial and earth circuit. While a piece of wire inadequately insulated and roughly attached to the nearest gable enables reception from Continental stations to be obtained without difficulty, it is by no means efficient or desirable.

The most important point to be considered is the use of as short a lead-in as possible. This should be kept well away from the house. When it is brought into the room it should not be taken round picture rails or tacked closely to the wall, unless absolutely unavoidable. It should be taken to the set by the shortest possible route. A set is best installed near the window. Similarly, the earth leads should be kept as short as possible.

The less sensitive a receiver and the more simple its nature, the greater should be the care taken with the aerial and earth system. Even the simplest form of insulator proves reasonably effective. The most elaborate form of insulated cable with a long trailing lead-in will give far worse results than a simple direct, indifferently insulated aerial. Dielectric losses due to a trailing lead-in are a serious factor, and they tend to unbalance a set.

A good earth is essential, particularly in the elimination of hum in a mains receiver

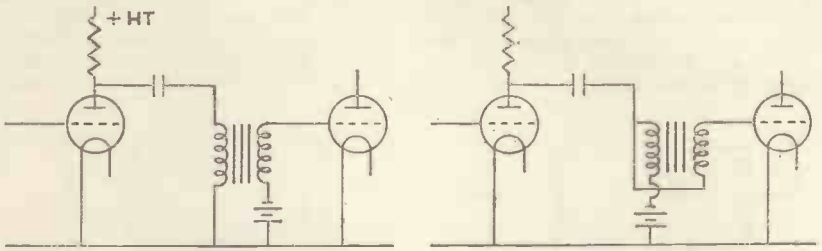

FIG. 4.—Anode feed system for a transformer giving (A) a direct connection and (B) an auto-connection, which increases the step up ratio.

If an earth tube is used, it should be buried as deeply as possible. An earth tube deeply buried in moist earth some feet from the wall of a house and necessitating a longer earth lead, is better than one pushed into hard dry ground by the side of a window.

Connection to a lead water pipe still forms one of the most effective earth connections. Gas companies object to the use of their pipes for earth connections and the practice should not be encouraged, even though it may prove effective. Pipes with screwed joints are obviously not as good as an electrically continuous pipe such as a lead water main.

Adequate precautions must be taken to prevent corrosion or bad contacts with lead-in tubes and earthing switches. Those in which the actual joints are protected from the weather are preferable in every respect. Where a lead-in is connected to a terminal which is exposed to the atmosphere, it is preferable to coat it heavily with vaseline or even a heavy coat of paint.

Anode Feed System.

The performance of a small transformer is always improved by removing the steady anode current from the primary winding. In the case of a special nickel alloy transformer which has a high incremental permeability, it is essential.

The transformer should be connected as shown in Fig. 4. This indicates alternative arrangements which vary the ratio by making

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an ordinary transformer an auto transformer, in which the primary and secondary windings are electrically continuous.

The value of the anode resistance depends upon the impedance of the valve with which the transformer is used. Approximately from 20,000 to 50,000 ohms is a useful range. The higher the impedance of the valve, the higher must be the value of the resistance. The feed condenser should be from 0.5 mfd. to 1 mfd. in capacity.

If a resistance-fed stage suddenly gives trouble resulting in loss of amplification and thinness of quality, it may appear at first sight to be due to shorted turns. On the other hand, it is more likely to be caused by failure of the feed condenser. Should this develop a bad leakage path a direct current load is imposed upon the primary of the transformer, the performance of which will then be completely spoilt. This fact should be determined by isolating the condenser and testing it separately.

Band Pass Units.

Band pass tuners consist of two identical inductances tuned by two identical condensers. In addition to the two main coils, if no aerial tapping is provided there is a small coil which acts as an aerial coupler. In some cases there is a coil which is used as a common portion of the two inductances for coupling purposes. In other cases, the two coils are coupled through a common condenser.

The actual windings of the coils should be tested in the normal manner, and the same remark applies, of course, to the tuning condensers. Most band pass units have a ganged control, and it is essential that the ganging is perfect, as otherwise there will be loss of signal strength, and the quality will also suffer owing to excessive side band cutting.

A band pass unit designed to work in conjunction with a screen should always be used with the screen and the use of a band pass unit of an unscreened type with a closely fitting screen will unbalance it.

Fig. 5 shows the most usual forms of band pass tuner. It will be seen that the second coil is connected to the input of the receiver, while there is no connection between the set and the first coil. The aerial coupling coil is generally fixed. No attempt should be made to modify any portion of the tuner in any way, as the correct matching of the two halves is an absolute necessity.

High-Frequency Chokes.

Desirable qualities in a high-frequency choke are a large inductance, a low self-capacity, and a small, concentrated field. A binocular arrangement helps to limit the field. Slots and fine wire limit the self-capacity and a large number of turns gives a high inductance. The resistance of a high-frequency choke varies very considerably with various makes. This does not matter since the other factors are the most important.

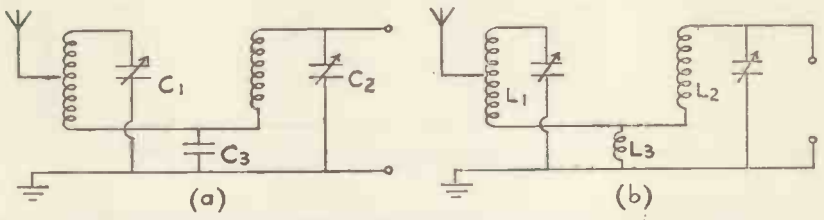

FIG. 5.—Two typical band-pass circuits. In (a) capacity coupling is used, in (B) inductive coupling.

There is no easy method of testing a high frequency choke, since it is really necessary to measure its impedance when connected in the anode circuit of a valve which is amplifying at all frequencies over the broadcast range. As a rough test, however, a choke can be connected in series with the aerial lead of a fairly sensitive receiver. If it is found that fairly loud signals are obtained when the choke is connected, it is usually an indication that it is not too effective.

An essential mechanical feature of a good high-frequency choke is a positive mounting of the former at the base so that it cannot rotate and so break the fine connecting wires taken to the terminals.

Low-Frequency Chokes.

Many of the statements made with respect to low-frequency transformers apply equally to chokes. When an ordinary alloy is used for the core, a large cross section and a large number of turns are required for a high inductance. In the case of special alloys, the overall dimensions can be reduced for the same inductance.

Faults likely to develop in chokes are intermittent contacts due to a breakage, short circuited turns and leakage to frame.

A circuit tester will indicate the presence of an earth to frame, and the continuity of winding. A silence tester (Fig. 6) can be used to check up the condition of the winding and the joints. If short circuited turns are present, thinness of reproduction and loss of volume indicate this condition.

Most chokes intended to carry large steady anode currents have an air gap in the core.

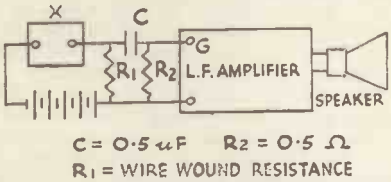

FIG. 6.—Circuit for a silence tester. A current from the battery is passed through a high resistance R1 and the component under test X. Connection to the grid of the first amplifier is through a condenser C, and a leak R2.

This air gap is only a matter of a few thousandths of an inch, and if any repairs are carried out to the choke, great care should be taken not to disturb the gap as may be done if the clamping frame is removed. Most air gaps, however, are filled with a thin sheet of insulating material against which the core stampings are firmly pressed.

There is no easy method of measuring the inductance of an iron core choke, particularly in the case of one carrying a D.C. current. A rough idea can be obtained by connecting the choke in series with a small battery and a milliammeter of the moving-coil type, watching the rate at which the needle rises to its maximum value. If the needle comes to this point very slowly, it indicates that the inductance is large. The quicker it reaches this value, the lower is the inductance of the choke.

Fixed Condensers.

Small fixed condensers rarely give trouble if they are of the mica type. Cheap varieties which are not too well made sometimes develop a fault at the connection of the plates to the terminal. This fault can be detected by using a silence tester of the type shown in Fig. 6. If any "scrappiness" arises when the terminal is moved or lightly tapped, the condenser should be discarded. A complete breakdown of this type of condenser is very rare.

Larger condensers of the tin foil and wax-paper variety are far more likely to develop faults. A complete short circuit will be shown by one of the continuity testers. Partial leakage is not so easy to determine without a sensitive instrument. The following test, however, will show whether a condenser is in a good condition.

The condenser should be connected to a 200 volt high-tension battery or to D.C. mains, and allowed to stand for half a minute after being disconnected, care being taken not to touch the terminals. It should then be short circuited through a resistance of about 100 ohms when there should be a distinct spark. If there is no spark, it is a fairly certain indication that the condenser is leaking.

A leaking condenser can be regarded as a high resistance and tested accordingly, provided a sufficiently sensitive measuring instrument is available. The best arrangement is a small battery and a microammeter or galvanometer as in Fig. 7A. When connecting the microammeter and battery in circuit with the condenser, the circuit should include a safety resistance of such a value that if the condenser were completely short circuited only full scale deflection would be obtained. This will safeguard the meter. In addition, it is essential to short circuit the meter for a few seconds when the circuit is first connected, as a comparatively heavy charging current flows into the condenser.

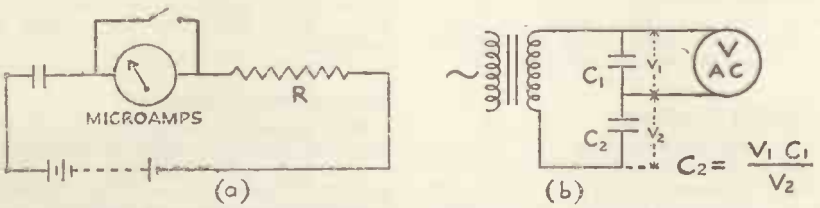

FIG. 7A.—When measuring the insulation of a condenser, a safety resistance R must be included in the circuit, the microammeter being shorted by a switch, while the condenser charges. How the capacity of a condenser can be checked is shown in (B).

The capacity of a large fixed condenser can be checked roughly by the arrangement shown in Fig. 7B. It is connected in series with a condenser of known value. A high resistance A.C. voltmeter such as a rectifier instrument is connected across both condensers. The capacity of the unknown condenser is given by the formula shown in the diagram. It is, of course, a matter of proportion.

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Variable Condensers.

Modern variable condensers are made so accurately that there is rarely occasion to question the capacity. Points to look for in a condenser are: sound bearings with an even "feel" throughout the entire movement, and absence of hard or slack spots; a good connection to the rotor, preferably by a pigtail; and firm anchoring of the stator assembly on a reasonable amount of insulating material which does not lie in the field of the condenser.

Accurate alignment of the plates is necessary. When a condenser is full-in the spacing should appear even. In particular, the spacing should appear the same when viewed from either side.

Scrapiness is the chief trouble caused by variable condensers. It is usually due to a bad friction connection to the rotor. Tightening and lubrication of bearings usually effects a cure.

If a fault persists the condenser should be returned to the makers. The slightest suspicion of scraping in a condenser used in a powerful receiver is the cause of intermittent background noise which is sometimes extremely difficult to trace.

Grid Leaks.

There is, fundamentally, no difference between a grid leak and an ordinary high resistance. The method of testing is identical except that it is preferable to measure the value at a low voltage with a microammeter. The calculation is exactly the same, and if the voltage is measured in volts, and the current in microamps., the value of the resistance is given in megohms. It is important that a grid leak be absolutely silent, particularly when it is used in a detector circuit.

Moving Coil Speakers.

Speakers can be tested in two different ways, for faults and for frequency response. The only satisfactory way of testing the frequency response of a speaker is to connect it to a good amplifier energised either from a beat oscillator or from a constant note record. This test will show two qualities of the speaker, a complete cut off or a resonance. If the input is kept constant, resonances will be apparent by a great increase in volume of certain frequencies. Cut off, of course, will be shown by the absence of any appreciable radiation.

A good moving-coil speaker should give excellent radiation at both ends of the scale, while the characteristic should be reasonably flat. The response should be fairly level in the region of 5,000 cycles and above.

Record scratch does not necessarily indicate that a moving coil speaker gives good top response, because very frequently scratch frequencies come out well, but frequencies in the neighbourhood of 4,000 to 6,000 cycles may show a distinct drop.

An excellent way of testing the bass response of a speaker is to utilise a 50 cycles mains supply. A true 50 cycle note should be used. It is easily obtained by connecting a long length of flex to the input of an amplifier and bringing it near to the mains leads. A grid leak should be connected between the grid and the bias battery.

This arrangement will pick up a large amount of 50 cycle energy which should be reproduced by the set in addition, of course, to the harmonics. A true 50 cycle note has a very deep boom, the presence of which can be almost felt. Even a 50 cycle note of low intensity produces a mild sensation of deafness. Turned up to greater volume it becomes exceedingly unpleasant. A good speaker should be capable of producing this effect. If it does not do so, it can be taken that the radiation at 50 cycles is poor.

While this test is conducted, the diaphragm should be touched with the hand. This should practically completely remove all the 50 cycle radiation, leaving only the harmonics audible. This actually occurs in a moving coil speaker if the moving coil is restricted owing to touching the gap. An excellent laboratory method of centreing the coil is to supply a 50 cycle input.

A coil should not get out of adjustment in the normal way. But if it has done so, there is a possibility of the turns almost shorting owing to the insulation being scraped off due to friction in the gap. If this occurs, the output will fall and the quality will be ruined.

Faults on input transformers are rare. They should be tested like output transformers.

Moving Iron Speakers.

Moving iron speakers should be tested in the same way as moving coil speakers, with the exception that the 50 cycle test is not applicable, since practically no moving iron speaker other than an inductor has any appreciable radiation at 50 cycles.

Faults in moving iron speakers can be divided into two classes, electrical and mechanical. In the mechanical class come faults due to diaphragm fixings and mountings.

Dealing first with the electrical faults, defective windings, short circuited turns, or leakage to frame are all that are likely to happen. Short circuited turns cause loss of volume and thinness of quality. Defective windings give rise to scraping noises. They should be tested in the manner already described.

It is not advisable to attempt to remedy any defect associated with the adjusting mechanism unless the unit is of the simplest reed type. If the tongue or armature is definitely in contact with a pole piece, no attempt should be made to rectify this by bending it. It should be returned to the makers.

Loose cone clamps or the edge of a diaphragm in intermittent contact with the cabinet or supporting chassis will give rise to jingles. Close inspection usually reveals the exact source of the trouble. On occasions, the seat of the trouble is obscure. A small flake of mountant which has worked loose will produce quite an appreciable buzzing noise, and possibilities of this type should not be overlooked.

In the early types of speakers the adjustments usually caused the armatures to hit the pole pieces with a decided click. This is not the case in many modern speakers, and the absence of a loud click should not be regarded as a possible fault.

The resistance of the winding of a speaker varies greatly with various makes. Alone it is no guide to the suitability of a speaker for any particular valve. What matters is the effective impedance, this is a function of the winding and not the resistance alone. Many speakers have alternative tappings. Actual signal tests usually reveal the best connection.

Where separate models are available with different impedances, a low impedance speaker should be used with a low impedance or super power output valve. When a pentode is used, a high impedance is necessary. The use of a low impedance speaker with a high impedance valve usually results in thinness of quality, whereas a high impedance speaker connected to a low impedance valve usually causes a roundness of tone with a loss in the upper registers.

In fitting moving iron units with cones, it can be taken that as a general rule the best results are obtained with a large cone which is fairly deep. It is important that the cone is reasonably light. Every precaution must be taken to prevent the hard edge of a cone being in contact with any object such as the side of a case. A layer of resilient material such as rubber, felt, cotton wool, or a leather suspension ring should be employed.

Metal Rectifiers.

Metal rectifiers are practically free from trouble. On no account should they be dismantled, since the success of a rectifier depends largely upon its mechanical assembly.

The easiest way to test a rectifier is to connect it to an alternating current supply and provide an artificial load on the D.C. side in the form of a resistance with a milliammeter included in the circuit. The makers rating should be referred to, and if, for example, with a 200-volt input 20 m.a. should be obtained at 160 volts, the calculated resistance which passes 20 m.a. at 160 volts should be connected to the output in series with a milliammeter. The value of this resistance is worked out, of course, from Ohm's Law, the value being given by the rated output voltage divided by the rated output current. In the example quoted, for 160 volts at 20 m.a., 8,000 ohms would be required.

The steadiness of the milliammeter needle should be carefully watched. Slight tremor may be experienced owing to the unsmoothed nature of the current, but there should be no violent needle kicks either up or down. If there are it indicates some trouble in the rectifier which should be returned to the manufacturers for their examination.

Pick-ups.

A good pick-up is usually characterised by a small light armature which is fairly freely mounted. This means that little force is required to move the armature. It results in minimum record wear and good bass reproduction, since large amplitudes are then permissible.

Two types of fault can develop in a pick-up, electrical trouble due to the winding, and displacement of the armature. If the armature gets out of centre, it will almost certainly hit one of the pole pieces. This is recognisable by loss of volume and thinness of tone. The higher frequencies will reproduce but there will be no bass response.

If, when the needle is felt with a finger, the movement seems restricted in one direction and free in the other, and if it is accompanied by a "ploppy" sound in the speaker, it is a good indication that the armature is fouling the pole pieces. Mere inspection of the pole system with the cover of the pick-up removed does not always show a displaced armature. The test described is essential.

A winding can break down completely, or it can develop short circuited turns. Short circuited turns give the same symptoms as an armature touching the poles, but the needle test described is not applicable.

Sometimes the clamping screw thread wears slack and the needle is not clamped properly. This gives rise to chatter. There is no real cure for this. Undue wear can be prevented by using less force in screwing up the needle clamp.

Continuity of winding and the possibility of one side of the winding being joined to earth or frame can be tested by one of the continuity testers.

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Resistances.

Resistances can be divided into two classes, wire wound and composition.

The essential features of a good wire-wound resistance are sound mechanical construction with good electrical joints at the ends. Spaghetti or link resistances should preferably be connected to their tags by electrical welding, while adequate protection in the form of reinforced high-grade sleeving is essential to prevent trouble due to absorption of moisture, and mechanical breakage through bending of the tag.

The only troubles likely to arise in resistances are bad joints and intermittent internal short circuits, giving rise to noisy operation. A noisy resistance should be tested by a silence tester.

The actual value can be quite accurately determined by measuring the current which flows through the resistance at a known voltage. The resistance, it will be remembered, is given by the voltage divided by the current.

It is essential not to overload resistances If a resistance becomes very hot in use, it should be replaced by one of a larger current-carrying capacity.

Low-Frequency Transformers.

Low-frequency or inter-valve transformers can be divided into two classes: Those employing the normal soft iron alloy cores, and those employing special cores of some type of nickel alloy.

For an even response over the entire useful frequency scale, a transformer must be of fairly large size if it employs an ordinary type of iron core. This is due to the fact that a definite impedance is required in the anode circuit of an amplifying valve. This impedance is provided by the primary winding of the transformer, and it cannot be sufficiently great unless a large amount of iron is employed. It follows, therefore, that a very small transformer with an ordinary iron core cannot give first-class results.

A small nickel alloy core, however, is satisfactory owing to the fact that a much higher impedance is obtained with a small core. However, when a very small core is used, it is necessary to remove the steady anode current from the primary winding. This is done by means of an anode feed system as described elsewhere.

Three faults can develop in a transformer : complete breakage of a winding, partial short-circuit of turns or complete or partial connection of windings to each other or the frame. A circuit tester will show whether the windings are complete, and whether they are in contact with themselves or the frame. The resistance measuring arrangement will give a rough indication of whether the windings are reasonably correct, but it will not show the presence of a short circuit of a few turns.

An intermittent short circuit or high resistance joint gives rise to intense scraping and crackling noises. If the fault is bad, it can be detected by connecting the windings-in series with a small battery and a pair of headphones.

A noisy transformer can be tested very accurately by means of the arrangement shown in Fig. 6. It will be seen that a small current is passed through the winding in series with a resistance which is connected across the input of an amplifier. Any intermittency will produce voltages across the resistance which are tremendously magnified by the amplifier. It is essential, of course, to use very tight connections between the battery, winding and resistance, and to use only a wire-wound resistance known to be perfect.

Short-circuited turns cause a loss in amplification and, generally, raising of the tone, the reproduction sounding very thin and high pitched. A resistance measurement will not show short-circuited turns, as the change in actual resistance is almost infinitesimal.

If there is any doubt as to the existence of shorted turns when other tests have shown everything correct, substitution of a similar transformer must be tried.

Output Transformers.

Output transformers are very similar to low-frequency transformers. Taken as a whole, however, they must be of even larger dimensions, since they have to carry heavy anode currents. Some transformers have air gaps to keep the inductance reasonably constant and to prevent the core from saturating. They should be tested in a similar manner to low-frequency transformers.

The ratio of an output transformer is not always 1 to 1. Very frequently a step down is provided so that the secondary is better suited to the impedance of the speaker with which the set is used. In the case of an output transformer used to energise a moving coil, a step down ratio of the order of anything from 10 to 1 to 30 to 1 should be employed, according to the constants of the coil.

When a large step down ratio is used, it is essential that the leads between the secondary and the actual moving coil are kept as short as possible, while the resistance must be low as otherwise there is a loss of power.

Great care should be taken in testing the secondary winding of an output transformer, since the resistance is very low. If this precaution is not taken, there is a possibility

of a meter being burnt out. A moving coil output transformer with a large ratio has a secondary winding with a fractional resistance, very heavy gauge wire being used. Accordingly, if it is found necessary to test this, and such an occurrence would be very rare, the test must be made with an ammeter and a 2-volt accumulator.

Tuning Coils.

The technique of the design of the high-frequency portion of a receiver has advanced so tremendously in recent years that it is a little difficult to make any definite statements.

The design of a tuning coil for the anode circuit in a high-frequency amplifier is determined largely by the type of valve with which it is to be used and the general circuit arrangement as a whole. It is a fallacy to assume that a large coil wound with heavy gauge wire, or spaced turns, or even Litz wire, will be more efficient than a smaller coil which has no apparent good points.

A few general statements can be made with regard to aerial coils. The lower the aerial tapping, the greater will be the selectivity, and the smaller the voltage applied to the grid of the first valve. A coil of this type is obviously necessary for use in a simple receiver near to a Regional transmitter. At a greater distance from the transmitter a higher aerial tapping is necessary, because more voltage will be required owing to loss of signal strength with distance, while, on the other hand, the less will be the interference.

For general single circuit tuners, one incorporating a variable coupled aerial coil is an excellent component, since it is so readily adapted to meet any particular requirements.

Faults in tuning coils are likely to be due to mechanical troubles rather than electrical. Unsound construction may result in the turns slipping. No attempt should be made to remedy this defect by coating the coils with shellac or celluloid, as this will increase the high-frequency resistance considerably, giving defective tuning and loss of strength. Damp has the same effect, and if a single circuit tuner, for example, suddenly goes below standard the possibility of damp should not be excluded.

A coil which is not designed to work with a screen should never be closely screened. It can be safely used in a screened compartment, however, if the screen is large and the coil is kept at a distance from it. A coil designed to work in a screening case is usually of small dimensions, and it has fairly compact field.

If a tuning coil fails, a fault can be readily checked up by means of the circuit testers. These should give continuous circuits with all windings, and discontinuous circuits between the various windings except in so far as they are intended to be connected. This can be determined from the maker's diagram.

If a coil gives a clear test on the circuit tester and still functions indifferently, its efficiency can be tested quite easily by the mere substitution of an equivalent coil known to be in order.

Volume Controls.

Volume controls can be divided into two types, wire wound and composition. Wire wound volume controls rarely have a value much greater than 50,000 to 80,000 ohms. A control of this type should not be used across a high impedance pick-up winding or across the secondary of a low frequency transformer.

A control in this position should have a value of the order of 500,000 ohms. This usually necessitates a composition type. A composition type in which the movable contact works directly on the element is not generally satisfactory. Efficient types usually include either a very springy dished metal washer which is pressed into contact with the element, or an arm which works over adjacent turns of wire wound over the resistance element. The wire is cut at each turn, the turns forming in effect a large number of contact studs.

The resistance of the control can be measured by the resistance measuring arrangement. If the degree of control is slow or too rapid, it is due to a change in the grading of the resistance, which sometimes occurs in the case of a composition type. This can be checked, of course, by measuring the resistance between one end of the control at equal intervals of rotation.

Silence is important, and it can be checked up by the silence tester.

TESTING RECEIVERS.

Broadcast receivers can be divided into four main classes. The first consists of a detector valve followed by one or more stages of low-frequency amplification. The second type embodies a single stage of screen grid high-frequency amplification followed by a detector, and again one or more stages of low-frequency amplification.

The third class is merely an elaboration of the second and involves more than one stage of screen grid amplification. The final class consists of a superheterodyne arrangement in which amplification is carried out at an intermediate frequency.

All other sets are really elaborations of one or other of these four basic types. There is no fundamental difference in a set operated

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from batteries or from the mains, and the principles involved are identical.

To service any receiver, it is essential that the dealer has a thorough understanding of the principle of operation, since the location and rectification of a fault is then only a matter of logical, progressive testing.

In Fig. 8 is shown a simple two-valve receiver. The first valve acts as a grid detector, and the second as an amplifier and output valve. L1C1 is the tuned input circuit and the aerial coil consists of a few turns coupled to it. The magnetic reaction coil L2 is variably coupled to L1. Rectification is obtained by means of a grid condenser C2 and a grid leak R1. Wave change is effected by short circuiting the long wave section of the coil by a switch S. The anode circuit of V1 contains the primary winding of a transformer T.

A very important part of the circuit is a condenser C3 which acts as a high-frequency by-pass, keeping any high-frequency component out of the primary winding of the transformer. The filaments of the valves are run in parallel from the battery B1 and a separate battery B2 provides the grid bias for the power valve. High-tension is supplied from a battery, and two condensers C4 and C5 are connected across the two high-tension tappings.

wiring or in the actual components. Readers are now familiar with the method of testing any component in a receiver, but before doing this, the set should be tested as a whole.

Having ascertained that the aerial and earth wires are connected to the set, and are not shorted, the best thing is to make sure of the presence of the high-tension and filament voltages on the actual valve holders.

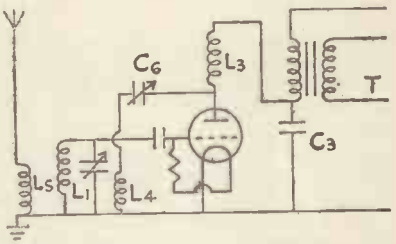

FIG. 9.—Alternative capacity reaction control to that used in Fig. 8. L1, L4 and L5 are frequently combined to form a "six-pin" coil.

If readings are obtained, it is best to commence further investigations from the speaker working towards the aerial terminal. As a preliminary test, however, slight tapping of the detector valve usually produces a distinct ringing noise in the speaker if the set is functioning. In the case of a 2-valve set, this will only happen if everything is correct from the anode circuit of the detector valve

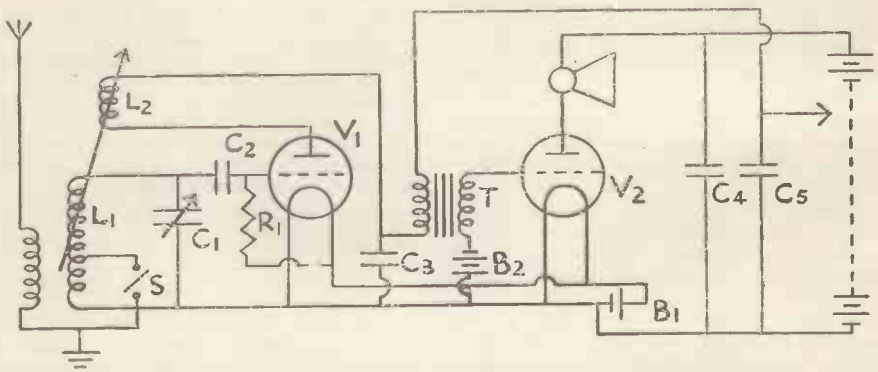

FIG. 8.—A fundamental circuit of a 2 valve receiver.

Fig. 9 shows an alternative arrangement of the input circuit using capacity reaction. A high frequency choke L3 is included in the anode circuit and reaction is controlled by a variable condenser C6 connected to a winding L4 permanently coupled to the main tuning coil L1.

Systematic Testing.

It is difficult to lay down hard and fast rules regarding the best method of testing a receiver. A fault may develop either in the

onwards. If it is, attention can be directed to the circuit between the aerial terminal and the grid of the detector valve.

Intermittent disconnection of the speaker should give deep "ploppy" sounds if the anode circuit is correct. In any case, it should be checked up by noting the total anode current supply. If it is excessive, it may be due to a break in the secondary of the transformer, which deprives the last valve of its negative bias. If the current is very

[*Continued on page* 93.]

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[*Continued from page* 90]

low it may be due to a partial fault in the speaker circuit introducing high resistance, or to the emission of the valve failing. Tests of this are described in another section.

If the last valve circuit appears correct, the anode circuit of the detector valve should be examined. If the current here appears correct and still no ringing noise is obtained in the speaker on tapping the first valve, the trouble is probably connected with the transformer T (Fig. 8) or the by-pass condenser C3. Temporary isolation of these points will indicate whether this is the trouble.

The power supply is shown obtained from an eliminator, the whole receiver working from a common positive high-tension tapping. The voltages for the various anode circuits are obtained by means of decoupling resistances consisting of a high resistance and a shunt condenser of about 1 mfd. to earth.

The speaker is not connected directly in the anode circuit of the pentode, but is operated through a feed circuit consisting of a choke and condenser. A tapped output choke is shown since this suits the impedance of a speaker better than direct connection across the choke.

This arrangement is very similar to that shown in Fig. 8, and it should be tested on similar lines.

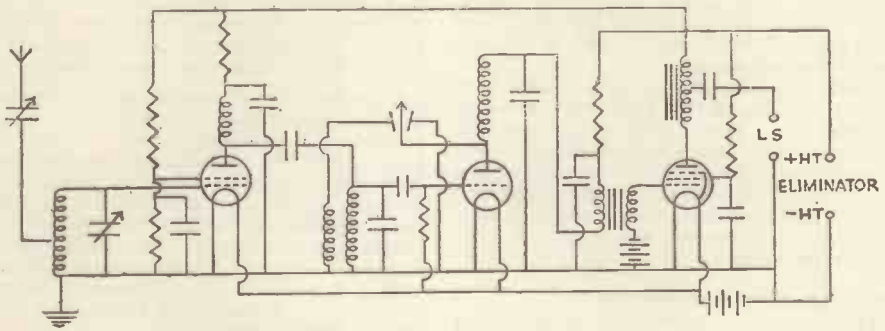

FIG. 10.—A popular 3-valve combination. A high-frequency volume control takes the form of a variable condenser in the aerial lead.

If the set has been proved correct from the anode circuit of the detector valve onwards, everything between the aerial terminal and the grid of this valve should be examined.

A short on the tuning condenser C1 or on the coil or the grid leak will cut signals off completely. A very easy test is made by disconnecting the grid of the first valve, temporarily attaching the aerial to the grid of the valve. If the transmission is reasonably powerful, something is sure to be heard, and it is then a simple matter to find where the trouble originates, connecting in progressive order the grid leak, condenser, tuning condenser, and finally the tuning coil itself.

High-Frequency Detector and Pentode.

In Fig. 10 is shown a very popular 3-valve combination consisting of a screen grid amplifier, a grid detector, and a pentode output valve. The aerial input circuit is of a quite straightforward type, while high-frequency amplification is obtained by a tuned grid circuit. The second tuned circuit is energised by a high-frequency choke and condenser in the anode circuit of the screen grid amplifier. Reaction is obtained by a differential reaction condenser, the anode being connected to the movable element.

The condenser which feeds the speaker should be of a fairly high voltage test type, since it will be subjected to high peak voltages during operation. In some circuits the other side of the speaker is connected to the positive high-tension instead of the earth or negative filament. This is only advisable with a self-contained type of set. Should the condenser fail, little harm will result.

Failure of this condenser in a normal circuit connects the speaker across the high-tension through the choke. Attention is also drawn to the connection to the screen grid of the H.F. valve. It will be seen that a potentiometer connection is employed, a resistance being connected between the screen and earth. This type of connection should only be used with an eliminator as it imposes an additional load which is still present when the set is not in use, unless the switching disconnects the high-tension battery as well as the filament circuit.

Multi-High-Frequency Sets.

An elaboration of this circuit is shown in Fig. 11 in which an additional screen grid stage is employed. A modification in this particular arrangement is the use of a resistance coupling which replaces the trans-

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former. In addition, the speaker is shown connected through an output transformer instead of a choke feed circuit. It should be understood that resistance coupling and transformer coupling are interchangeable, as also are output transformers and choke feed circuits.

The mode of operation is identical with the receiver in Fig. 8, and the set should be tested in the same logical way, working backwards. When the low-frequency side has been tested back to the anode of the detector valve, the "tap on" method is extremely useful. This consists of connecting the aerial first to the grid of the detector valve, then to the grid of the second high-frequency amplifier, and finally to the grid of the first high-frequency amplifier.

Sudden apparent loss of volume and quality in a set of this type sometimes has an obscure cause. Receivers employing several high-frequency stages usually have the condensers ganged. Should the ganging slip, this will cause both loss of volume and quality, as the set then uses a series of non-resonant input circuits which give a very peculiar wave form.

Superheterodyne Receivers.

The ordinary method of reception of broadcast signals consists, first, of amplifying the received energy from an aerial coil at the frequency at which it is received. This process is known as high-frequency or radio frequency amplification. Energy thus amplified is then detected or rectified, a low-frequency component being obtained.

This is not sufficiently powerful to operate a speaker directly, because speakers are extremely inefficient. Further amplification is necessary, and this is carried out by means of low-frequency amplifiers. The successive stages of these are coupled either by transformers, resistance coupling units, or choke coupling units. In some cases, a mixed amplifier is used, one stage being resistance-coupled, and the others, perhaps, transformer types.

Supersonic or superheterodyne reception, however, is fundamentally different, in that amplification is carried out at an "intermediate" frequency different from the frequency of the received signal. Signals on the normal broadcast band are transmitted at frequencies in the region perhaps of, say, 1,000 kilocycles. This is a comparatively high frequency. Signals obtained at this frequency in supersonic reception are converted to another or intermediate frequency by the heterodyne beat principle.

This consists of combining the received oscillations with oscillations produced locally by an oscillating valve. When the two sources of oscillations are combined and the resultant output is rectified or detected, oscillations are obtained at a frequency equivalent to the numerical difference of the two frequencies. In actual practice the received oscillations are usually combined with a source of local oscillations which give a frequency difference of 100 to 130 kilocycles. This corresponds to a wavelength in the region of 2,700 metres.

The high-frequency valves in a superheterodyne receiver are, therefore, arranged to amplify not at the incoming frequency, but at a pre-determined intermediate frequency, such for example, as 2,500 metres. For this purpose incoming signals are detected by an ordinary detector valve which is

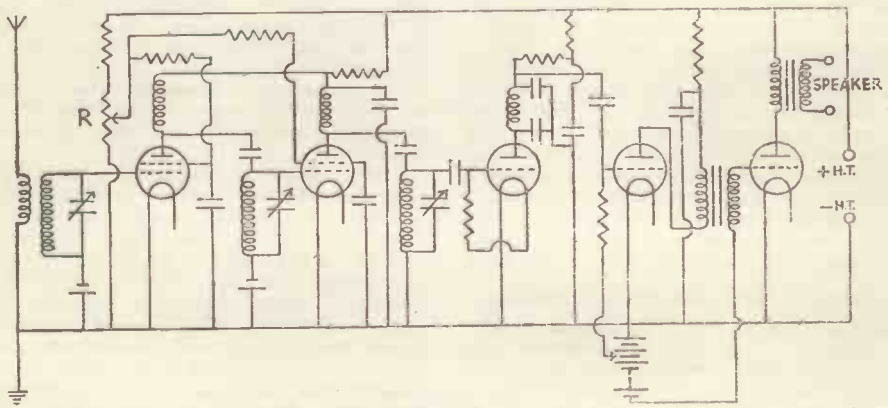

FIG. 11.—Two high-frequency stages without reaction. Volume is controlled by the potentiometer R which varies the screen voltage. All circuits are decoupled. Note the filter in the detector anode circuit to eliminate all traces of high-frequency from the low-frequency side.

also used to detect a source of local oscillations which is tuned to a slightly different wavelength from that at which reception is desired.

Instead of the anode circuit of this detector valve containing a low-frequency transformer, it contains an intermediate frequency transformer tuned to a wavelength in the region of 2,500 metres. The output of this detector

controls, that of the input circuit and that of the oscillator.

These two condensers are sometimes ganged, but this is a matter which should not be attempted by the dealer as it necessitates extremely complicated "laws" for the two condensers. These are frequently obtained by the use of series condensers connected to one of the variable condensers. For this

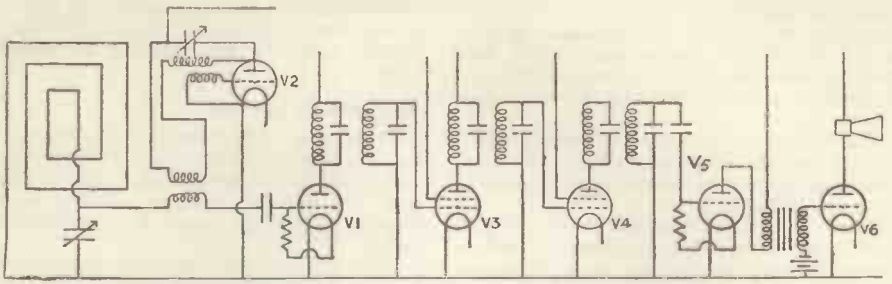

FIG. 12.—Fundamental circuit of a superheterodyne receiver; V1, first detector; V2, oscillator; V3 and V4, intermediate amplifiers; V5, second detector; V6, output valve.

valve is then amplified by one or more screen grid stages which are generally coupled by high-frequency transformers tuned to the wavelength of 2,500 metres.

Amplification having been carried out at this frequency, the output from the last valve is fairly considerable, and this is then detected so as to obtain audio frequency components. For this purpose a second detector

reason, a proprietary ganged superheterodyne receiver should never be dismantled, as ganging may be upset, in which case it will be totally unbalanced.

Fig. 12 shows a typical superheterodyne receiver working in conjunction with a frame aerial. This is a very popular arrangement in which two stages of screen grid amplification are used for the intermediate amplifier.

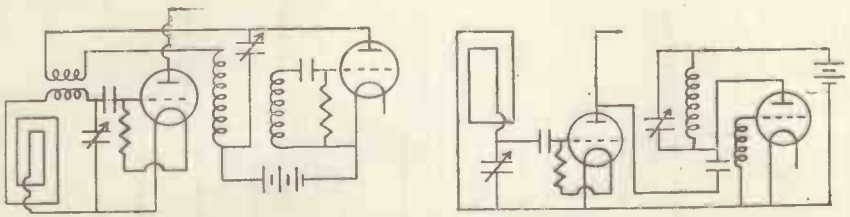

FIG. 13.—Above and on the right are shown examples of magnetic and capacity coupling of superheterodyne oscillators.

valve is used which is usually of the power grid type, that is, a fairly large valve working with a small grid condenser, and relatively low grid leak. The output of this valve is coupled to one or more low-frequency stages by means of a transformer or a resistance and capacity coupling.

It will be seen that one great advantage of this system lies in the fact that there is no need to have a large number of variable tuned circuits, since the amplifier always operates at the same frequency or wavelength. A very powerful and selective receiver is obtained which requires only two

Coupling is by means of tuned circuits consisting of coils and condensers in parallel forming circuits tuned in the region of 2,500 metres. This forms what is in effect a band pass amplifier, that is, one which amplifies over a very narrow range of frequencies, the response curve being somewhat flat topped. The actual nature of the response depends upon the sharpness of tuning and the degree of coupling.

Proprietary superheterodyne intermediate transformers, as they are generally called, consist of small coils and condensers in parallel, generally mounted in metal screens.

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In some cases, variable coupling is provided.

In a superheterodyne the coupling from the oscillator to the first detector is provided either magnetically or directly through a small condenser. A coil forming part of the oscillator circuit is sometimes coupled to a small coil in series with the frame aerial. In another arrangement, the oscillator is connected directly to the anode of the first detector through a small condenser. The two alternative arrangements are shown in Fig. 13.

The fundamental methods of testing apply equally well to superheterodynes, although certain special tests are necessary and modifications are desirable.

From the second detector to the output valve a superheterodyne is identical with a straightforward set of the type shown in Fig. 8, with the exception that there is no reaction control.

Having checked over the power supply to the various circuits, the aerial "tap on" method cannot be employed beyond the second detector valve. If there is complete absence of signals and the second detector and low-frequency amplifying valves are in order, there is a possibility that the oscillator may not be working.

This can easily be detected by the use of an "anode adaptor" connected to the first detector valve, a pair of headphones being included in the circuit. The outside aerial should be connected through a small condenser to the grid terminal of the first valve, the frame aerial being tuned to the local transmission. Signals will be heard. On varying the oscillator control an ordinary heterodyne beat note at audio frequency should occur being characterised by a high pitched whistle. If this is not the case, the coupling from the oscillator and the oscillator itself should be suspected and tested immediately.

Tests of the intermediate amplifier are not so easy since it only functions at its predetermined wavelength. Continuity of grid and anode circuits and absence of short circuits can be tested as well as the possibility of stray earth connections. The valve connections and power supplies to them can also be checked up in the ordinary way. Other than this part, the receiver is perfectly straightforward, and it should present no greater difficulty than testing an ordinary receiver.

Portable Receivers.

There is no difference in the construction and mode of operation of a portable receiver. The absence of an earth connection, however, and the general compact nature of the receiver generally makes it somewhat less stable.

Some portable sets, unfortunately, are not well designed and they operate rather inefficiently. This is generally due to the fact that the high-frequency and low-frequency currents are not properly separated—a fundamental principle underlying set design.

When most of the components are contained within the field of the frame aerial it follows that there is a great possibility of high-frequency energy being picked up by portions of the circuit connected to the low-frequency amplifier. For this reason, a good portable receiver should be very efficiently screened, and this applies to such portions as the leads connected to the speaker. These leads very frequently run near to the turns of the frame aerial.

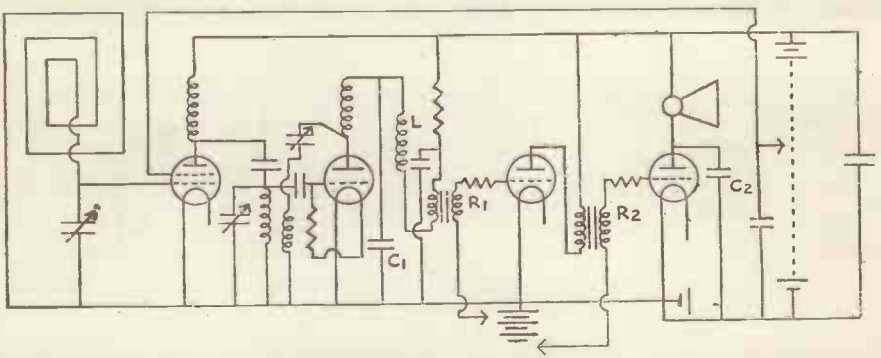

FIG. 14.—Typical 4-valve screen grid portable. Note condenser C1, choke L, resistances R1 and R2, and condenser C2, used to keep high-frequency currents from the output.

A typical four-valve screen grid receiver is shown in Fig. 14, and it will be noticed that it is very similar to the screen grid arrangement of Fig. 10. The input is a frame aerial while coupling on the low-frequency side is usually carried out by two stages of transformers.

The set is tested through in exactly the same way as an ordinary receiver, but the mere connection of test meters and leads or anode adaptors may introduce sufficient stray coupling to make the set oscillate.

Low-frequency oscillation at an inaudible frequency causes loss of amplification and filament heating, high-tension voltage and grid voltage.

When the supply is direct current, high-tension is readily obtained simply by the use of a smoothing circuit. When the supply is alternating it has to be rectified and subsequently smoothed.

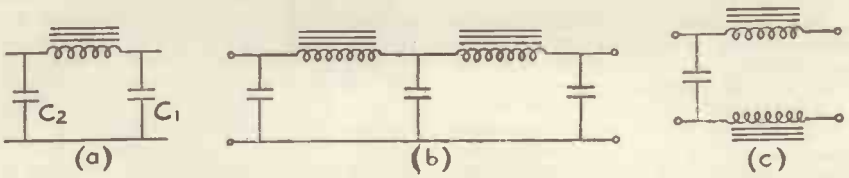

FIG. 15.—Three examples of fundamental smoothing circuits comprising iron cored chokes and large condensers.

general thinness of quality and is not easy to detect. It should never exist in a properly designed receiver. It is caused by interaction in the low-frequency stages.

Many portable sets are actually designed on compromises and certain practices are frequently adopted which are theoretically unsound, in order to stabilise a set.

One of the commonest forms of trouble is due to interaction both in high-frequency and low-frequency stages upon the high-tension battery's becoming exhausted which increases the internal resistance. For this reason, it is important that the detector valve is adequately decoupled.

It is also essential to keep the high-frequency energy out of the amplifier, and a by-pass condenser in the anode circuit of the detector valve is most necessary. The circuit actually shows an additional high-frequency choke to keep the high-frequency component out of the primary winding. A grid stopping resistance is also shown in both stages as well as a by-pass condenser in shunt with the speaker leads.

Microphonic valves are a source of very great trouble. Adequate acoustic insulation is necessary. If this does not effect a cure, the valves must be substituted by less microphonic ones.

A word must be said with regard to straight 5-valve portables in which two ordinary three electrode valves are used as high-frequency amplifiers, the anode circuits merely containing high impedances or high frequency chokes. Sets of this type are even more difficult to stabilise than a highly efficient 4-valve screen portable and, of course, they have a very much smaller amplification.

The method of test is perfectly straightforward, and no particular difficulties are likely to arise.

Mains Supplies.

Mains can be used for supplying all the power required by any set. This includes

It is common practice to construct mains units as separate components so that they can be used with existing sets in which the valves are still run from accumulators. It should be understood, however, that a mains set contains exactly the same number of components arranged in the same way as those in a separate mains unit. The only difference is that the components in a mains set are sometimes distributed throughout the set instead of being arranged in one place.

A mains unit consists of a smoothing circuit and a voltage distribution arrangement. In the case of an A.C. mains unit it includes, in addition, a rectifier.

A smoothing circuit consists of an inductance in the form of an iron core choke and two condensers. Fig. 15 shows three typical smoothing circuits. The first (a) is the most usual. It is sometimes referred as a simple *pi*. The first condenser C1 takes the feed from the supply, and the second one C2 feeds the output.

A double *pi* filter is shown in Fig. 15 (b), and it is essentially two *pi* filters with a common condenser. Provided that this filter is properly designed it gives far better smoothing than the arrangement of Fig. 15 (a).

An arrangement which is not used to a very great extent is shown in Fig. 15 (c) in which a choke is included in each leg. Sometimes these two chokes are wound on the same core, and the actual mode of operation is somewhat involved.

Faults can occur in the smoothing circuits of mains units. The chokes and condensers should be tested in the manner described for the components in question.

It is a good plan never to connect a mains unit to the supply without a load on the output since this reduces peak voltage on the condensers and tends to prolong the life.

Fig. 16 shows two basic systems of voltage distribution. It will be seen that the output of the filter is shunted by a resistance R1, the

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full positive tapping being shunted by a condenser C3. An intermediate tapping is taken across the resistance R1 which acts as a potentiometer, this in turn being shunted by a condenser C4.

Fig. 16 (b) indicates an alternative form in which the voltage is dropped for the intermediate tapping by means of series resistances R1 and R2, each shunted to earth by condensers C4 and C5. The values of the resistances R1 and R2 are sometimes made variable, taking the form of carbon compression resistances or wire-wound types. The actual values obtainable are very frequently such that they suit the normal connections of typical receivers, and the arrangement shown in Fig. 16 (b) is the basic principle of what is known as decoupling. When the values are fixed, however, it frequently happens that they do not suit a receiver, in which case additional decoupling resistances are necessary.

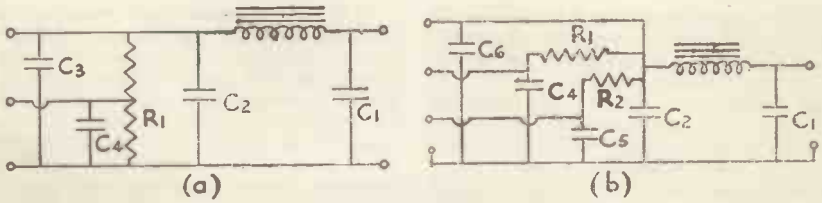

FIG. 16.—Shows two voltage distribution systems. (a) Potentiometer or constant load method. (b) Series resistance method.

Scraping noises in an eliminator are sometimes caused by faults developing in the resistances, and these should be carefully checked.

It should be particularly noted when using a D.C. mains eliminator consisting as it does of a filter and voltage divider, that the earth connection is not made directly to the receiver, but it must be taken through a mica insulated condenser as shown in Fig. 17. This condenser is frequently incorporated in D.C. mains units. Its object is to prevent accidental short circuiting of the mains by connection to earth. It should be noted that in some cases, and particularly on a three-wire system, that the positive main is earthed.

A.C. Units.

When an A.C. supply is available, a smoothing circuit and voltage divider is energised through a transformer and rectifier, that is, either a two-electrode valve or a metal rectifier. Fig. 18 shows the basic circuits for half and full wave rectification.

The input transformer is designed to operate from the supply mains and it is provided with two secondary windings. The first suits the filament of the valve and is frequently centre tapped. In the case of the half wave rectifier as shown in Fig. 18 (a) a single winding is used, one end going to the anode, and the other forming the main negative high-tension terminal. The positive terminal is the filament or centre tap of the filament winding.

Fig. 18 (b) shows an almost identical arrangement for a full wave rectifier, *i.e.*, a double anode valve. In this case, the high-tension secondary winding is centre tapped, the outers going to the two anodes, and the centre tap forming the main negative terminal of the high-tension supply. When a metal rectifier is employed the input transformer has only one secondary winding, since there is no filament to heat.

Three forms of rectifier circuits are employed. In Fig. 19, (a) shows a simple half wave rectifier in which the rectifier is connected to one of the leads from the secondary winding, the other lead forming the negative terminal. The more general arrangement, however, is shown in (b), in which the metal rectifier has four terminals. The unit actually contains four separate elements connected on what is sometimes called the Gratz system. Some form of bridge arrangement is actually employed.

The third method is shown in Fig. 19 (c) and is known as the condenser doubling method. It employs a special double metal rectifier unit, the high-tension being derived from the outer terminals of two condensers connected in series. The A.C. voltage is connected to the centre point of the rectifier unit and the centre point of the condensers. The effective output voltage is about double the input voltage.

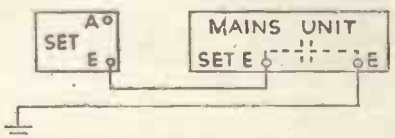

FIG. 17.—Essential safety condenser for the earth connection of a D.C. mains unit.

The great advantage of an A.C. mains unit lies in the fact that the voltage can be stepped up to a value suitable for operating high voltage power valves. In the case of D.C.

supplies the voltage is limited to that of the supply itself, and accordingly very large sets cannot be run from D.C. mains without some form of motor generator or other supply arrangement.

the total electron emission, and, therefore, the valve operates without any appreciable hum.

The cathode, i.e., the coated tube, replaces the valve filament in so far as the grid returns

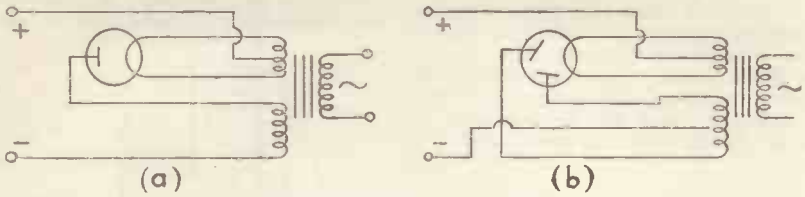

FIG. 18.—Half and full wave valve rectifier circuits.

The components of an A.C. mains unit can be tested as indicated in the appropriate sections. It is more important in the case of an A.C. unit than in the case of a D.C. unit not to connect it to the supply without a load on the output, since the first condenser in the filter circuit is subjected to much greater peak voltages than in the case of a comparatively smooth D.C. output on which there is only a commutator ripple.

Mains Driven Cathode Circuits.

There are now only two systems in general use for direct operation of valve filaments or cathodes from A.C. supplies. The valves, for the most part, are of the equi-potential cathode type. They usually employ a flat tube coated with an electron-emitting substance. The tube is heated by means of an insulated hair pin which takes the place of the ordinary filament.

On switching on a valve a short time elapses before the cathode becomes uniformly hot. Owing to the thermal inertia of the coated tube, any changes in temperature due to the wave form of the A.C. supply do not affect

and earth connections are concerned. The basic circuit is shown in Fig. 20 (a). It is the usual practice to connect the centre point of the heater winding to the earth or common cathode connection. Shown in Fig. 20 (b) is the usual conventional diagram for an equi-potential cathode mains valve.

It is essential in a sensitive receiver employing valves of this type to keep the field of the heater wires as small as possible. It is general to use the shortest possible leads between the valve holders, and the wires are usually twisted together. In some cases, an earthed screen is used for the filament leads.

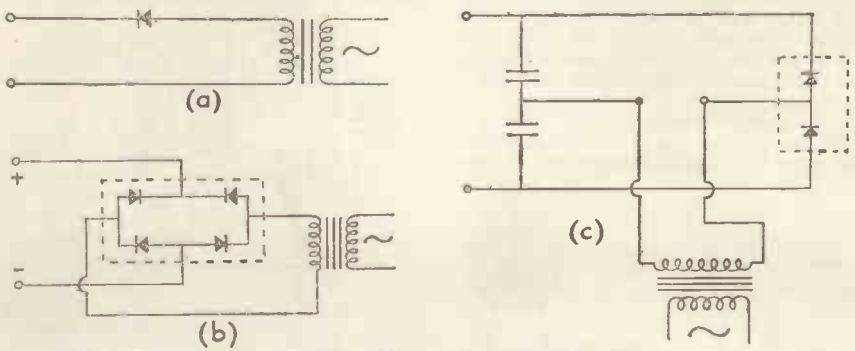

FIG. 19.—Half wave, full wave, and condenser doubling metal rectifier circuits.

In re-wiring a set with mains valves, the heater circuit should certainly be kept as compact as possible. Large output valves having comparatively big filaments with a large thermal inertia can be run successfully by direct operation from the A.C. supply. Fig. 21 (a) and (b) shows two general arrangements in which the grid return is taken to what is substantially the middle point of a parallel resistance or the centre tapping of a filament supply.

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Grid Bias Supply.

Grid bias can be derived either from a separate metal rectifier and smoothing circuit, or from the main high-tension supply in which the high-tension voltage is robbed of a few volts for the grid bias.

Fig. 22 shows one of the most convenient methods to employ, particularly in a multi-valve receiver, since the arrangement of wiring is considerably simplified and the

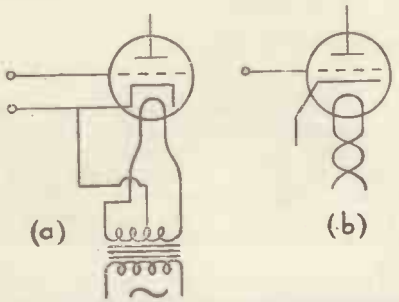

FIG. 20.—Arrangement and conventional representation of equi-potential cathode valve.

adjustment of grid bias for any particular valve is easily accomplished. The system consists in placing a resistance, shunted by a condenser, between the cathode of any particular valve and the negative high-tension terminal. The grid returns, of course, are taken to the negative high-tension terminal which is the main earth busbar, and not to the cathode.

An alternative arrangement is shown in Fig. 23 in which a main bias resistance is included in the negative high-tension lead,

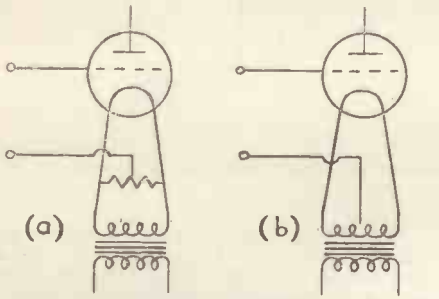

FIG. 21.—Two filament connections for directly operated A.C. valves.

and is tapped off at various points for the respective bias voltages. In some cases, it is found necessary to decouple the grid circuits in a similar manner to that used for high-tension supplies, and separate high resistances and condensers shown at R_1, C_1, and R_2, C_2 respectively are included.

When testing automatic bias voltages it is essential to use an exceptionally high resistance voltmeter, as otherwise the load imposed will totally unbalance the voltage and give a false reading. It is best to check the bias voltage by measuring the resistance

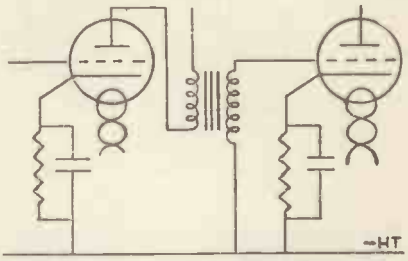

FIG. 22.—The most usual auto-bias arrangement with separate resistances and condensers in each cathode lead.

and measuring the current which passes through the resistance with a milliammeter, working out the actual voltage from the simple Ohm's Law equation.

The components used for auto-bias can readily be isolated from the circuit and tested.

Motor Boating.

Motor boating or a continuous definite frequency " plopping " sound is due to interaction of circuits, and it can invariably be

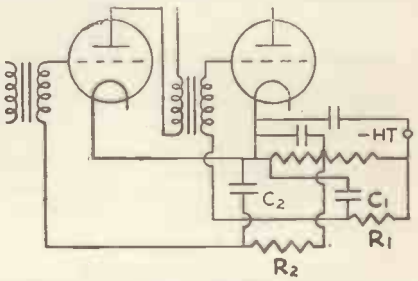

FIG. 23.—A common auto-bias resistance in series with the main negative high-tension lead tapped off for various bias voltages. Decoupling resistances and condensers are also shown.

cured by decoupling of the circuits in question.

Sometimes the reversal of the secondary winding of a low-frequency transformer will effect a cure, since it changes the phase relationship, but this is not recommended as it may affect the quality appreciably.

There is no golden rule for determining the value of a decoupling resistance, as it is largely a function of the impedance of the valve with which it is working, and also whether the valve is carrying radio-frequency or audio-frequency components, or both. A

large increase in the decoupling resistance is accompanied by a corresponding fall in the effective anode voltage with loss of power.

A fairly simple way of determining which anode circuit needs decoupling, if any doubt exists, is temporarily to isolate it from the power supply, and connect it to a separate external battery. The same process applies, of course, to grid returns.

When dealing with mains units or mains sets employing a really large output valve, it is essential not to connect the high-tension supply before the filaments and cathodes are really hot. Exceptionally large valves really require a delay action switch, examples of which are now available. Sets run from D.C. mains are identical in operation with those worked from A.C. supplies. The only difference lies in the filament circuits.

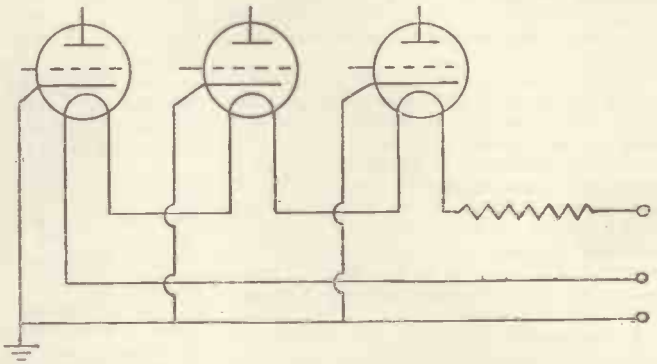

FIG. 24.—Filament circuit of D.C. mains valves

Special D.C. mains valves are now available, and the filaments are so designed that they can be run either in series or series parallel combinations, so that the total current and voltage in each branch of the circuit is the same. The use of the valve filaments or heaters in series tends to minimise the voltage which has to be dropped to bring it down to the valve value.

A typical filament circuit for a D.C. receiver is shown in Fig. 24. The grid returns being taken to the cathodes.

Auto bias can be taken as shown in Fig. 22 if desired. It will be seen that a main resistance is used to drop the unnecessary voltage.

VALVES.

Complete valve failure is extremely rare. It can be instantly identified. Partial valve failure is a more common occurrence and precise testing methods are necessary in order to identify it. A valve can be tested either in a receiver while it is operating, or it can be more closely examined on the test bench. The latter procedure is undoubtedly the better.

There are two properties of a valve which we can measure, the filament consumption, and the anode current at any particular high-tension voltage and grid voltage. The measurement of filament current is perfectly simple, as it involves merely the inclusion of an ammeter in the filament circuit, the valve being connected, of course, to a battery of the correct voltage.

The filament current should coincide fairly accurately with the maker's rating. This measurement immediately shows whether the filament is intact. It is better to test the filament continuity in this way rather than use one of the circuit testers, since we have known cases of intermittency arising as soon as the filament becomes hot. The filament current as indicated by the ammeter should remain perfectly constant, even if the valve is moved or tapped gently.

Occasionally the grid will come into contact with the filament, and this should be determined by one of the circuit testers when the filament is hot. This sometimes causes expansion, and the grid-filament contact will only show up when the filament is actually hot.

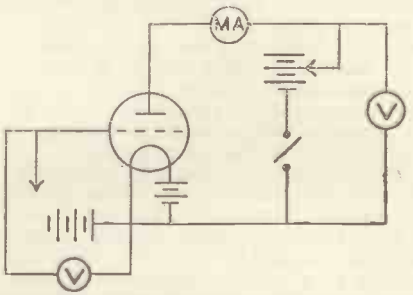

FIG. 25.—A simple circuit for obtaining a fairly accurate measurement of the amplification factor and slope, or mutual conductance, of a valve.

Providing the filament current is correct and no electrodes are in contact, the next test is that of the anode current. A milliammeter is included in the anode circuit of the valve, the correct high-tension and grid bias

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being applied. The value of the anode current should then be accurately observed and compared with the maker's curve. If it is found that the anode current is considerably smaller than that shown in the curve, it indicates that the filament has lost part of its emission.

This is bound to occur with a valve which has been in use for a very long time, but should it happen in the case of a comparatively new valve, further investigations should be made.

A valve must never run at too high an anode voltage or with too small a grid bias value. The position in which it has been used in a set should be investigated and the voltages measured. If these are found in order, the valve should be returned to the manufacturers for their examination. There is frequently a few milliamps difference between the actual recorded values and those of the maker's curves in the case of valves having an average anode current of 15 m.a. to 20 m.a.

If the anode current at the correct grid voltage appears correct and a valve still fails to give the presumed amplification, the slope and amplification factor can be roughly checked in the following manner.

The slope is the relationship of the change in anode current with respect to grid voltage. For example, a slope of 3 m.a./v. means a change of 3 m.a. for change of 1 grid volt. Most manufacturers rate their valves at zero grid bias, and 100 volts on the anode.

The circuit shown in Fig. 25 should be arranged, and the change in anode current noted while the grid bias is increased to, say, minus 1.5. By simple proportion the change in anode current for 1 volt can be calculated.

Measurements should not be taken at zero grid volts on power valves, since the total filament emission may be greater than the maximum for which the valve is rated. The measurements should be made at a higher anode voltage with the requisite grid bias as shown by the maker's chart.

The amplification factor is the ratio of the voltage produced in the anode circuit to the applied grid voltage. The circuit shown in Fig. 25 is again utilised, but the method of procedure is slightly different. The anode current at a given high-tension voltage is noted at a given grid bias value. The grid bias is then increased by a few volts, for example, 3 volts, when, of course, the anode current falls. Extra voltage is then added to the high-tension circuit until the former value of anode current is again reached. The extra voltage which has been added is noted and this is divided by the change in grid voltage which was applied to the valve. If 15 volts were added then the amplification factor of the valve would be 5.

From these two values we can calculate the impedance of a valve. It is only necessary to divide the amplification factor by the slope and multiply the result by 1,000. For example, a valve with an amplification factor of 14 and a slope of 2 would have an impedance of 7,000 ohms.

General Notes.

The selection of suitable valves for a receiver is a matter of vital importance. Such a problem only arises when a manufacturer's specification is not available. In the case of high-frequency amplification, screen grid valves are employed almost without exception. Where a single stage is used, a valve having the best possible amplification factor and slope should be employed, since this gives the greatest gain.

A set employing several stages of screen grid amplification, however, will be rather difficult to stabilise if high gain valves are employed, and accordingly, it is better to use a screen grid valve with a slightly lower amplification factor.

The remaining valves can be divided into four classes, three electrode valves of high, medium, and low impedance respectively, and pentode output valves.

High impedance valves should be chosen for resistance coupled amplifiers, and anode bend detectors where the applied grid swing is small. Where a large grid swing has to be dealt with, a medium impedance valve should be substituted. Grid rectification is now generally of the power type, and this calls for a medium impedance valve.

Early low-frequency stages should use medium impedance valves and output stages in small sets such as three valve combinations should use an ordinary power type which, of course, is a low impedance valve.

Super power valves are necessary in the final stages of powerful receivers, while the preceding stage generally requires a small power valve. Little need be said with regard to pentode valves, as their method of testing is identical with the ordinary type of valve.

Mention has not previously been made of rectifying valves. The method of testing, of course, consists in checking the filament consumption in the normal manner, while the total emission should be measured by including a milliammeter in circuit with a fixed resistance and using the maximum high-tension supply. This is a safety resistance to protect the valve, and the value is always contained amongst the manufacturer's data. On no account should this be omitted.

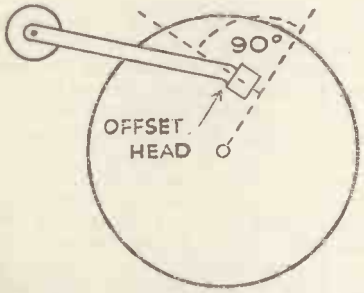
As a final word of warning, high-tension should never be applied to a large valve without the necessary grid bias. Grid bias should only be altered when the high-tension circuit has been switched off.

GRAMOPHONES.

Minor gramophone adjustments can easily be carried out by the dealer, but unless he is a qualified mechanic, we do not advise him to undertake such jobs as, for example, fitting a new spring to a gramophone motor.

Many radio-gramophones contain clockwork motors, and the dealer should be in a position to adjust these. Most troubles are usually associated with the governor mechanism starting with a little jerky action which gives rise to uneven running.

Practically all governors are controlled by a leather pad working on a friction disc.



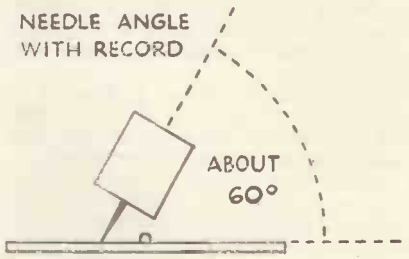


FIG. 26.—These three sketches show the correct position of a pick-up with respect to the record, and how to connect an external volume control.

If this becomes dry and hard, uneven running results. Proper lubrication almost immediately rectifies the trouble. If the leather has become very worn and hard a new piece should be fitted.

The motor should be kept well lubricated. Special oil for this purpose is available and only this should be used. Uneven running, recognisable by inconsistency of pitch, may also be due to worn or slack bearings. This can be determined by pressing on the turntable, when any lateral movement or shake will be readily apparent.

Motor Speeds.

Most records are intended to run at 78 r.p.m. The speed adjuster should, therefore, be capable of running the turntable at just below 78 to just above 80.

The easiest way to check the speed is by means of a stroboscopic disc. This is used either in conjunction with a neon lamp or an incandescent electric lamp operating on an alternating current supply. Stroboscopic discs consist of circles of dots which when viewed by interrupted light appear stationary at certain speeds, depending upon the frequency of the electrical supply, the number of dots, and the rate of revolution.

Electric Motors.

Electric motors can be divided into two classes, induction motors without brush gear, and universal motors with brush gear. Gearless induction motors require practically no attention with the exception of occasional oiling or greasing according to the type of bearings fitted.

Motors with brush gear require occasional overhaul, which involves merely cleaning of the commutator by removal of any loose carbon dust, and perhaps the removal of the brushes from their holders, and the general clearing of particles of carbon from the actual holders themselves.

Gearing arrangements and governors with friction controls require exactly the same treatment as those of clockwork motors.

When installing an electric motor, it is usually found necessary to earth the frame, as a protective measure against shocks from the metal turntable and also in the elimination of interference with the amplifier.

Tone and Carrier Arm Fixing.

To ensure correct playing and minimum record wear, carrier arms and tone arms should be fixed so that most accurate tracking is obtained. By tracking is meant relationship of the pick-up or sound box to the record grooves. Theoretically, the movement of the needle should be in a plane at right angles to a tangent drawn at the point of contact in the groove. It is obvious that the longer the tone arm the more accurate will be the tracking. Even better tracking is obtained by means of an offset tone arm, the head of the arm carrying the pick-up pointing slightly inwards towards the centre of the record.

The needle angle is also a matter of importance, and this should neither be too flat nor, on the other hand, too steep. The accompanying diagram, Fig. 26, shows suitable positions for pick-ups and carrier arms in their relation to the record.

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Pick-ups.

Detailed information regarding pick-ups will be found in the appropriate section. One word, however, may be said here with regard to faults which can only be rectified on the carrier arm itself.

It is important to see that a pick-up is not capable of side movement with respect to the carrier arm, as chatter may be set up which causes bad reproduction on heavily recorded passages. The leads from a pick-up should preferably be screened, particularly with a pick-up which employs a single coil, or one which has a very high impedance. Omission to screen the leads of a pick-up may be the cause of instability or bad hum in the amplifier.

When the volume control is situated on the motor board itself and does not form part of the receiver, the leads to and from the control should be similarly screened.

If a new volume control has to be fitted to a motor board, great care should be taken to see that one of the correct resistance is obtained. A volume control with too low a resistance will cause a serious cutting of top, and in some cases it may reduce the output of the pick-up very considerably.

ACCUMULATORS.

Accumulator charging and service forms a very important branch of practically every dealer's business.

There are three golden rules which if properly carried out will result in the minimum of trouble, and the maximum of efficient service. Here they are : The maximum life will be obtained from an accumulator if (1) it is regularly charged at the correct rate, (2) it receives regular attention as regards acid level and strength, and (3) it is kept clean.

Accumulators should be charged at their correct rates, not only in fairness to the batteries themselves, but also to the manufacturers and the owners. Nothing does more harm to a battery, and particularly a mass type battery, than charging it at too high a rate.

Acid strength should be checked by means of a hydrometer. The necessity of using a first-class instrument cannot be too strongly urged. Dealers should buy a thoroughly reliable float type hydrometer. The battery maker's recommendation as to specific gravity must be adhered to rigidly. While most cells operate correctly at about the same S.G., certain are designed to work at higher or lower values.

Great care must be taken to remove every trace of free acid from every part of the outside of an accumulator case, and particularly the terminals. It is a good plan to wipe the terminals over after charging, with water containing a little ammonia. Terminals should be well vaselined and, before handing a cell to a customer, the case should be given a good polish with a duster. Nothing is more revolting than an accumulator with an acid-covered top, and any charging station which sends out cells in this condition stamps itself as inefficient.

Charging Plants.

The type and size of plant which is installed must be determined entirely by the estimated amount of charging which will have to be carried out per week.

Where only direct-current mains are available, there are only two suitable systems. The first consists of charging the cells directly from the mains and the second involves the use of a motor driving a dynamo or a combined motor generator set.

Direct charging from the mains can only be economical when the total number of cells connected in series gives a voltage of about the same value as that of the supply. This means that at least 60 or 70 cells should be available for charging at the same time. It must also be remembered that the charging current must be cut down to the value required for the smallest cell. It is obvious, therefore, that charging by this method will only be economical in a few isolated cases. Those who have D.C. supplies are recommended to install a suitable motor generator set.

Where A.C. supplies are available some form of rectifying device or motor generator is immediately necessary. These can be classified under four headings : Motor generators, or motors driving dynamos, synchronous rectifiers, metal rectifiers, and valve or mercury rectifiers.

Valve, mercury, and metal rectifiers have practically no upkeep cost, since there are no moving parts. Replacements of the actual rectifying units are only necessary at long intervals. Motor generator sets, providing they are well made, run for long periods with little attention. Regular cleaning of the commutator and maintenance of the brush gear is of vital necessity for efficient operation of motor generator sets and synchronous rectifiers. Motor generators and synchronous rectifiers should not be installed without perfectly foolproof automatic cut outs.

The manufacturer's instructions regarding the correct method of installing any form of rectifying arrangement or generator set, and also the maximum outputs, should be strictly adhered to. No attempt should be made to overload any charging device.

Whatever charger is employed, external rheostats are necessary for adjusting the various charging rates. Many dealers prefer to make these themselves, and useful in-

formation relating to wire sizes and current carrying capacities is given in Fig. 27.

Data for Calculating Charging Resistances.

Current to be carried. In amps.	Eureka Resistance Wire S.W.G.	Resistance per yard. In Ohms.
0.5	30	5.57
1.0	26	2.64
2.0	22	1.09
3.0	20	0.661
5.0	17	0.273
10.0	13	0.101

Fig. 27.

Before carrying out any charging, dealers should make quite sure that their charging arrangements comply with fire insurance regulations. Cells should preferably be placed on glass sheets during charging. Meters should not be anywhere near the cells during charging operations because of fumes, and adequate ventilation should be provided. The ideal device, of course, is a fan extractor.

Providing the cells are carefully connected and arranged in a tidy manner there is practically no fire risk. A tangled mass of half-corroded wires lying haphazard on a heap of accumulators should never be tolerated. A proper system of time-keeping, and charging currents must be adopted, while careful inspection of all the cells during charging is invaluable. If a cell does not charge up in the correct time, there is something radically wrong, and it should be investigated as much in the dealer's as the customer's interest.

If there is no obvious cause, the dealer should communicate immediately with the manufacturers. Prompt action in this manner will save a tremendous amount of subsequent trouble between dealer, customer and manufacturer, while the dealer will do much to gain the confidence of both customer and manufacturer.

PUBLIC ADDRESS.

A successful public address demonstration is one of the best forms of advertisement which can come to a dealer. It does much to enhance his business reputation. Unfortunately the converse is true, and failure of public address does untold harm. It is absolutely essential to make quite sure that any public address demonstration will be an unqualified success from the outset.

There are only two important points which need to be watched. The first is meticulous care in the connection of the apparatus and the wiring of the amplifier. The second is the use of adequate power.

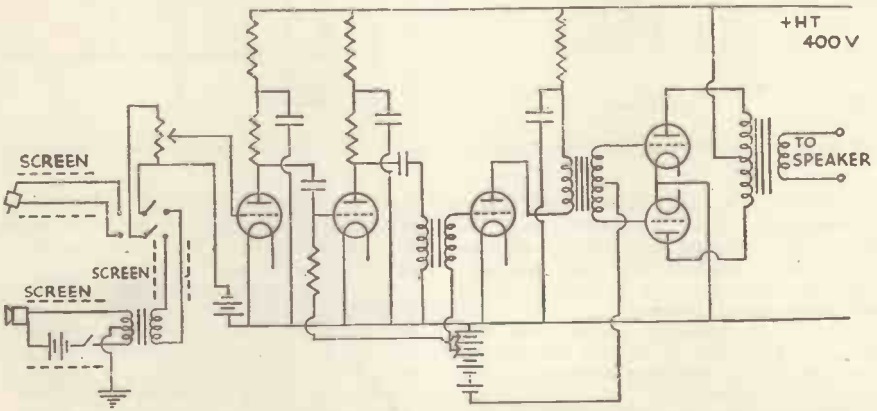


FIG. 28.—A small power public address amplifier arranged for microphone and record reproduction.

Without sufficient power, a public address system is doomed to failure.

A good powerful demonstration receiver which seems to be excellent in the showroom is utterly useless for public address. A set which is overpowering in the showroom becomes a mere whisper in a hall or an open space. It is essential, therefore, to use special apparatus for public address work.

Three Systems.

Public address arrangements can be divided into three sections, broadcast reception, gramophone reproduction, and microphone reproduction.

RADIO SERVICING

When radio reception is contemplated, the main receiver must have an ample reserve of sensitivity on the high-frequency side. Preferably, it should be capable of working from a frame aerial or a short length of wire hung across a room, unless it is definitely known that a large aerial is available.

At a really important demonstration it is advisable to duplicate the apparatus. One faulty connection can ruin a demonstration completely.

It is necessary to build special apparatus for public address work, but an ordinary receiver can be utilised for the first part of the reception. This, of course, must be followed by a really powerful power amplifier. Each stage of the latter should be completely screened, and this again should have ample reserve power.

Unless it is definitely known that A.C. mains are available, it is best to utilise a generator, since anything from 400 volts upwards is required.

Where gramophone reproduction is concerned, a pick-up jack of an ordinary receiver may be used for the first part of the amplifier, being followed, of course, by a power bank. The leads to the pick-up must be completely screened and earthed. The output side of the amplifier must be kept well away from the input connections.

With microphones even greater care is necessary. Connecting a microphone to the pick-up jack of an ordinary set is not advised. Very considerable amplification is necessary, and unless the low-frequency side of the receiver is completely screened, and this is unlikely, trouble may be experienced. It is preferable to build a special amplifier for the initial stages.

Amplifiers are conveniently built into stout tin-plate cases with screened compartments for each stage. Adequate decoupling is necessary, and volume controls on the first and second amplifiers are desirable.

Placing of Speakers.

In arranging speakers in a hall for demonstration purposes, it is general to place them so that they all point in the same direction. One successful arrangement consists in hanging them from the roof with the horns pointing slightly downwards.

No trouble is experienced with broadcast or gramophone reproduction. Where microphones are concerned, however, great care must be taken in the placing of them. They must be so arranged that no sound waves from the speakers can fall upon them, as otherwise continuous ringing or howling will be obtained. The less resonant the microphone, the less howling.

Only first-class microphones should be used for public address work. These are expensive and insensitive, but they should certainly be employed. The greater the number of people in the hall the less will be the tendency to howl back, owing to greater absorption.

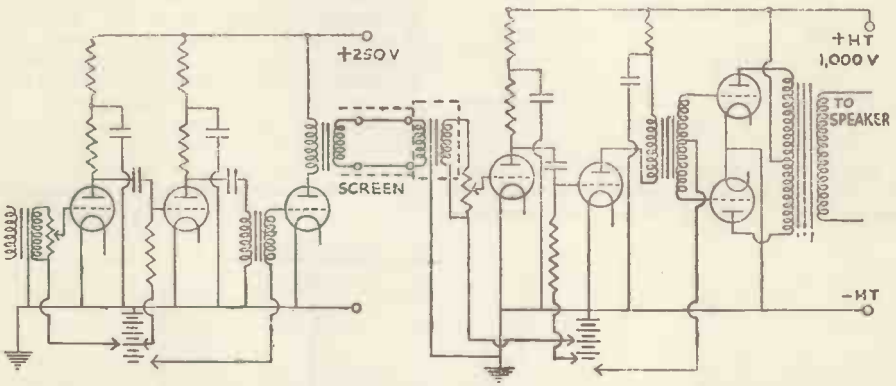


FIG. 29.—A double unit power amplifier for general work. Each stage is completely screened.

Power Required.

From two to three times the volume of sound which fills an empty hall will be required to fill it when the seats are occupied by a large number of people. If the music is to drown the general room noise of talking or dancing, then even greater power will be necessary. A speaker which is only just audible at the bottom of an empty room will be quite useless during a demonstration.

Dealers who are bound to give a demonstration and feel that they have not the necessary power should, without hesitation, apply to firms who manufacture public address equipment for the loan of suitable gear. Suitable public address amplifier circuits are shown in Figs. 28 and 29.

Interference.

The subject of hum in a loud speaker output and interference are somewhat closely associated. Interference can be classified under three headings—pure inductive hum, ripples and surges transferred to a set through the mains supply, and radio-frequency interference.

Pure inductive hum can originate in a receiver itself and also outside the set. Hum which has its origin in a receiver is due entirely to incorrect design. The most prolific cause is inadequate smoothing, and the cure is just a matter of increasing the smoothing by using more efficient chokes of high inductance and increasing the capacity.

Hum which still persists is then invariably due to induction caused by relatively strong fields adjacent to grid wires, or even interaction amongst the low-frequency components and the mains transformer or smoothing chokes. This is easily detected by moving any components or leads which are suspected of causing trouble, and seeing if this has the effect of increasing or diminishing the hum.

Care must be taken particularly with regard to long leads connected to the input of the amplifying portion, as, for example, the pick-up connection. An earthed screen lead will usually cure the trouble. It sometimes happens on a set with which an external pick-up is used that the mains lead is brought too near to the pick-up or even to the aerial or earth lead of the set. In this manner hum is sometimes introduced, and the remedy of course is obvious.

Effects which are introduced either through the mains connection or by high-frequency radiation are best dealt with together. There is practically nothing which can be done in the set itself, and the trouble has to be cured by eliminating it at its origin.

Some of the most usual sources of interference are sparking at the brushes of motors, contactors, or similar controls, and vibrating interrupters such as tremblers on induction coils.

In the majority of cases interference can be prevented simply by the use of fixed condensers which form a low impedance path between the origin of the disturbance and earth.

The simplest case is that of sparking at motor brushes. Interference of this type can be eliminated by connecting each brush to earth through a fixed condenser of 0.1 mfd. or a 0.01 mfd. can be connected between the two brushes. High insulation types must be used.

Interference is frequently increased by radiation from the supply mains. In this case the trouble can be cured by what is known as a centre point earth system. Two condensers are connected in series and placed across the leads, the junction point of the condensers being taken to earth. A centre point earth may be used at either end of a pair of leads.

On rare occasions H.F. chokes have to be inserted in the supply leads to a set. In this case the chokes are preferably placed in an earthed metal box, while the condensers are arranged on the set side of the chokes.

Interference from sparking plugs or distributors and magnetos on petrol engines can be reduced by using screening over the exposed portion of the electrical circuit. The high-tension leads may have a length of wire wrapped closely round them, the wire being earthed to the frame, while a metal screen can also be placed over the tops of the plugs and the distributors.

Adequate insulation, of course, is necessary and thick rubber cable should be used for the leads. Small apparatus which is the subject of tremendous electrical disturbance may require to be enclosed in an earthed screen, while centre point earth condensers and even chokes may be necessary.

Gas discharge tubes used for charging rectifiers also generate oscillations which cause interference, and these can easily be prevented by a fixed condenser from 0.001 mfd. to 0.01 mfd. connected between the anodes and earth. Each particular example of interference usually requires individual treatment, and the simplest remedy should be tried first until a complete cure is effected.

The first rule is always to disconnect the aerial from the receiver, and then the earth, to determine if the interference is being picked up on the radio-frequency side of the set. Interference which comes in strongly with the aerial connected, and is almost absent without the aerial must be eliminated at its source.

Disturbances in a set which are not affected by the aerial may be purely inductive effects in the receiver, or alternatively, they may be introduced through the supply mains.

Variable-Mu Valves.

The variable-mu valve is a screen grid amplifier in which the effective amplification factor and mutual conductance are variable over very wide limits.

When an ordinary screen grid valve is operating under correct conditions, it will only handle a small applied grid voltage. A large signal would oversweep the grid bias and cause considerable distortion introducing a rectification effect. This is a condition which is likely to obtain when a set using a screen grid amplifier is tuned in to a strong local signal.

If the effective amplification factor could be lowered, the valve would handle a very much greater grid swing without running off the straight portion of the curve. This is what happens in the case of the variable-mu

[*Continued on page* 112.]

The Broadcaster CIRCUIT

& WIRELESS RETAILER

WITH the data and charts given it is easy to find the component values of any circuit. This is how it is done in the case of a typical circuit such as that given on this page.

Several values can be obtained immediately from the table of Standard Average Values. C_1 must be .0005 mfd. capacity, C_2 .00015 to .0003 mfd., according to the reaction coil; C_3 .0001 mfd., and R_1 .5 megohm. C_4, it is found, must be .0003 mfd. and C_5 2 mfd.

For the resistance of R_2 the voltage drop *abac* is used. First, however, the characteristics of the valve V_1 must be examined, and the recommended anode voltage and the anode current—in this case with no grid bias—ascertained. Values of 150 volts and 5 m.a. respectively can be assumed.

As the H.T. voltage is 250, it is obvious that 100 volts have to be dropped across the resistance R_2.

Now, taking the *abac* and placing a straight edge so that it passes through the 100 volt and 5 m.a. marks, it will also be seen to cut the resistance line at 20,000 ohms. This is the required value of R_2.

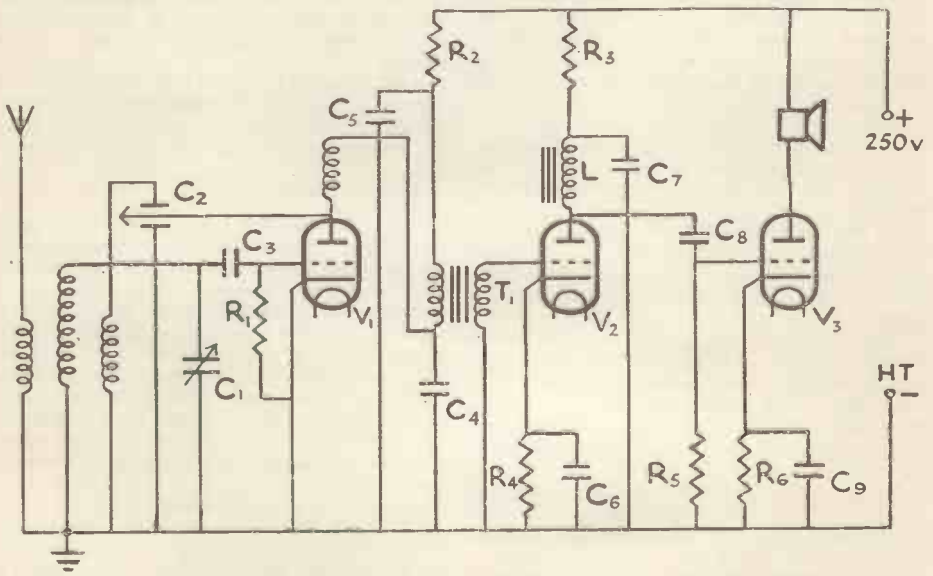
To find the required inductance of the transformer T_1 the impedance of V_1 must be found. Supposing this to be 10,000 ohms and referring to the chart, it is seen that for 90 per cent. bass amplification T_1 should have an inductance of 67 henries.

For R_3 the same process as for R_2 is employed. Assuming that V_2 is a 5,000 ohms valve working at 200 volts and requiring 12 volts negative bias, the anode current being 10 m.a., R_3 will be found to be 5,000 ohms.

R_4, the bias resistance, is found by placing the straight-edge on the anode current of 10 m.a., and the bias value of 12 volts. This results in a resistance value of 1,200 ohms.

For 90 per cent. bass, L_1, the chart shows, should have an inductance of just over 30 henries, with, of course, the anode current passing. Next the table gives these values: C_6 and C_7 1 mfd., C_8 .025 mfd., and R_5 .25 megohm.

The valve V_3, assuming 25 volts bias and 18 m.a. anode current, needs a bias resistance of 1,400 ohms. Lastly, C_9, from the table, should be 1 mfd.



How the values of all the components of a representative circuit such as this can be determined in a few minutes by means of the charts and data given on these pages is described above.

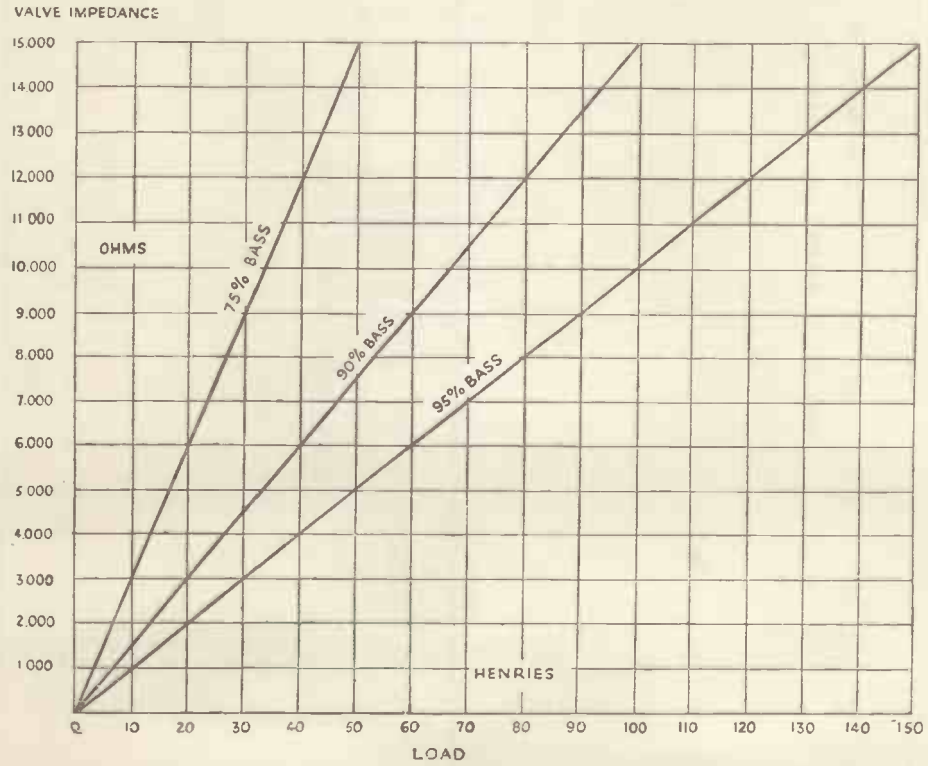
DESIGN DATA CHARTS

STANDARD AVERAGE VALUES

CONDENSERS.	
Tuning Condenser	0.0005 mfd.
Reaction Condenser	0.00015 mfd. to 0.0003 mfd.
Grid Rectification Condenser	0.0003 mfd.
Power Grid Rectification Condenser	0.0001 mfd.
H.F. By-Pass Condenser	0.0003 mfd.
H.F. Shunt Condenser	0.01 mfd.
L.F. Coupling Condenser	0.025 mfd. to 0.05 mfd.
Decoupling Condenser	1 mfd. to 2 mfd.

CONDENSERS—*contd.*	
L.F. Shunt By-Pass Condenser	1 mfd.
Band-Pass Coupling Condenser	0.01 mfd. to 0.04 mfd.

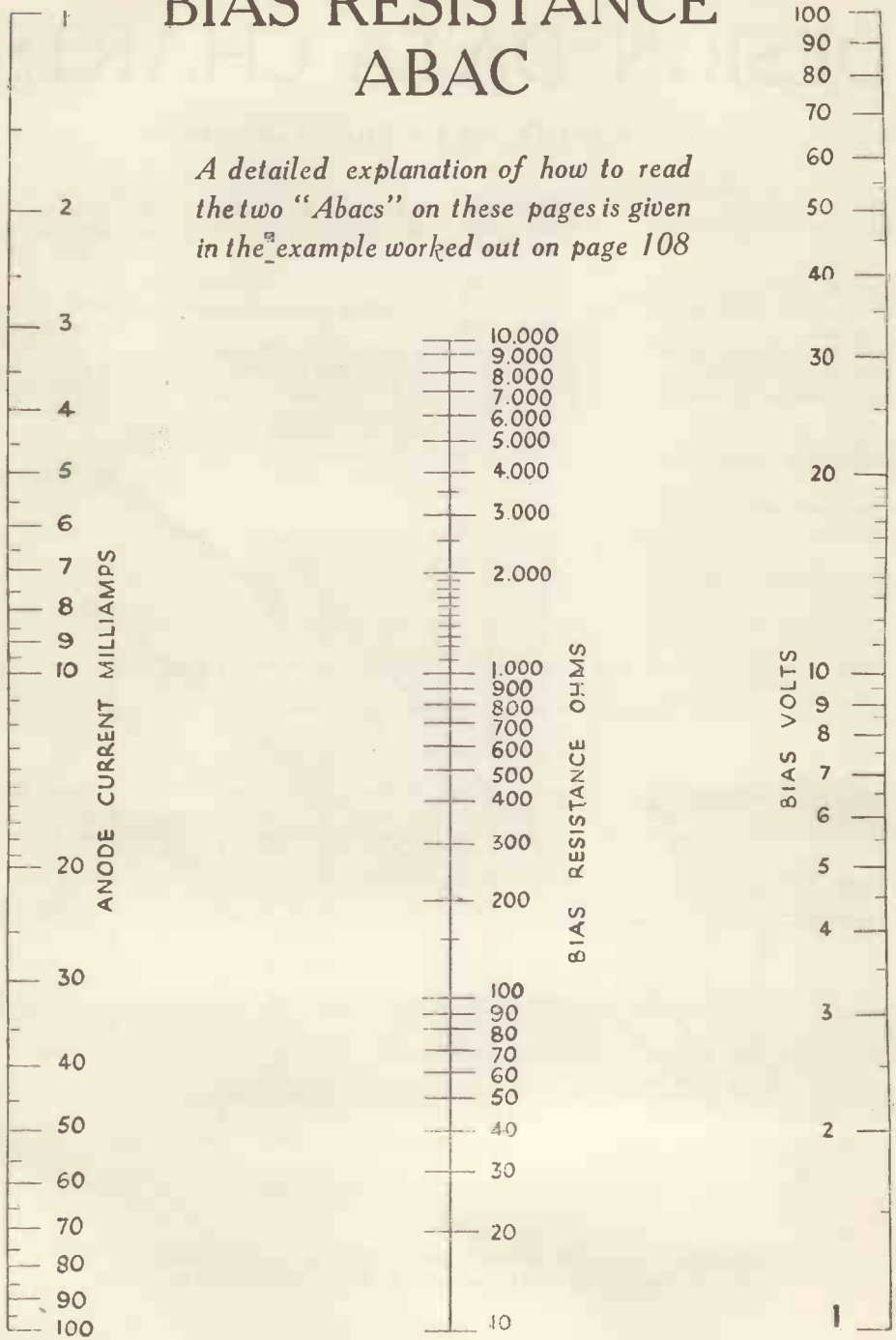
RESISTANCES.	
Coupling Grid Resistance	0.25 megohms.
Grid Rectification Leak	2 megohms.
Power Grid Rectification Leak	0.5 megohms
H.F. Stopping Resistance	50,000 ohms.
Volume Control Potentiometer	50,000 ohms.
Volume Control Potentiometer in shunt with High Impedance	250,000 ohms.



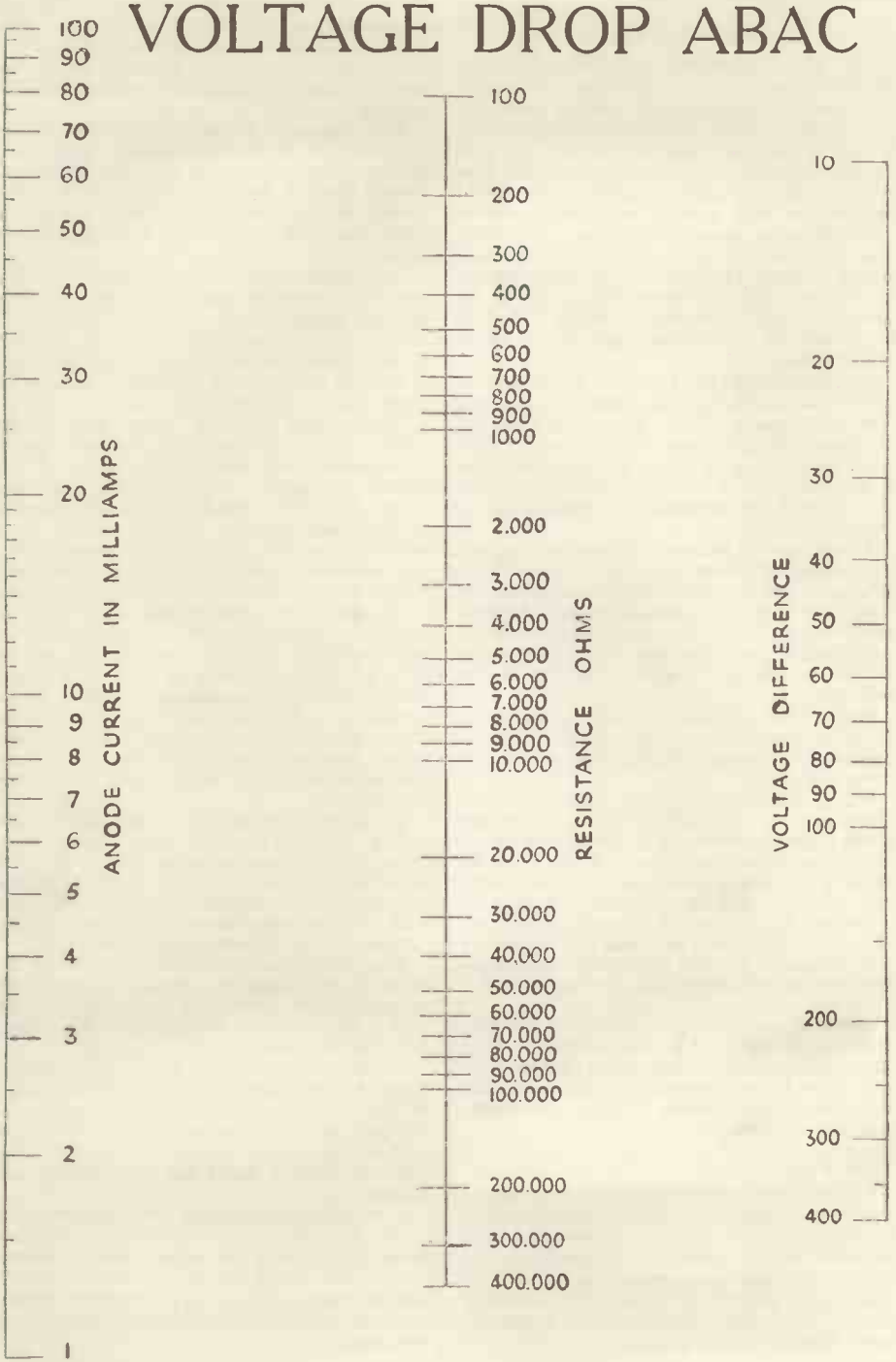
This graph shows at a glance the necessary anode load (in henries) for obtaining 75, 90, or 95 per cent. bass response with all valves up to those of 15,000 ohms impedance.

BIAS RESISTANCE ABAC

A detailed explanation of how to read the two "Abacs" on these pages is given in the example worked out on page 108



VOLTAGE DROP ABAC



RADIO SERVICING

[*Continued from page* 107.]

valve. The construction is different from the normal type, and the properties are usually obtained by having a gap control grid.

Constants of the valve are entirely controlled by the grid bias. In practice, the grid voltage is generally obtained on the auto bias system. This consists in passing the anode current through a fixed resistance, across which there is then a volt drop. This volt drop is applied to the grid of the valve and serves as bias. The variable-mu valve circuit is substantially identical with that of an ordinary valve, the control being obtained by means of a potentiometer which alters the grid bias.

It is essential to run the valve at the correct screen and anode voltages, and a little more care is necessary in the correct adjustment of these voltages than in the case of the ordinary screen grid valve. The bias variation is quite large, and in the maximum position the mutual conductance is reduced to a fractional value.

In the case of battery variable-mu valves, the necessary bias control is sometimes obtained from a potentiometer which can be connected across the bias battery. In this case it is best to provide a switch for disconnecting the potentiometer when the set is not in use, as this prolongs the life of the battery.

When two variable-mu valves are used, the grid potentials of the valves can be simultaneously controlled through a common potentiometer.

When converting a set from ordinary screen grid to variable-mu valves, the value of the potentiometer can be worked out very simply from the bias abacs. With a knowledge of the anode current and the maximum grid bias that will be required, it is easy to determine the value of the potentiometer. The resistance should be made too big rather than too small, so that the maximum desired bias can be obtained with a certain factor of safety.

When a common potentiometer for two valves is arranged, if it is connected so that the anode currents of both valves pass through it, it must be remembered in calculating the value that the current flowing is double that of a single valve.

Tone Control.

When a large amount of reaction or regeneration is applied to a sharply tuned circuit, the sharpness of tuning is increased still further. In a suitably designed circuit the reaction can be increased to a point at which the circuit is extremely critically tuned. In other words, the resonance curve becomes highly peaked.

A broadcast transmission consists of radiation at a given radio-frequency which is modulated at speech frequencies. This produces side bands, as they are called, which have frequencies equal to the carrier frequency plus or minus the modulated frequency.

For example, a 300 metre transmission consists of a radio-frequency oscillation having a carrier value of 1,000,000 cycles per second, and if this is modulated at 1,000 cycles, the two side bands have a value of 1,000,000 plus 1,000, and 1,000,000 minus 1,000.

In an ordinary tuned circuit the resonance curve is somewhat flat at the top, and this flatness extends over a range which would include all the side bands. Intense reaction, however, on a low loss copper circuit produces a marked peak at the resonance point with very quickly falling away sides.

This means that the upper side bands, that is those produced by the high speech frequencies, will only be received at far smaller strength. Accordingly, distortion is present, the form of distortion being known as side band cutting. It is apparent by a marked absence of the higher speech frequencies, therefore, circuits have to be used which compensate for the side band cutting.

It should be understood that what is definitely removed from the output can never be introduced, so that tone correction can only be applied so long as there is a slight amount of the frequencies which have to be corrected. The obvious method of tone correcting is to employ an L.F. amplifier which has an exactly opposite or inverse characteristic to that of the input or detector circuit.

It is only necessary, therefore, to use an L.F. amplifier in which one stage, or sometimes several, have a characteristic which is deficient in bass, so that when a falling top output is amplified by an amplifier with a falling bass characteristic, the resultant output will be substantially level.

This is frequently achieved by using an extra stage comprising a choke coupling unit in which the choke has an inductance of only a fraction of a henry, or at the most, perhaps two henries.

Correct value can be found very simply from the amplification formula if the shape of the radio-frequency response curve is known. As this is not usually the case, it is best to try the set experimentally by using different chokes, until the best results are obtained.

A rough approximation to tone correction can be obtained simply by using an ordinary transformer which has a low primary inductance. This has a falling bass characteristic, and in many cases it approximates closely to the inverse of the distorted radio-frequency response.

ELECTRICAL FORMULÆ AND DATA

FOR D.C. CIRCUITS.

Ohm's Law.

$$I=\frac{E}{R} \qquad E=IR \qquad R=\frac{E}{I}$$

Power.

Power (watts) = E.M.F. (volts) × Current (amps.).

FOR A.C. CIRCUITS.

Current in A.C. circuit containing Inductance (L) only :—

$$I=\frac{E}{\omega L}$$

$\omega = 2\pi f$.

Current in circuit with Capacity (C) only :— $I = \omega CE$.

Current in circuit containing Resistance, Capacity and Inductance in series :—

$$I=\frac{E}{\sqrt{R^2+\left(\omega L-\frac{I}{\omega C}\right)^2}}$$

Impedance.

$$\text{Impedance } Z=\sqrt{R^2+\left(\omega L-\frac{I}{\omega C}\right)^2}$$

Reactance.

$$\text{Reactance } X=\left(\omega L-\frac{I}{\omega C}\right)$$

Angle of Lag or Lead.

$$\text{Tan } \phi = \frac{\text{Reactance}}{\text{Resistance.}}$$

Admittance.

$$\text{Admittance} = \frac{1}{\text{Impedance.}}$$

Conductance.

$$\text{Conductance} = \frac{1}{\text{Resistance.}}$$

Power.

$$\text{R.M.S. value} = \frac{1}{\sqrt{2}} \times \text{peak value.}$$

In three-phase systems—

Star connection—

Line voltage = $\sqrt{3}$ × phase voltage.
Line current = phase current.

Delta connection—

Line voltage = phase voltage.
Line current = $\sqrt{3}$ × phase current.

With either connection total power is given by $\sqrt{3}E_LI_L \cos\phi$ where E_L = line voltage ; I_L = line current and $\cos\phi$ = cosine of angle of phase difference between the coil voltage and the current.

$$\textit{Crest Factor} = \frac{\text{Maximum value.}}{\text{R.M.S. value.}}$$

$$\textit{Form Factor} = \frac{\text{R.M.S. value}}{\text{Average value.}} = 1{\cdot}11 \text{ in case of sine wave.}$$

$$\textit{Power Factor} = \frac{\text{True Power}}{\text{Apparent Power}} = \frac{EI\cos\phi}{EI}$$

$$\textit{True Power} = EI\cos\phi = I^2R\cos\phi$$

RESISTANCES, CAPACITIES AND INDUCTANCES IN SERIES AND PARALLEL.

Units.	*Series Total.*	*Parallel Total.*
Resistances : r_1, r_2, r_3	$R=r_1+r_2+r_3$	$R=\frac{1}{\frac{1}{r_1}+\frac{1}{r_2}+\frac{1}{r_3}}$
Capacities : C_1, C_2, C_3	$C=\frac{1}{\frac{1}{C_1}+\frac{1}{C_2}+\frac{1}{C_3}}$	$C=C_1+C_2+C_3$
Inductances : l_1, l_2, l_3	$L=l_1,+l_2,+l_3$	$L=\frac{1}{\frac{1}{l_1}+\frac{1}{l_2}+\frac{1}{l_3}}$

FOR COILS AND CONDENSERS.

Inductance.

In a single-layer coil close wound on a cylindrical former, the inductance is given by :

$$L=\pi^2d^2n^2lK,$$

where =diameter of coil in cms. ; l=length of coil in cms. ; n=number of turns per cm. ; K=factor depending on the ratio of diameter to length of coil ; L=inductance in micro-henries.

$\frac{d}{l}$.	K.	$\frac{d}{l}$.	K.
0·00	1·000	1·5	0·595
0·10	0·959	2·0	0·526
0·20	0·920	2·5	0·472
0·30	0·884	3·0	0·429
0·40	0·850	4·0	0·365
0·50	0·818	5·0	0·320
0·60	0·788	6·0	0·285
0·70	0·761	7·0	0·258
0·80	0·735	8·0	0·237
0·90	0·711	9·0	0·218
1·00	0·688	10·0	0·203

ELECTRICAL FORMULÆ.

For a single-layer close-wound coil, the coil of maximum inductance from a length of wire is given by—

$$\frac{\text{Diameter}}{\text{Length}} = 2{\cdot}4.$$

Capacity.

In a parallel metal plate condenser capacity is given by—

$$C \text{ (cms.)} = \frac{nkA}{4\pi d},$$

where n=number of sheets of dielectric, k=specific inductive capacity of dielectric with air as unit; A=area of one plate in sq. cms., and d=distance between plates.

Charge held by condenser is Q (coulombs) = C (farads) × V (volts).

WAVELENGTH AND FREQUENCY.

Radio waves travel at 300 million metres a second.

Wavelength × Frequency = Velocity.

$$\underset{\text{(metres)}}{\text{Wavelength}} = \frac{\text{300 million}}{\underset{\text{(cycles per sec.)}}{\text{Frequency}}}$$

Wavelength (metres).	L.C value (micro-henries × microfarads).
6	·0000101
12	·0000407
20	·000113
30	·000253
60	·00101
100	·00281
250	·0176
300	·0253
333·33	·0313
375	·0396
428·75	·0519
500	·0704
600	·101
750	·158
1,000	·281
1,500	·633
3,000	2·53

FOR OSCILLATORY CIRCUITS.

Wavelength of a circuit LC is given by :—

$$\lambda = 1885\sqrt{LC}$$

where λ is wavelength in metres, L is inductance in microhenries and C is capacity in microfarads.

Resonant frequency of a circuit LC is given by :—

$$f = \frac{1}{2\pi\sqrt{LC}}$$

where f is cycles per second, L is inductance in henries and C is capacity in farads.

When a voltage is applied to a circuit LC, the circulating current

$$I_R \text{(amps)} = V\sqrt{\frac{C}{L}} \text{ (approx), and}$$

the supply current I (amps) $= V\frac{RC}{L}$

where R is resistance in ohms of the circuit, L is inductance in henries and C is capacity in farads.

The smaller the ratio $\frac{C}{L}$ the greater is the selectivity of a receiver.

The voltage across an inductance or a condenser in a circuit LC is given by :—

$$E_L = E_C = I\sqrt{\frac{L}{C}}$$

where I is current in amperes, L is inductance in henries and C is capacity in farads.

When two circuits L_1C_1 and L_2C_2, tuned to the same frequency, are coupled together, the co-efficient of coupling is given by :—

$$k = \frac{M}{\sqrt{L_1 L_2}}$$

where M = coefficient of mutual induction.

Both circuits coupled together radiate two frequencies given by :—

$$f_1 = f \times \frac{1}{\sqrt{1+k}} \text{ and}$$

$$f_2 = f \times \frac{1}{\sqrt{1-k}}$$

when f is the natural frequency of the two circuits.

With inductance coupling between two circuits is used, the coefficient of coupling is

$$k = \frac{L_M}{\sqrt{L_1 L_2}}$$

With capacity coupling the coefficient is

$$k = \frac{\sqrt{C_1 C_2}}{C}$$

Magnetic Equivalent of Ohm's Law.

$$\text{Magnetic Flux} = \frac{\text{Magneto-motive Force}}{\text{Reluctance}}$$

$$i.e.\ \ \phi = \frac{\text{M.M.F.}}{S}$$

M.M.F. = $0{\cdot}4\pi$ NI, where N = number of turns on solenoid, and I = current in amperes.

Flux Density and Permeability of Iron.

$$\text{Permeability} = \frac{\text{Flux Density}}{\text{Magnetising force}}$$

$$i.e.\ \ \mu = \frac{B}{H}$$

Energy Stored in Magnetic Field.

Stored energy = $\frac{1}{2}$ LI^2 where L = induc-

tance of circuit in henries and I the steady current in amperes.

Building Up and Decay of Direct Current.

When an E.M.F. of E volts is applied to a circuit having resistance R ohms and inductance L henries, the instantaneous current is given by :—

$$i = \frac{E}{R}\left(1 - \epsilon^{\frac{-Rt}{L}}\right)$$

where t is time in seconds. The ratio $\frac{L}{R}$ is called the "time constant."

Where the source of E.M.F. is removed the instantaneous current is given by :—

$$i = I\,\epsilon^{\frac{-Rt}{L}}$$

where I is the initial value of the current.

DIELECTRIC STRENGTHS.

Material.	Volts per mm.
Glass	8,000
Paraffin	12,000
Micanite	40,000
Ebonite	30,000
Porcelain ...	10,000
Empire Cloth ...	10,000
Pressspahn ...	5,000

Two sharp points in air 10 inches apart will flash over at about 100,000 volts.

Quantities of Water and Acid to be added to produce required specific gravity.

Using 1·400 acid.

Required Specific Gravity.	Water Parts by Volume.	Acid Parts by Volume.
1·300	4·5	10
1·280	5·5	10
1·275	6·25	10
1·260	6·5	10
1·250	6·75	10
1·835 acid.		
1·400	15·6	10
1·350	19·5	10
1·300	24·7	10
1·290	26·0	10
1·280	27·5	10
1·270	29·0	10
1·260	30·0	10
1·250	32·2	10
1·240	34·0	10
1·230	36·0	10
1·225	37·2	10

COMPARATIVE RESISTANCES.

Resistances of materials taking that of copper as unit.

Aluminium	1·6
Brass	4·4
Concondin	60
Constantin	30
Eureka	20
German Silver	13
" "	18·
Gold	1·5
Iron	6·2
"	7·4
Kruppin	52·6
Manganese Copper	62
Manganin	26
Mercury	59
Neusilber	23
Nichrome	55
Nickel	4·4
Nickel Steel	18
" "	46·5
Nickeline	20
"	27
Phosphor Bronze	4·4
Platinoid	20
"	31
Platinum	6·3
Rheostan	30
"	62
Silicon Bronze	1·5
Silver	·94
Steel	12

EQUIVALENT TEMPERATURES.

$$F = \frac{9}{5}C + 32$$

$$C = \frac{5}{9}(F - 32)$$

F = Fahrenheit scale.

C = Centigrade scale.

CALCULATION OF RESISTANCE OF WIRE.

$$R = \frac{l\rho}{\frac{\pi}{4}d^2}$$

where R = resistance

l = length of wire

ρ = resistivity

d = diameter

Sectional area of a wire = $\cdot 7854\, d^2$

where d = diameter

STANDARD WIRE TABLES

SINGLE COTTON COVERED.

S.W.G.	Total thickness of covering in mils.	Turns per inch.	Turns per sq. inch.	Yards per lb.
40	4	112.5	26,600	3,910
38	4	100	10,000	2,550
36	4	86·2	7,430	1,610
34	5	70·5	4,970	1,280
32	5	63·3	4,010	835
30	5	57·5	3,300	634
28	5	50·5	2,550	452
26	5	43·5	1,892	311
24	5	37	1,369	219
22	5/6	29·8	888	134
20	5/6	24·1	581	81·7
18	6/7	18·3	335	46·3
16	7	14·1	198	26·1
14	7/8	11·4	130	16·9
12	7/8	9	81	10·3
10	7/8	7·4	54	6·63

DOUBLE COTTON COVERED.

S.W.G.	Total thickness of covering in mils.	Turns per inch.	Turns per sq. inch.	Yards per lb.
40	7/9	78	6,080	3,456
38	7/9	71·5	5,110	2,287
36	7/9	64	4,010	1,477
34	8/10	55	3,020	1,024
32	8/10	50·5	2,550	755
30	8/10	47	2,210	587
28	8/10	42	1,790	422
26	8/10	37	1,400	294
24	8/10	32·3	1,043	203
22	9/11	26·3	692	129
20	9/11	21·7	473	79·4
18	9/11	17·3	299	45·4
16	10/12	13·3	177	25·6
14	12/14	10·75	115	16·6
12	12/14	8·5	72	9·09
10	12/14	7·1	50·3	6·58

SINGLE SILK COVERED.

S.W.G.	Total thickness of covering in mils.	Turns per inch.	Turns per sq. inch.	Yards to weight.
				per oz.
47	1·2	312	97,300	1,375
46	1·2	278	77,300	1,000
45	1·2	250	62,500	752
44	1·2	227	51,530	599
42	1·2	192	36,860	387
40	1·3	164	26,900	276
				per lb.
38	1·3	137	18,770	2,871
36	1·3	112	12,540	1,815
34	1·3	95·2	9,060	1,250
32	1·3	82·6	6,820	912
30	1·3	73	5,330	695
28	1·3	62·1	3,860	488
26	1·3	51·8	2,680	332
24	1·5	42·5	1,810	222
22	2	33.3	1,090	137
20	2	26·3	692	83·3
18	2	20	400	46·8
16	3	15	222	26·4

DOUBLE SILK COVERED.

S.W.G.	Total thickness of covering in mils.	Turns per inch.	Turns per sq. inch.	Yards to weight.
				per oz.
47	2·2	238	56,600	1,190
46	2·2	217	47,100	871
45	2·2	200	40,000	675
44	2·2	185	34,200	536
42	2·2	161	25,900	358
40	2·5	137	18,800	258
				per lb.
38	2·5	118	13,900	3,760
36	2·5	90·1	8,120	1,750
34	2·5	85·5	7,310	1,220
32	2·5	75.2	5,650	887
30	2·5	67·1	4,500	675
28	2·5	57·8	3,340	478
26	2·5	48·8	2,380	325
24	3	40	1,600	218
22	3	32·2	1,040	134
20	3	25·6	655	82.5
18	3	19.6	384	46·3
16	4	14·7	216	26·1

(For enamelled wire see opposite page.)

B.S.I. SPECIFICATION FOR EBONITE

The specification refers to pure non-loaded sheet, rod and tube ebonite, not moulded. It provides for two grades, Grade I. and Grade II.

Composition.—The ebonite shall be composed of new first-grade Hevea rubber and sulphur, and shall be free from loading materials. If ebonite dust is used the composition of the dust shall comply with this clause. There shall not be more than 29 per cent. of combined sulphur and not more than 4 per cent. of free sulphur, the percentages in each case being calculated on only the rubber plus the combined sulphur.

For the specification, rubber plus combined sulphur shall be taken to mean the residue after deduction of ash and all matter extractable by acetone. The combined sulphur content shall be determined by deducting the free sulphur from the total sulphur.

The amount of resin or other organic matter extracted by acetone after deduction of the free sulphur shall not exceed 4 per cent. for Grade I. and 8 per cent. for Grade II. The ash left after thorough incineration shall not exceed 2 per cent. for Grade I. and 3 per cent. for Grade II.

The ebonite shall be free from metallic particles.

Density.—The density at 20° C. shall not exceed 1·2 grammes per cubic centimetre for either grade.

Cross-breaking Strength.—When a sample 85 mm. long by 6 mm. square is supported in a clamp extending 20 mm. along its length from one end and it is loaded with weights held in a stirrup 5 mm. from the other end, it shall be able to withstand a load of 17 lb. (7·71 kg.) for Grade I. and 13·5 lb. (6·12 kg.) for Grade II. The temperature must be 15° C. to 25° C.

Surface Leakage.—An instrument of the magneto-ohmmeter type, of 1,000 volts and capable of indicating a resistance of not less than 2,000 megohms, shall give a reading greater than 2,000 megohms over the whole of the surface of ebonite sheets, and of rods and tubes where practicable, the instrument being connected to a contact comb with 25 points spaced in a straight line with ¼-in. gaps and arranged with alternative positive and negative points. The points shall be spring mounted to secure good contact.

Electric Strength.—The ebonite shall withstand for one minute the following test voltages :—

Grade I.—2,250 volts per mil (90 k.v. per mm.).

Grade II.—1,500 volts per mil (60 k.v. per mm.).

Power Factor.—The power factor shall not exceed 0·6 per cent. for Grade I. and 0·8 per cent. for Grade II. when tested at a frequency of 800 cycles per second.

Dimensions.—Unless otherwise specified, bulk material shall be supplied in the following sizes only, and the number of pieces shall be that which most nearly gives the weight of the order :—

Sheets—36 in. by 18 in. (91·4 cm. by 45·7 cm.).

Rods and Tubes—1 metre.

STANDARD WIRE TABLES.

ENAMELLED.

S.W.G.	Total thickness of covering in mils.	Turns per inch.	Turns per sq. inch.	Yards to weight.
				per oz.
50	·2	833	694,000	6,480
49	·2	714	510,000	4,510
48	·3	526	277,000	2,540
47	·3	435	189,000	1,630
46	·4	357	127,500	1,128
45	·5	303	91,800	835
44	·5	270	72,900	642
42	·6	217	47,100	411
40	·7	182	33,100	286
				per lb.
38	1·0	143	20,450	2,810
36	1·0	116	13,450	1,840
34	1·0	98	9,600	1,202
32	1·2	83.3	6,940	915
30	1·2	73·5	5,400	694
28	1·6	60·1	3,610	488
26	1·8	50·5	2,550	330
24	2·3	41·1	1,690	221
22	2·5	32·8	1,080	137
20	2·7	25·8	666	83·3
18	2·7	19·7	388	46·9
16	3·5	14·8	219	26·4

BRITISH STANDARD WIRE SIZES

BARE COPPER.

S.W.G.	Diam.	Section Area.	Ohms per 1,000 yds.	Length per Ohm.	Weight per 1,000 yds.	Ohms per lb.	Approx. safe current.
	ins.	sq. in.		ins.	ozs.		in amps.
50	·001	·00000079	30,570	1·18	·145	3,365,000	·003
49	·0012	·00000113	21,230	1·7	·209	1,623,000	·005
48	·0016	·00000201	11,941	3·02	·372	513,500	·008
47	·002	·00000314	7,642	4·71	·581	210,300	·012
46	·0024	·00000452	5,307	6·78	·834	101,440	·02
45	·0028	·00000616	3,899	9·24	1·14	54,750	·025
44	·0032	·00000804	2,985	10·77	1·49	32,090	·03
43	·0036	·0000102	2,359	15·26	1·88	20,040	·04
42	·004	·0000126	1,910	18·87	2.32	13,146	·05
41	·0044	·0000152	1,578	22.81	2·81	8,978	·06
40	·0048	·0000181	1,326	27·15	3·35	6,340	·07
				yards.	lbs.		
38	·006	·0000283	849	1·18	·327	2,597	·1
36	·0076	·0000454	529	1·89	·525	1,008	·15
34	·0092	·0000665	361	2·77	·769	469·8	·25
32	·0108	·0000916	262	3·82	1·06	247·4	·4
30	·0124	·000121	199	5·03	1·40	142·35	·5
28	·0148	·000172	139·5	7·18	1·99	70·14	·7
26	·018	·000254	94·3	10·6	2·94	32·06	1·0
24	·022	·000380	63·2	15·8	4·4	14·366	1·5
22	·028	·000616	39	25·6	7·12	5·475	2·5
20	·036	·00102	23·6	42·4	11·8	2·004	4
18	·048	·00181	13·27	75·4	20·9	·634	7
16	·064	·00322	7·46	134·6	37·2	·2	13
14	·08	·00503	4·78	208	58·1	·08216	19
12	·104	·0085	2·83	353	92·8	·02877	28
10	·128	·013	1·87	535	148·8	·012537	35

RESISTANCE WIRES.

	Beacon Wire.			Iron Wire.		German Silver.	
Gauge.	Ohms per yd.	Yards per lb.	Current amp.	Ohms. 1,000 ft.	Current.	Ohms. 1,000 ft.	Current.
8	·067	5·5	15·7	2·4	47	6·8	30
9	·083	6·5	13·4	3·1	40	8·7	26
10	·104	8	12·4	3·8	37	11	24
11	·134	9·5	10·9	4·8	33	14	22
12	·159	12	9·5	6·1	28	17·3	19
13	·205	15·5	8·1	7·8	24	21·6	16
14	·270	20	6·7	9·8	20	27·4	13
15	·330	25	5·7	12·2	17	34·7	11
16	·422	31	4·7	15·5	14	44	9
17	·540	41	3·8	19·5	11	55·3	8
18	·750	55	2·9	28	8	77	6
19	1·04	83	2·0	39	6	112	4
20	1·33	100	1·7	48	5	138	3·5
21	1·66	125	1·4	62	4	176	8
22	2·15	164	1·05	79	3	224	2

BROADCASTING STATIONS

EUROPEAN

Metres.	Kc.	Station.	Power in Kw.
211.3	1,420	Newcastle	1
214.3	1,400	Warsaw No. 2 (Poland)	10
214.3	1,400	Aberdeen	1
216	1,391	Radio Chatelineau (France)	3
223	1,345	Fécamp (France)	10
224.4	1,337	Cork (Ireland)	1
227	1,319	Cologne (Germany)	1.7
235	1,283	Lodz (Poland)	2
237.2	1,265	Radio Nimes (France)	1
237.2	1,265	Bordeaux (France)	3
239	1,256	Nurnberg (Germany)	2
240	1,250	Radio Beziers (France)	1.5
242	1,238	Belfast (Ireland)	1
244.1	1,229	Wilno (Poland)	22
246	1,220	Bern (Switzerland)	1.1
247.7	1,211	Trieste (Italy)	10
252	1,193	Barcelona (Spain)	1
252	1,193	Almeria (Spain)	1
253	1,184	Gleiwitz (Germany)	5
255	1,175	Toulouse (France)	1
257	1,166	Horby (Sweden)	10
259	1,157	Leipzig (Germany)	2
261.6	1,147	London National	50
263	1,139	Moravska-Ostrava (Czecho-Slovakia)	11
265.4	1,130	Lille (France)	2
268	1,121	Radio Valencia (Spain)	1.5
270	1,112	Bari (Italy)	20
272	1,103	Rennes (France)	1.2
273.7	1,096	Turin (Italy)	7
276.5	1,085	Heilsberg (Germany)	60
279	1,076	Bratislava (Czecho-Slovakia)	14
282.2	1,063	Lisbon (Portugal)	2
288.5	1,040	Scottish National	50
288.5	1,040	English Relays	
		Bournemouth	1.2
		Plymouth	0.16
		Swansea	0.16
290.5	1,033	Lisbon (Portugal)	2
291	1,031	Viipuri (Finland)	13.2
291	1,031	Tampere (Finland)	1
293	1,022	Kosice (Czecho-Slovakia)	2.5
296.1	1,013	Hilversum (Holland)	20
298.8	1,004	Tallin (Estonia)	11
301.5	995	Northern National	50
304	986	Bordeaux Lafayette (France)	13
309.9	968	Cardiff	1
312.8	959	Genoa (Italy)	1.5
312.8	959	Cracow (Poland)	1.5
315	950	Marseilles (France)	1.5
319	941	Naples (Italy)	1.5
319	941	Sofia (Bulgaria)	1
322	932	Goteborg (Sweden)	10
325	923	Breslau (Germany)	60
328.2	914	Poste Parisien, Paris	60
332	905	Milan (Italy)	7
335	896	Cadiz (Spain)	5.5
335	896	Poznan (Poland)	1.9
338.2	887	Brussels No. 2 (Belgium)	15
342	878	Brno (Czecho-Slovakia)	35
345	869	Strasbourg-Brumath (France)	11.5
349	860	Barcelona (Spain)	8
351	855.5	Leningrad (Russia)	1.2
352	851	Graz (Austria)	17
356	843	London Regional	50
360.5	832	Muhlacker (Germany)	60
363.4	825.3	Algiers (N. Africa)	13
364	824	Bergen (Norway)	1
368.1	815	Bolzano (Italy)	1
368.1	815	Seville (Spain)	1.5
368.1	815	Helsinki (Finland)	13.2
370.4	810	Radio LL, Paris (France)	1.2
372	806	Hamburg (Germany)	1.5
376.4	797	Scottish Regional	50
381	788	Lwow (Poland)	16
385	779	Toulouse (France)	8
390	770	Archangel (Russia)	10
390	770	Frankfurt (Germany)	1.5
394	761	Bucharest (Roumania)	12
398.9	752	Midland Regional	25
403	743	Sottens (Switzerland)	25
408	734	Katowice (Poland)	16
413	725	Dublin (Ireland)	1.2
416	721.1	Rabat (Morocco)	6
419.5	715	Berlin, Witzleben	1.5
424.3	707	Madrid (Spain)	2
430.4	697	Belgrade (Yugoslavia)	2.5
436	689	Stockholm (Sweden)	50
441	680	Rome (Italy)	50
450.4	660	Odessa (Russia)	4
453.2	662	Salamanca (Spain)	1
459	653	Beromunster (Switzerland)	60
465.5	644	Lyons (France)	5
473	635	Langenberg (Germany)	60
476	630	Sebastopol (Russia)	1.2
480	626	Northern Regional	50
488.6	614	Prague (Czecho-Slovakia)	120
493.4	608	Trondheim (Norway)	1.3
497	603.5	Moscow (Russia)	1.2
500.8	599	Florence (Italy)	20
509	590	Brussels No. 1 (Belgium)	15
517	581	Vienna (Austria)	15
525	572	Riga (Latvia)	15
533	563	Munich (Germany)	1.5
542	554	Palermo (Italy)	3
542	554	Sundsvall (Sweden)	10
550	545	Budapest (Hungary)	18.5
560	536	Kaiserslautern (Germany) (relays Munich)	1.5
563	533	Wilno (Poland)	16
565	531	Smolensk (Russia)	2
566	530	Grenoble (P.T.T.) (France)	
574.7	522	Ljubljana (Yugoslavia)	2.5
700	428.6	Minsk (Russia)	4
720	416.7	Moscow Experimental (Russia)	20
760	395	Geneva (Switzerland)	1.5
761.4	394	Nijni Novgorod (Russia)	1.8
778	385	Petrozavodsk (Russia)	2
848.7	353.5	Rostov-Don (Russia)	4
937.5	320	Kharkov (Russia)	20
1,000	300	Leningrad (Russia)	100
1,034	290	Kiev (Russia)	36
1,071	280	Tiflis (Russia)	10
1,083	277	Oslo (Norway)	60

Metres.	Kc.	Station.	Power in Kw.
1,116	268.5	Moscow, Popoff (Russia)	40
1,153	260	Kalundborg (Denmark)	7.5
1,200	250	Reykjavik (Iceland)	21
1,200	250	Istanboul (Turkey)	5
1,260	238.1	Novosi Birsk (Russia)	4
1,304	230.1	Moscow (Russia)	100
1,348	222.5	Motala (Sweden)	30
1,411	212.5	Warsaw No. 1 (Poland)	120
1 445.7	207.5	Eiffel Tower (France)	13
1,481	202.6	Moscow (Russia)	100
1,538	195	Ankara (Turkey)	7
1,554.4	193	Daventry National	30
1,635	183.5	Konigswusterhausen (Germany)	60
1,725	174	Radio Paris	75
1,796	167	Lahti (Finland)	54
1,875	160	Huizen (Holland)	8.5
1,935	155	Kaunas (Lithuania)	7

SHORT WAVE STATIONS

Metres.	Kc.	Station.	Power in Kw.
13.92	21,540	Pittsburg East W8XK	—
14.47	20,730	Buenos Aires (Argentine) LSY	—
16.57	18,105	Chicago W9XAA	—
16.87	17,778	Bound Brook (N.J.) W3XAL	—
19.56	15,340	Schenectady W2XAD	20
19.68	15,234	Radio Colonial (Paris)	—
19.72	15,210	Pittsburg East W8XK	—
19·73	15,200	Zeesen (Germany) DJB	8
19.84	15,123	Vatican City (Italy) HVJ	10
19.9	15,073	Heredia (Costa Rica) TI4NRH	—
20.5	14,630	Chapultepec XDA	20
21.5	13,950	Bucharest	.3
23.8	12,605	Rabat (Radio Maroc)	2.5
25.2	11,905	Radio Colonial (Paris)	—
25.27	11,870	Pittsburg East W8XK	40
25.4	11,810	Rome (Italy) 2RO	9
25.4	11,810	Bowmanville (Canada) VE9GW	—
25.5	11,763	Chapultepec XDA	20
25.53	11,750	Chelmsford (G5SW)	12
25.6	11,715	Winnipeg (Canada) VE9JR	2
25.63	11,705	Radio Colonial (Paris)	—
26.83	11,181	Funchal (Madeira) CT3AQ	.05
28.98	10,350	Buenos Aires LSX	20
30	10,000	Belgrade	—
30.4	9,869	Madrid (Spain) EAQ	20
31.26	9,596	Eindhoven (Holland) PCJ	—
31.28	9,590	Sydney (Australia) VK2ME	20
31.28	9,590	Philadelphia (Pa.) W3XAU	.5
31.35	9,570	Springfield (Mass.) W1XAZ	5
31.35	9,570	Poznan (Poland) SR1	1
31.38	9,560	Zeesen (Germany)	8
31.48	9,530	Schenectady N.Y. W2XAF	40
31.51	9,520	Skamlebæk (Denmark) OXY	.5
31.55	9,510	Melbourne (Australia) VK3ME	5
31.58	9,500	Rio de Janeiro (Brazil)	—
32.26	9,300	Rabat (Radio Maroc)	6
32.5	9,230	Paris FLJ	—
33	9,090	Radio LL (France)	.5
33.5	8,928	Guatemala City (S. America) TGX	—
34.68	8,650	Long Island W2XV	—
38.07	7,880	Kemikawoa-Cho-Chibe-Ken, Tokio	—
39.4	7,612	Nuevo Laredo (Mexico) X26A	—
39.7	7,556	Bogotá (Colombia) HKF	—
41.6	7,211	Tenerife Radio Club EAR58	.5
41.7	7,195	Singapore VS1AB	—
42.9	6,991	Lisbon CT1AA	2
43	6,976	Madrid EAR100	—
45	6,667	Constantine (Algeria) 8KR	.2
45.38	6,611	Moscow (Russia) REN	—
46.69	6,425	BoundBrook(N.J.)W3XL	—
47	6,382	Quito (Ecuador) HC1DR	—
48	6,250	Casablanca (N. Africa) CN8MC	—
48.2	6,220	Rome (Italy) 2 RO	9
48.35	6,205	Bogotá (Colombia) HKC	—
48.62	6,170	Tegucigalpa (Honduras) HRB	2.5
48.65	6,167	Mexico City X1F	—
48.8	6,147	Winnipeg (Canada) VE9CL	3.5
48.86	6,140	Pittsburg East W8XK	40
49.18	6,100	Bound Brook (N.J.) W3XAL	12
49.34	6,080	Chicago W9XAA	.5
49.2	6,096	Johannesburg (S. Africa) JB	5
49.4	6,072	Vienna Experimental UOR2	—
49.43	6,069	Vancouver (B.C.) VE9CS	—
49.5	6,060	Philadelphia (Pa.) W3XAU	.5
49.5	6,060	Nairobi (Kenya) 7LO	-
49.5	6,060	Cincinnati, W8XAL	10
49.67	6,040	Miami Beach (Florida) W4XB	2·5
49.8	6,023	Mexico City XEW	—
49.83	6,020	Chicago W9XF	5
49.96	6,005	Drummondville VE9DR	4
49.96	6,005	Tegucigalpa (Honduras) HRB	—
50	6,000	Moscow (Russia) RW59	—
50	6,000	Bucharest (Roumania)	.3
50	6,000	Barranquilla (Colombia) HKD	—
50	6,000	Barcelona Radio Club EAJ25	—
50.26	5,969	Vatican City (Italy) HVJ	10
50.6	5,928	Medellin (Colombia) HKO	—
51.22	5,857	Chapultepec (Mexico) XDA	20
52.5	5,714	Quito (Ecuador) HCJB	—
52.7	5,692	Tananarive (Madagascar) FIUI	—
54.52	5,502	Brooklyn (N.Y.) W2XBH	—
58	5,172	Prague	—
62.5	4,800	Long Island W2XV	—
62.56	4,795	London (Ontario) VE9BY	—
70.2	4,273	Khabarovsk (Russia)	20
76	3,947	Maracaibo (Venezuela) YV11AM	—
80	3,750	Rome (Italy) I2RO	—

SUPPLY VOLTAGES OF UNITED KINGDOM

METROPOLITAN AND SUBURBAN.

Authority.	Supply Voltage.	System	Cycles.
Barking District Council ...	230, 460	C	—
	230, 400	A	50
Barnes U.D.C.	210, 420	C	—
Battersea Corporation	230, 460	A	50
	230, 460	C	—
Beckenham District Council ...	200	A	50
Bermondsey Corporation ...	240, 480	C	—
Bethnal Green Borough Council	240, 415	A	50
Brompton & Kensington Co., Ltd.	100	A	50
Charing Cross E.S. Co. ...	230, 400	A	—
	200, 400	C	—
Chelsea Electricity Supply Co.	200, 400	C	—
	230, 400	A	50
Chiswick (Company)	220, 440	C	—
	220, 380	A	50
City of London Co., Ltd. ...	240	A	50
County of London E.S. Co., Ltd.—			
(a) Camberwell (part), Peckham	205, 230, 400	A	50
	410	C	—
	530	C	50
(b) Finsbury and Holborn (part)	104, 230, 400	A	—
(c) St. George the Martyr, Southwark	205, 410	C	—
	230, 400	A	50
(d) St. Olave, Bermondsey	205, 410	C	—
	230, 400	A	50
(e) Balham, Clapham, Dulwich, Rochampton, Southfields, Streatham, Wandsworth, Tooting & Putney ...	205, 230 400	A	50
(f) Addington. Sanderstead, Coulsdon, Purley, Woodmansterne, Beddington, Mitcham, Morden, Selsdon & Kenley	205, 230 400	A	50
(g) Hornchurch	205, 230, 400	A	50
(h) Dagenham	205, 230 400	A	50
(i) Romford (Urban) ...	205, 230, 400	A	50
(j) Romford (Rural) ...	205, 230, 400	A	50
(k) Orsett (Rural)	205, 230 400	A	50
(l) Woodford, Wanstead, Buckhurst Hill, Loughton, Chigwell & Epping	230, 400	A	50
(m) Merstham, Chipstead ...	230, 400	A	50
Ealing Corporation	230, 240	A	50
East Ham Corporation ...	230, 460	C	—
	230, 400	A	50
Eltham (Woolwich Boro. Council)	220, 380	A	50
Finchley Urban District Council	250, 500	C	—
Fulham Council	200	A	50
Hackney Corporation	240	C	—
Hammersmith	110, 230	A	50
Hampstead	105, 210	A	50
Hendon Company	240, 415	A	50

Authority.	Supply Voltage.	System	Cycles.
Heston District Council	240, 480	C	—
Hornsey Corporation	240, 480	C	—
Ilford Corporation	230, 460	C	—
	230, 400	A	50
Islington Corporation	100, 200 400	A	50
Kensington & Knightsbridge Co.	200, 400	C	—
	230, 400	A	50
Leyton Corporation	150, 300	C	—
	230, 400	A	50
London Electric Supply Corpn.	105, 210	A	85
	220, 230 400	A	50
	240	A	25
	230, 460 480	C	—
London & Home Counties Joint Elec. Authority	240, 480	C	—
	240, 420 480	A	50
Met'n. E. S. Co., Ltd.			
Holborn and Strand District	100, 200	C	—
	230, 400	A	50
Paddington	100, 200	A	50
	230, 400		
Greenford	230, 400	A	50
Acton	230, 460	C	—
Southall	230, 400	A	50
Norwood	230, 400	A	50
Hanwell	230, 400	A	50
North Met'n. E.P.S. Co., Ltd.			
Barnet...	240, 480	C	—
	240, 415	A	50
Buntingford	240, 415	A	50
Cheshunt (Waltham Cross) ... Chingford ... ... Cuffley... ... ... East Barnet Valley ... ... Edgware ... ... Edmonton ... ... Elstree and Boreham Wood	240, 415	A	50
Enfield : Highway and Wash and Ponders End	240, 415	A	50
	240, 480	C	—
Epping Rural District ... Friern Barnet ... ... Harpenden ... ... Harrow Weald and Stanmore Hatfield	240, 415	A	50
Hertford	240, 480	C	—
	240, 415	A	50
Hertford Rural	240, 415	A	50
High Beach ... ... Hoddesdon ... ... Kingsbury ... ... Royston	240, 415	A	50
St. Albans	240, 480	C	—
	240, 415	A	50
Southgate	240, 415	A	50
South Mimms and Potters Bar ...	240, 415	A	50
Stevenage	240, 415	A	50
	240, 480	C	—

SUPPLY VOLTAGE DATA

TOWN.	Authority	Supply. Voltage.	System.	Cycles.
North Met'n. E.P.S. Co., Ltd.—*contd.*				
Tottenham				
Totteridge				
Waltham Cross				
Ware				
Wealdstone		240, 415	A	50
Welwyn Rural District ...				
Wembly				
Wheathampstead				
Notting Hill Electric Lighting Co.		200, 400	C	—
		230, 400	A	50
Poplar Corporation		230, 460	C	—
Richmond Light and Power Co.		220, 440	C	—
		220, 400	A	50
St. James' and Pall Mall Co., Ltd.		220, 440	C	—
		105, 210	A	85 & 50
		230, 400		
St. Marylebone Corporation ...		240, 480	C	—
		240, 415	A	50
St. Pancras ... ,, ...		220, 440	C	—
Shoreditch ... ,, ...		240, 480	C	—
Smithfield Markets Elec. Supply Co.		200, 400	C	—
South London Elec. Supply Corp. (Lambeth)		220	A	50
South Metropolitan E. L. & P. Co.				
Blackheath, Greenwich ...		200	A	50
Forest Hill		200, 230	A	50
Lewisham		200	A	50
Penge		200	A	50
Sydenham		200, 230	A	50
Southwark Borough Council		220, 440	C	—
Stepney Corporation		240, 480	C	—
Stoke Newington Corporation... ...		240, 480	C	—
Tottenham & District Gas Co.		240, 480	C	—
		230, 400	A	50
Walthamstow Corporation ...		230, 460	C	—
		230, 400	A	50
West Ham Corporation		200	A	50
Westminster E. S. Corporation		200, 400	C	—
		230, 400	A	50
Willesden District Council ...		240, 480	C	—
		240, 415	A	50
		480		
Wimbledon Borough Council		220	A	50
Wood Green (Company)		240, 480	C	—
Woolwich Corporation ...		210, 420	C	—
		220, 380	A	50
		500		

PRINCIPAL PROVINCIAL TOWNS.

TOWN.	Authority.	Supply Voltage	System.	Cycles.
Aberayron ...	Company ...	230	C	—
Aberdare ...	U.D.C.	230, 460	C	—
		230, 400	A	50
Abertillery ...	U.D.C.	250, 500	C	—
		250, 440	A	50
Aberystwyth ...	Chiswick E.S. Co.	220, 440	C	—
Abingdon ...	Company ...	230, 400	A	50
Accrington ...	Corporation ...	400	A	50
Adwick-le-Street (Yorks.) ...	U.D.C.	230, 400	A	50
Ainsworth ...	Company ...	230, 400	A	50
Aldeburgh ...	Company ...	200, 400	C	—
		230, 460	C	—
Alderley Edge ...	Elec. Board ...	230,400, 460	A	50
Aldershot ...	Corporation ...	210, 420	C	—
		230, 400	A	50
Aldershot Camp...	War Dept. Undertaking ...	250, 400	C	—
		230	A	50
Alfreton	Derby & Notts E.P.C.	250, 440	A	50
Alnwick	Company ...	250, 500	A	40
Altrincham ...	Company ...	100, 200	A	80
Amble	U.D.C.	250, 400	A	40
Amblecote ...	Company ...	200	A	50
Amersham ...	Chesham E.L. & P. Co.	200	A	50
Amesbury ...	Company ...	220	C	—
Ammanford ...	U.D.C.	250	C	—
Andover	Company ...	230, 400	A	50
Annfield Plain ...	U.D.C.	250, 440	A	40
Arnside	Company ...	220	C	—
Ascot	Company ...	220, 440	C	—
		200, 240, 416	A	50
Ashby-de-la-Zouch	Company ...	440	A	50
Ashford (Kent) ...	U.D.C.	230, 400	A	50
Ashington ...	Company ...	240, 480, 440	A	40
Ashton-in-Makerfield	U.D.C.	230, 400	A	50
Ashton-under-Lyne	Corporation ...	240, 480,	C	—
		240, 420	A	50
Ashwicken ...	E. Anglian E.S. Co.	230, 400	A	50
Askrigg (Yorks.)	Company ...	230, 400	A	50
Astley	Lancs E.P. Co. ...	230, 400	A	50
Aston	City of Birmingham	220, 440	C	—
Atherton ...	U.D.C.	240	A	50
Aukland R.D. ...	Company ...	220	A	40
Aylesbury ...	Corporation ...	220, 440	C	—
		220, 380 440	A	50
Bacup	Corporation ...	230, 400	A	50
Bampton (Devon)	Exe Val. E. Co.	230, 400	A	50
Banbury ...	S.W. & S. Development Co ...	230	A	50
		230	C	—
Bangor	Corporation ...	200, 400	C	—
		230, 400	A	50
Barford	Company ...	250, 430	A	50
Bargoed	Corporation ...	230, 400	A	25 & 50
Barnsley ...	Corporation ...	230, 460	C	—
		230, 400	A	50
Barnstaple ...	Corporation ...	230, 460	C	—
Barrow-in-Furness	Corporation ...	220, 440	C	—
		220, 230	A	50
		380, 400	A	50
Barton-on-Humber	Company ...	220, 440	C	—
Basingstoke ...	Corporation ...	230, 460	C	—
		230, 400	A	50
Bath	Corporation ...	230, 440	C	—
		230, 380	A	50
Batley	Corporation ...	220, 440	C	—
		230, 400	A	50
Beccles	East Anglian E.S. Co.	230, 400	A	50
Bedale	Cleveland & Dur. C.E.P. Co.	110	C	—
Bedford	Corporation ...	105, 210, 230, 385, 400	A	50
Bedlington ...	N. C'nties E.S. Co.	250, 500	A	40
Bedwas & Machen	U.D.C.	230, 400	A	25
Bedwellty ...	U.D.C.	230, 400	A	50 & 25
Bedworth ...	L. & W. E.P. Co.	250	A	50
Beeding	Steyning E.L. Co.	230, 240	A	50
Belmont (Co. Durham)	Company ...	240, 440	A	40
Bentham... ...	Company ...	200	C	—
Benton	Newcastle Co. ...	250, 440	A	40
Benwell	Newcastle Corp....	240, 440	A	40

TOWN.	Authority.	Supply Voltage.	System.	Cycles.
Berwick-on-Tweed	Urban E.S. Co. ...	240, 480	C	—
Bethesda... ...	U.D.C.	230, 400	A	50
Bettws-y-Coed ...	U.D.C.	110	A	50
Bewdley	S.W. & S.E.P. Co.	230, 460	C	—
		230, 400	A	50
Bexhill	Corporation ...	230	A	50
		220	C	—
Bexley Heath ...	U.D.C.	200, 400	A	50
Bideford (Devon)	Company ...	240, 415	A	50
Bingley	U.D.C.	230, 400	A	50
Birkdale	Company ...	230, 460	C	—
		230, 460	A	50
Birkenhead ...	Corporation ...	230, 460	C	—
		230, 400	A	50
Birmingham ...	Corporation ...	220, 440	C	—
		230, 400	A	50
Birstall	E.D. Yorks. Co....	230, 400	A	50
Bishop Auckland	C & D.E.P.C. ...	240, 480	C	—
		250, 440, 500	A	40
Bishop's Castle ...	S.W. & S. E.P. Co.	230	A	50
Bishop's Stortford	Company ...	220, 380	A	50
Blackburn ...	Corporation ...	230, 400	A	50
		220, 440	C	—
Blackburn, R.D.	Lancs. E.P. Co. ...	230, 400	A	50
			A	50
Blackpool ...	Corporation ...	200	A	83
Blaenau Festiniog	Yale E. P. Co. ...	230	C	—
Blandford ...	Forum & District E. S. Co.	500	C	—
		220	C	—
Blockley ...	Company ...	110	C	—
Blyth	N. C'nties E. Co.	240, 480	C	—
		250, 500	A	40
Bodmin	Company ...	200	C	—
Bognor Regis ...	Company ...	220, 440	C	—
		230, 400	A	50
Boldon	C. Dur. E.P.D. ...	250, 440	A	40
Bolsover ...	U.D.C.	200	A	50
		250, 440	A	30
Bolton	Corporation ...	230, 460	C	—
		100, 200	A	50
		230, 400		
Boroughbridge ...	C. & D.C.E.P. Co.	230	C	—
Boston	Company ...	240, 415	A	50
		230, 400	A	50
Bourne End ...	Cookham & Dis. E. Co.	230, 400	A	50
Bournemouth ...	Bournemouth & Poole E.S. Co.	200, 230, 400	A	100
		250	C	—
Bourton-on-Water	Company ...	120	C	—
Bovey Tracey ...	Company ...	230, 400	A	50
Bradford ...	Corporation ...	230, 460	C	—
		230, 400	A	50
Bradford-on-Avon	W. Wilts E. L. & P. Co.	230, 400	A	50
Bradninch ...	Culm Valley E.S. Co.	230, 400	A	50
Braintree ...	East Anglian E.S. Co.	240, 415	A	50
Braunton ...	Company ...	220	C	—
Bredbury ...	U.D.C.	230, 400	A	50
Brentwood ...	Company ...	240, 415	A	50
Bridgend... ...	U.D.C.	210, 230	A	50
Bridgnorth ...	S. W. & S. D.P. Co.	230	C	—
		230	A	50
Bridgwater ...	Company ...	230, 460	C	—
Bridlington ...	Corporation ...	220, 440	C	—
Bridport (Dorset)	Corporation ...	230, 400	A	50
Brierfield ...	U.D.C.	230, 400	A	50
Brierley Hill ...	Mid. E.C. for P.D.	200, 400	A	50
		230	C	—
Brighouse ...	Corporation ...	230, 400	A	50
Brightlingsea ...	Company ...	230, 400	A	50
Brighton ...	Corporation ...	115, 230, 460	C	—
		230, 400	A	50
Bristol	Corporation ...	250	A	50
Brixham ...	Company ...	220, 440	C	—
Bromley (Kent)...	Corporation ...	230, 400	A	50
		210, 420	A	50
Bromsgrove ...	S. W. & S. D.P.Co.	230	C	—
Brough (Westmorland)	Company ...	200	C	—

Authority.		Supply. Voltage.	System.	Cycles.
Bryna	S. W. & S. D.P.Co.	230, 400	A	50
Brynamman ...	Company ...	230, 400	A	50
Buckfastleigh (Devon)	Teignmouth E.L. Co.	250	C	—
Bude	Company ...	200, 400	C	—
Budleigh Salterton	Company ...	220	C	—
Builth Wells ...	S. W. & S. E.P.Co.	230	C	—
Bungay	Company ...	230, 460	A	50
Burford	Company ...	110	C	—
Burgess Hill ...	Company ...	240	C	—
Burnham-on-Sea	Company ...	230, 400	A	50
Burnley	Corporation	220, 440	C	—
		230, 400	A	50
Burton-on-Trent	Corporation	200, 230, 400	A	50
Bury (Lancs) ...	Corporation	220, 440	C	—
		230, 400	A	50
Bury St. Edmunds	Corporation ...	200, 400	C	—
Butetown ...	U.D.C.	230, 400	A	25 & 50
Buxton	Corporation ...	230, 460	C	—
Caerau	Private Co. ...	120, 125	C	—
Caerphilly ...	U.D.C.	230, 400	A	25
Calne	Corporation ...	220	C	—
Camberley (Surrey)	Company ...	250	A	50
Camborne ...	Urban E. S. Co., Ltd.	240, 415	A	25
Cambridge ...	Company	200, 346	A	50
		400	A	50
Cannock	U.D.C.	230, 400	A	50
Canterbury ...	Corporation	220, 440	C	—
		230, 400	A	50
Cardiff	Corporation	200, 400	C	—
		200, 230, 400, 440	A	50
		230, 400	A	25
Cardiff	R.D.C. ...	250, 440	A	50
		230, 400	A	50
		240	A	25
Cark (Lancs) ...	Company ...	230, 415	A	50
Carlisle	Corporation	230, 460	C	—
		500		
		230, 400	A	50
Carmarthen ...	Company	220, 440	C	—
		230, 400	A	50
Carnarvon ...	Corporation	230, 460	C	—
		230, 400	A	50
Carn Brea ...	Urban E. S. Co., Ltd.	240, 480	A	50
				25
Caterham ...	Urban E. S. Co.	240, 415, 480	A	50
Caton	Company ...	200, 250	C	—
Chagford ...	Company ...	200	C	—
Chapel-en-le-Frith	Trent Valley Co.	230	A	50
Chasetown ...	Company ...	250, 440	A	50
Chatham ...	Kent E. P. Co. ...	230, 400	A	50
Cheadle (Cheshire)	U.D.C.	240, 416	A	50
Cheddar	N. Som. E. S. Co.	230, 400	A	50
Chelmsford ...	E.S. Corp., Ltd....	230, 400	A	50
Cheltenham ...	Corporation	210, 220	A	50
		230, 380, 400		
Chepstow ...	Company ...	230, 400	A	100
Chesham ...	Company ...	240	A	50
Chester	Corporation	210, 420	C	—
		230, 400	A	50
Chesterfield ...	Corporation	240, 480	C	—
		240, 415, 480	A	50
Chichester ...	Corporation ...	230, 400	A	50
Chippenham ...	W. Wilts. E. P. Co.	230, 400	A	50
Chipping Norton	Company ...	220	C	—
Chislehurst ...	Company ...	210, 420	A	50
Christchurch ...	Bournem'th Co.	250	C	—
		200, 230	A	100
Chudleigh ...	Company ...	200	C	—
Church Stretton	S.W. & S. E. P. Co.	230	C	—
Cirencester ...	Company ...	230, 400	A	50
Clacton-on-Sea ...	U.D.C. ...	230, 460	C	—
		230, 400	A	50
		460		
Cleethorpes ...	U.D.C.	230, 400	A	50
Clevedon ...	N. Som. E. S. Co.	230, 400	A	50

SUPPLY VOLTAGE DATA

TOWN.	Authority.	Supply. Voltage.	System.	Cycles.
Clitheroe	U.D.C.	230, 400	A	50
Coalville	Company	440	A	50
Colchester	Corporation	210, 420	C	—
		230, 400	A	50
Colne (Lancs)	Corporation	240, 480	C	—
		230, 400	A	50
Colwyn Bay	U.D.C.	220, 440	C	—
		230, 400	A	50
Congleton	Corporation	230, 400	A	50
Coniston (Lancs)	Company	200, 400	C	—
Consett	C. & D.C.E.P. Co.	250, 440	A	40
Conway	Corporation	230, 400	A	50
Corsham	W. Wilts E.P. Co.	230, 400	A	50
Coventry	Corporation	200, 230	A	50
		400		
Cowpen	Company	250, 440	A	40
Cranbrook	Weald E. S. Co.	230, 400	A	50
Cranleigh	Company	230, 400	A	50
Craven Arms	S.W.S.E.P. Co.	230	C	—
Crawley	Sussex E.S. Co.	240	C	—
		230, 400	A	50
Crayford	W. Kent El. Co.	230	C	—
		240, 415	A	50
Creswell	Company	220	C	—
Crewe	Corporation	230, 460	C	—
		230, 400	A	50
Criccieth	E. Dist. N. Wales & Dist. Ltd.	230	A	50
Cromer	E. L. S. Co.	240, 480	C	—
Crook (Co. Durham)	U.D.C.	250, 440	A	40
Crowborough	Weald E.S. Co.	230, 400	A	50
		230, 460	C	—
Croydon	Corporation	200, 230		
		400, 460	A	50
Crumlin	S. W. E.P.D. Co.	220	C	—
Cuddington (Ches)	Weaverham Co.	230	A	50
Darlington	Corporation	230, 460	C	—
		230, 460	A	50
Dartford	U.D.C.	230, 460	C	—
		230, 400	A	50
Dartmouth	Company	240, 480	C	—
Darwen	Corporation	230, 460	C	—
		230, 400	A	50
Dawlish	Company	200, 230, 400	A	50
Deal	S.E. Kent E. P. Co.	230, 400	A	50
Dearne (Yorks)	Elec. Board	230, 400	A	50
Delabole	Company	200	C	—
Derby	Corporation	230, 460	C	—
		205, 230	A	50
		400		
Devizes	W. Wilts E.L.P. Co.	230, 400	A	50
Dewsbury	Corporation	220, 440	C	—
		230, 400	A	50
Diss	Company	200	C	—
Doncaster	Corporation	230, 460	C	—
		230, 400	A	50
Dorchester	Corporation	220	C	—
Dorking	L. & H. C. Joint Elec. Auth'ty	240, 480	C	—
		230, 240		
		400, 480	A	50
Douglas, Isle of Man.	Corporation	220, 460	C	—
		230, 400	A	50
Dover	Corporation	200, 230	A	100
Dudley (Worcs)	S.W. & S.D.P. Co.	230	C	—
Dulverton	Company	200, 225	C	—
		230	A	50
Durham City	Dur. E.P.D. Co.	240, 480	C	—
		250, 500	A	40
Durham R.D.	Company	240, 480	C	—
		250, 440	A	40
		500		
Earby	U.D.C.	230, 400	A	50
Easington	W. Glouc. P. Co.	230, 400	A	40
Easingwold	Bannister & Co.	230	C	—
East Cowes	I.O.W. E. L. & P. Co.	240, 415	A	50
East Dereham	U.D.C.	230, 400	A	50
East Grinstead	U.D.C.	230, 460	C	—
		230, 400	A	50
Eastbourne	Corporation	200, 230	A	50
		400		
East Retford	Corporation	230, 400	A	50
Ebbw Vale	U.D.C.	240, 480	C	—
Eccles	Corporation	230, 400	A	50
Elland	U.D.C.	240, 480	C	—
		230, 400	A	50
Ellesmere Port	Mersey Pr. Co.	250, 440	A	50
Ely Valley	Lighting Co.	230, 400	A	50
Emley	E. D. of Y., Ltd.	230, 400	A	50
Epsom	U.D.C.	230	C	—
		230	A	50
Erith	U.D.C.	200, 350	A	50
Eston (S.O. Yorks)	U.D.C.	250, 440	A	40
Exeter	Corporation	100, 210	A	50
		220, 230		
Exmouth	Company	230, 400	A	50
Eythorne	Company	220, 440	A	50
Falmouth	Elec. S. Corp., Ltd.	240, 480	C	—
Fareham	U.D.C.	210	A	50
Faringdon	Wessex E. Co.	220	C	—
Farnborough	Mid. South Dist. Utility Co.	220, 230	A	50
		240		
		220, 240	C	—
Farnham	Company	100	A	50
		230, 400		
Farnham (Bucks)	Company	220, 440	A	50
Farnworth	U.D.C.	220, 440	C	—
		230, 400	A	50
Faversham	Corporation	230, 460	C	—
Felixstowe	U.D.C.	200, 400	C	—
		240, 415	A	50
Fence Houses	N. Counties E.S. Co.	220, 380	A	40
Fladbury	Company	220	C	—
Fleetwood	U.D.C.	200, 400	C	—
		230	A	50
Folkestone	Company	210, 420	C	—
		210, 420	A	50
Foots Cray	Company	200, 400	A	50
Formby	U.D.C.	230, 400	A	25 & 50
Framlingham	E. Ang. E.S. Co.	200, 400	C	—
Frinton-on-Sea	Company	230, 460	C	—
Frome	Company	240, 480	C	—
Gabalfa	U.D.C.	230, 400	A	25
Gainsborough	U.D.C.	230, 400	A	50
Garw Valley	U.D.C.	230, 400	A	25
Gateshead	County of Durham E.P.D. Co.	240, 480	C	—
		500		
Gellygaer	U.D.C.	230, 400	A	25 & 50
Gillingham	Corporation	230, 400	A	50
Glossop	Urban E.S. Co.	240, 480	C	—
Gloucester	Corporation	220, 440	C	—
		230, 400	A	50
Glyn Neath	R.D.C.	220	A	50
Godalming	Company	240, 480	C	—
Goldthorpe	Dearn Dis. E.Bd.	230, 400	A	50
Goring	Wessex E.S. Co.	230, 400	A	50
Gorseinon	Company Co.	200	C	—
		230, 400	A	50
Gosforth	N'castle E.S.Co.	240, 480	C	—
		250, 440, 500	A	40
Gosport	Company	240, 480	C	—
Grange-over-Sands	U.D.C.	230, 400	A	50
Grantham	Urban E.S.	240, 480	C	—
Grassington	Company	250	C	—
Gravesend	Corporation	230, 460	C	—
		230, 400	A	50
Grays	U.D.C.	230, 460	C	—
		230, 400	A	50
Great Missenden	Chesh. E.L. &P. C.	230	A	50
Greenford	Company	200, 230, 400	A	50
Greenlaw	Company	210	C	—
Grimsby	Corporation	230, 460	C	—
		230, 400	A	50

TOWN.	Authority	Supply Voltage.	System.	Cycles.
Guernsey	... Company	210, 420	C	—
		230, 400	A	50
Guildford	... Corporation	220, 440	C	—
		230, 400	A	50
Guisborough	... U.D.C.	250, 440	A	50
Halesowen	... S. W. & S. D. Co., Ltd.	230	C	—
Halifax	... Corporation	230, 460	C	—
		230, 400	A	50
Harrogate	... Corporation ...	200, 230	A	50
Harrow ...	... Company	220, 440	C	—
Hartlepool	... Newcastle E.S. Co.	240, 480	C	—
		240, 480	C	—
		250, 500	A	40
Harwich ...	... Corporation ...	240, 416	A	50
Haslingden	... Corporation ...	230, 400	A	50
Hastings	... Corporation	200, 230	A	50
		400		
Haverfordwest	... Company ...	220	C	—
Hawarden	... R.D.C.	230, 400	A	50
Hawes ...	... Company ...	230, 400	A	50
Haworth	... U.D.C.	230, 400	A	50
Hay ...	... S. W. & S. Co. ...	230	C	—
Hayes (Middlesex)	Uxbridge Co.	200, 230,	A	50
		400		
Hayle ...	... Cornwall P. Co. ...	440	A	25
Haywards Heath	Company ...	240	C	—
Hazel Grove	... U.D.C.	230, 400	A	50
Hebburn	... Company	250, 440,	A	40
		500		
		240	C	—
Hebden Bridge	... U.D.C. ...	230, 400	A	50
Heckmondwike	... U.D.C.	230, 460	C	—
Hereford	... S. W. & S. E.Co.	220, 440	C	—
		230, 400	A	50
Herne Bay	... Herne B. & D.E. S. Co., Ltd.	230, 440	A	50
Hersham	... Company	240, 480	C	—
		240, 480	A	50
Herstmonceaux	... Company ...	100	C	—
Hexham ...	... Company ...	250, 440	A	40
Heywood	... Corporation	200, 400	C	—
		230, 400	A	50
Highcliffe	... Bournemouth Co.	230, 400	A	100
High Wycombe	... Company	230, 400	A	50
		210, 420	C	—
Hillinghall	... Harrogate ...	100, 200	A	50
Hinckley	... L. & W. E. P. Co.	440	A	50
Hinderton	... E. S. Co. ...	230	C	—
Hindhead	... Mid. S. D. Utility Co.	220, 440	C	—
		220, 230,	A	50
		240		
Hindley (Lancs.)	U.D.C.	230, 400	A	50
Hirst ...	... Company ...	250, 500	A	40
Hitchin ...	... Company ...	240, 415	A	50
Holbeach	... Boston Co. ...	230, 400	A	50
Holme (Yorks.)	... U.D.C. ...	230	C	—
		230	A	50
Holmfirth	... U.D.C.	230, 400	A	50
Holsworthy	... Company ...	200	C	—
Holyhead	... U.D.C.	200, 400	C	—
Honiton ...	... Company ...	230, 400	A	50
Honley ...	... R.D.C.	230, 400	A	50
Horley ...	... Company ...	230, 400	A	50
Hornsea ...	... S.E. Yorks. L. & P. Co.	230, 400	A	50
Horrabridge	... Company ...	220	C	—
Horsham...	... U.D.C. ...	230	C	—
		230	A	50
Houghton-le-Spring	Company ...	220, 380	A	40
Hove ...	... Corporation	220	C	—
		220, 440	A	50
		240, 480	C	—
Howdon-on-Tyne	Company	250, 440	A	40
Hoylake ...	... U.D.C.	230	A	50
Huddersfield	... Corporation	100, 200,	A	50
		230		
		400	A	50
Hull ...	... Corporation	220, 440	C	—
		230, 400	A	50
Huntingdon	... Company ...	240	A	50
Ickenham	... Uxbridge Co.	220, 230,	A	50
		400		

TOWN.	Authority.	Supply. Voltage.	System.	Cycles.
Ilfracombe	... Company ...	240, 480	A	50
Ikeston	... Derby & Notts E. P. Co.	230, 460	C	—
Ilkley ...	... U.D.C. ...	230, 460	C	—
		230, 400	A	50
Ingleton (Yorks.)	Company	100, 200,	C	—
		220		
Ipswich ...	... Corporation	230, 460	C	—
		230, 400	A	50
Isle of Thanet	... Company	240, 480	C	—
		240, 215	A	50
Isle of Wight	... I.O.W. E. L. & P. Co.	240	A	50
Ivybridge	... Company ...	230	C	—
Jarrow ...	... Dur. E.P.D. Co.	240, 480	C	—
		250, 440,	A	40
		500		
Jersey ...	... Company ...	240, 415	A	50
Keighley	... Corporation	230, 460	C	—
		230, 400	A	50
Kendal ...	... Corporation	220, 440	C	—
		230, 400	A	50
Kenilworth	... Mid. E. L. & P. Co.	250, 433	A	50
Keswick ...	... Company ...	100, 200	A	100
Kettering	... U.D.C. ...	230, 460,	C	—
		230, 240		
		400, 415,		
		460	A	50
Kettlewell (Skipton)	Company ...	230	C	—
Kidderminster	... S. W. & S. Devel. Co.	230	C	—
King's Lynn	... Corporation	200, 400	C	—
		230, 400	A	50
Kingston-on-Thames	Corporation ...	240, 415	A	50
Kirkheaton	... E. D. of Y. Ltd....	230, 400	A	50
Knaresborough	... U.D.C.	200	A	50
Lampeter	... Company ...	230	C	—
Lancaster	... Corporation ...	230, 400	A	50
Launceston	... L. & Dist. E.S. Co.	200	C	—
Leamington	... Mid. E. L. & P. Co.	230, 460	C	—
		250, 433	A	50
Leatherhead	... L. & H. C. Joint Elec. Auth.	230	A	50
Ledbury ...	... S.W. & S.E.P. Co.	230	C	—
Leeds ...	... Corporation	200, 230	A	50
		346, 400		
Leek ...	... U.D.C. ...	230, 460	C	—
		230, 400	A	50
Leicester	... Corporation ...	240, 415	A	50
Leigh (Lancs.)	... Corporation	220, 440	C	—
		230, 400	A	50
Leominster	... Company	230	A	50
Letchworth	... Company	250, 500	C	—
		240, 415,	A	50
		480		
Lewes ...	... Company ...	230, 460	C	—
Leyburn ...	... Company ...	130	C	—
Lichfield	... Corporation ...	230, 400	A	50
Lincoln ...	... Corporation	230, 460	C	—
		230, 400	A	50
Liskeard ...	... Company ...	230	A	50
Littleborough	... U.D.C.	230, 400	A	50
Littlehampton	... Sussex E.S. Co. ...	240	C	—
Liverpool	... Corporation	230, 460	C	—
		230, 400	A	50
Llandilo ...	... U.D.C.	230	C	—
Llandrindod Wells	U.D.C.	230, 460	C	—
		220, 440	C	—
Llandudno	... U.D.C. ...	230, 400	A	50
Llandyssul	... Company ...	250	C	—
Llanelly	... Company	250, 500	C	—
		250, 230	A	50
		440, 500		
Llangollen	... Company ...	220	C	—
Llanrhaiadr-yn-Mochnant	Smith & Bellhouse	230	A	50
Llanrwst	... Company	220	C	—
		230	A	50
Llantarnam	... U.D.C.	230, 400	A	25
Llantrisant	... S.W.E.P.D. Co.	230, 400	A	25

SUPPLY VOLTAGE DATA

TOWN.	Authority.	Supply. Voltage.	System.	Cycles.
Llwyngwril	Celynin Co.	220	C	—
Long Eaton	U.D.C.	220, 440	C	—
		220, 380	A	50
Loughborough	Corporation	220, 440	C	—
		230, 400	A	50
Lowestoft	Corporation	230, 460	C	—
		230, 400	A	50
Ludlow	S.W. & S.E.P. Co.	230	C	—
Luton	Corporation	250, 500	C	—
		240, 415	A	50
Lyme Regis	Corporation	220, 440	C	—
Lymington	Company	230, 240	A	50
Lyndhurst	W. Hants. Elec. Co. Ltd.	230, 400	A	50
Lynmouth	Company	100, 200	A	100
Lytham St. Annes	Corporation	240, 480	C	—
		240, 415	A	50
Macclesfield	Company	230, 460	C	—
		230, 400	A	50
Maesteg	U.D.C.	230, 400	A	50
Maidenhead	Corporation	230, 460	C	—
		230, 400	A	50
Maidstone	Corporation	230, 460	C	—
		230, 400	A	50
Maldon (Essex)	Company	200, 400	C	—
Malton	N. Counties Co.	240, 480	C	—
Malvern	U.D.C.	100, 200	A	50
Manchester	Corporation	200, 400	C	—
		230, 400	A	50
Mansfield	Corporation	240	C	—
		230, 250	A	50
Mardy (Glam.)	Company	230	C	—
		230, 440	A	25
Margate	Isle of Thanet E. S. Co.	240, 480	C	—
Market Drayton	Company	240, 480	C	—
Market Harborough	Kettering U.D.C.	230, 240	A	50
		400, 415		
Marlborough	Corporation	220	C	—
Masham	Company	200	C	—
Matlock	Company	250, 440	A	50
Melksham	W. Wilts. E. P. Co.	230, 400	A	50
Melton Mowbray	Company	240, 480	C	—
Menai Bridge	U.D.C.	230, 400	A	50
Merthyr Tydfil	Company	230, 460	C	—
		250, 440	A	25
Mevagissey	Company	230	C	—
Mexborough	U.D.C.	220, 440	C	—
Mickleham	Leatherhead Co.	210, 420	C	—
Middlesbro'	Corporation	230, 460	A	50
		230, 400	A	50
Middleton (Lancs.)	Corporation	220, 440	C	—
		230, 400	A	50
Mildenhall	Company	220	C	—
Milford Haven	U.D.C.	220, 440	C	—
Milford-on-Sea	Company	230, 460	C	—
Millom	U.D.C.	230, 400	A	50
Milnrow	U.D.C.	230, 400	A	50
Minehead	Company	230	A	50
Mirfield	U.D.C.	200, 230	A	50
		400		
Monmouth	Company	230	A	50
Morecambe	Corporation	230, 400	A	50
Morley	Corporation	100, 200	A	50
Morpeth	N. C'nties E. S. Co.	240, 480	A	40
		440	A	40
Mountain Ash	U.D.C.	230, 400	A	25
Mynyddislwyn	U.D.C.	230, 400	A	25
Narberth	Company	110	C	—
Neath (Borough)	Corporation	220	A	50
Neath (Rural)	R.D.C.	220	A	50
Needham Market	Company	230, 415	A	50
Nelson (Lancs.)	Corporation	230, 460	C	—
		230, 400	A	50
Newbury	Urban E.S. Co.	240, 480	C	—
Newcastle-Emlyn	Company	230	C	—
Newcastle & District E.L. Co., Ltd.	Company	240, 480	C	—
		100	A	80
		250	A	40

TOWN.	Authority.	Supply Voltage.	System.	Cycles.
Newcastle-on-Tyne.	Corporation	240	A	40
Newcastle-u-Lyme	Corporation	230, 460	C	—
		240, 415	A	50
		230, 400	A	50
Newmarket	E. L. Co.	210, 420	C	—
Newport (Mon.)	Corporation	230	A	50
Newquay	Company	230, 460	A	50
New Radnor	Company	110	C	—
Newton-in-Makerfield.	U.D.C.	230, 400	A	50
Normanton	U.D.C.	230, 400	A	50
North-Eastern Elec. Supply Co.	Company	240, 480	C	—
		220, 250	A	50
		380, 440		& 40
Northallerton	Company	220	C	—
Northampton	Company	210, 420	C	—
		210, 230	—	—
		365		
		400, 420	A	50
		460		
Northleach	Northleach E.S. Ltd.	220	C	—
Northwich	Company	220, 380	C	—
		220, 380	A	50
Northwood	Company	240, 480	A	50
Norwich	Corporation	220, 440	C	—
		220, 230	A	50
		380, 400		
Nottingham	Corporation	200, 400	C	—
		230, 400	A	50
Nuneaton	Corporation	220, 440	C	—
		230, 400	A	50
Oakham	Company	240	A	50
Ogmore Valley	Company	220	A	50
Okehampton	Company	230	A	50
Oldbury	S.W. & S.E.P. Co.	110, 190	A	25
Oldham	Corporation	210, 420	C	—
		230, 400	A	50
Old Windsor	Company	230, 400	A	50
		110 220	C	—
Orford, Suffolk	E. Suffolk Elec. Distribution Co.	230, 400	A	50
Ormskirk	Company	230, 400	A	50
Oswestry	Corporation	220	C	—
		230, 400	A	50
Ottery St. Mary	Company	200	C	—
Oxford	Corporation	100	C	—
		100, 200	A	50
		230, 400		
Padiham	U.D.C.	230, 400	A	50
Padstow	Company	240	A	25
Paignton	Company	230, 400	A	50
Paisley	Corporation	200, 250, 440	A	50
Pateley Bridge	Private	120	C	—
Peacehaven	Company	230, 400	A	50
Pelaw-on-Tyne	Company	240, 480	C	—
Pembroke	Company	220	C	—
Penarth	Company	230, 460	C	—
		230, 400	A	50
Pencoed	S.W.E.P.D.Co.	230, 400	A	50
Penmaenmawr	U.D.C.	230, 400	A	50
Penrith	Company	220	C	—
Penzance	Company	240, 415	A	25
Peterborough	Corporation	200, 400	C	—
		230, 400	A	50
Peterhead	Company	230, 400	A	50
Petersfield	Company	230, 400	A	50
Pinner	Colne Valley E.S. Co.	240, 415	A	50
Plymouth	Corporation	230, 460	C	—
		200, 230	A	50
		346, 400		
Plympton	R.D.C.	230, 400	A	50
Pontardawe	R.D.C.	220	C	—
		230, 400	A	50
Pontefract	Yorks. E.T. Co.	230, 400	A	50
Pontlottyn	U.D.C.	230, 400	A	25
				& 50

TOWN.	Authority.	Supply. Voltage.	System.	Cycles.
Pontypool	... Company ...	230, 400	A	25
Pontypridd	... U.D.C. ...	230, 460	C	—
		230, 400	A	25
Porlock ...	... Company ...	200	C	—
Port Talbot	... Corporation ...	240, 415	A	50
Portishead	... N. Som. E. S. Co.	230, 400	A	50
Portland	... U.D.C.	230, 400	A	50
Portsmouth	... Corporation ...	240, 415	A	50
Prescot ...	... B.I. Cables, Ltd.	240	C	—
		115, 230	A	50
Prestatyn	... U.D.C.	230, 400	A	50
Preston ...	... Corporation ...	230, 416	A	50
Pudsey ...	... Corporation ...	230, 400	A	50
Queenborough	... Sheerness Co.	250, 440	A	50
		230, 460	C	—
Radcliffe	... U.D.C. ...	220, 440	C	—
		230, 400	A	50
Ramsgate	... Company ...	240, 480	A	50
Ravensthorpe	... Company ...	230, 400	A	50
Rawtenstall	... Corporation ...	230, 400	A	50
Reading	... Company	200, 400	C	—
		200, 345	A	50
Redcar ...	... Corporation ...	250, 440	A	40
Redditch...	... S.W. & S.E.P. Co.	230	A	50
Redruth ...	... Company ...	240, 415	A	25
Reeth (Yorks.)	... Company ...	230	C	—
Reigate	... Corporation ...	200, 440	A	50
Rhayader	... S. W. & S. Development Co.	230	C	—
Rhondda...	... U.D.C.	230, 400	A	25
Rhyl ...	... U.D.C. ...	230, 460	C	—
		230, 400	A	50
Richmond (Yorks)	R.D.C.	230, 400	A	50
Rickmansworth	Colne Valley E. S. Co. ...	240, 415	A	50
Ripon ...	... Corporation ...	230, 400	A	50
Risca ...	... U.D.C.	230	A	25
Rochdale	... Corporation ...	230, 400	A	50
Rochester	... Company ...	230, 400	A	50
Ross-on-Wye	... Company	230	C	—
		230, 400	A	50
Rotherham	... Corporation ...	230, 400	A	50
Rugby ...	... U.D.C.	230	A	50
Ruislip ...	... Company ...	240, 415	A	50
Runcorn	... Mersey Pr. Co.	250	A	50
		440	A	50
Rushden	... Company	210, 420	C	—
		210, 365	A	
Ruth ...	... Askrigg El. Co.	230, 400	A	50
		230	C	—
Ruthin ...	... Company ...	230	C	—
St. Austell	... Company	110, 220	C	—
		230, 400	A	50
St. Helens (Lancs)	Corporation	230, 460	C	—
		230, 400	A	50
St. Helier, Jersey	Company ...	240, 415	A	50
St. Ives (Cornwall)	Company ...	440	A	25
St. Neots ...	Company ...	240, 415	A	50
Saffron Walden ...	Corporation ...	220, 440	C	—
Salcombe	... Company ...	230, 400	A	50
Sale	U.D.C.	240	A	50
Salford	Corporation	230, 460	C	—
		200, 230, 400, 460	A	50
Salisbury	... Company ...	210, 420	C	—
Saltash ...	... Company ...	230	C	—
Saltburn-by-Sea	N. C'ntles E.S.Co.	250	A	40
Savile Town	... Dewsbury Corp.	230, 400	A	50
Scarborough	... Corporation ...	230, 400	A	50
Scunthorpe (Lincs.)	... U.D.C.	250, 440	A	50
Seaham Harbour	U.D.C.	250, 440	A	40
Seahouses	... Seah'ses E.S.Co.	440	A	50
Seaton Delaval	... Newcastle Co. ...	240	C	—
Seaton (Devon)	... Company ...	220	C	—
Sennybridge, Brecon	... Company ...	220	C	—
Sevenoaks	... Company	220, 230	A	50
		380, 440		
Sheerness	... Company	230, 460	C	—
		250, 440	A	50
Sheffield ...	... Corporation ...	200, 350	A	50
Sherborne	... Company ...	230, 400	A	50

TOWN.	Authority.	Supply Voltage.	System.	Cycles.
Sheringham	... Sheringham & Dis. E.S. Co. ...	240, 420	A	50
Shildon (Old & New)	N. Counties E. S. Co ...	250, 500	A	40
		230, 460	C	—
Shipley	U.D.C. ...	500		
		230, 400	A	50
Shipston-on-Stour	S.W. & S.E.P. Co.	230	C	—
Shoeburyness	... U.D.C.	230, 400	A	50
Shoreham-by-Sea	Company ...	230, 400	A	50
Shrewsbury	... Corporation ...	210, 420	C	—
Sidmouth	... East Devon Elec. Co.	220, 225	C	—
		230	A	50
Skelton	U.D.C. ...	110, 250, 440	A	40
Skipton ...	... U.D.C.	230, 400	A	50
Sleaford ...	... U.D.C.	220	C	—
Slough ...	... Company ...	230, 400	A	50
Smethwick	... S.W. & S.E.P. Co.	230	C	—
Somerby	... Company ...	100	C	25
Southam	... L. & W.E.P. Co.	250, 433	A	50
Southampton	... Corporation	200, 400	C	—
		200, 240	A	50
		380, 415		
Southend	... Corporation	230	C	—
		230	A	50
Southport	... Corporation	110, 190		
		220, 380	A	50
		110, 220	A	50
South Shields	... Corporation	550	C	—
Southwold	... Company ...	200	C	—
Spalding	... U.D.C.	230, 400	A	50
Spenborough	... U.D.C.	230, 400	A	50
Spennymoor	... N. C'ntles E.S. Co.	250, 500	A	40
Springwell	... Durham Co. ...	250	A	40
Stafford ...	... Corporation	210 420	C	—
		230, 400	A	50
Staines ...	... Company	100, 200	A	50
		240, 416		
		230, 460	C	—
Stalybridge	... Joint Board	230, 400	A	50
Stamford	... Urban E. S. Co....	240, 480	C	—
Staveley ...	... Company ...	240, 440	A	30
Steyning	... Company ...	230, 400	A	50
Stockport	... Corporation ...	230, 400	A	50
Stockton-on-Tees	Corporation ...	250, 440	A	50
Stoke-on-Trent ...	Corporation	220, 240	C	—
		440, 480		
		200, 240	A	50
		400, 415		
Stone	U.D.C.	230, 400	A	50
Stowmarket	... Company ...	230, 400	A	50
Stratford-on-Avon	S. W. & S. Dev. Co. ...	230	C	—
Streatley-on Thames ...	—	230, 400	A	50
Street	Company ...	230, 400	A	50
		460, 500,	C	—
Stretford, Lancs.	Board ...	520		
		400, 460	A	50
Stroud (Glos.)	... Company ...	230, 400	A	50
Sturminster Newton	... E. E. Corp'n. Ltd.	220	C	—
Sudbury, Suffolk	East Anglian E. S. Co. ...	240, 415	A	50
Sunderland	... Corporation ...	220, 380	A	50
Surbiton	... Joint Elect. Auth.	240	C	—
Sutton, Surrey	... S. Met. E. Tram Co.	200	A	50
Sutton Coldfield	Corporation	230, 460	C	—
		230, 400	A	50
Swanage ...	... Company ...	240	A	50
Swansea ...	... Corporation	220, 440	C	—
		220, 380	A	50
Swindon ...	... Corporation	220, 440	C	—
		220, 380	A	50
Swinton (Lancs.)	U.D.C. ...	250, 500	C	—
		230, 400	A	50
Tadcaster	... Company ...	230, 460	C	—
Talgarth	... Company ...	230	C	—
Tamworth	... Corporation ...	250, 440	A	50
Tanfield ...	... U.D.C.	240, 440	A	40
Taplow ...	... Corporation ...	230, 460	C	—

SUPPLY VOLTAGE DATA

TOWN.	Authority.	Supply. Voltage.	System.	Cycles.
Tarporley	... Chester Corpn.	210, 420	C	—
		230, 400	A	50
Taunton ...	... Corporation	550	C	—
		105, 210, 420	A	50
Tavistock	... Tavistock and Dis. E. S. Co.	250, 500	C	—
Teignmouth	... Company ...	230, 400	A	50
Tetbury ...	... Company ...	230	C	—
Tewkesbury	... E. L. Co.... ...	230, 400	A	50
Thetford	... E. Anglian E.S. Co.	110	C	—
Thirsk ...	... N. Counties Co.	240, 480	C	—
		240, 480	A	40
Thornaby-on-Tees	C.D.C.E.P. Co. ...	250, 440	A	40
Thornton (Lancs.)	U.D.C.	230, 400	A	50
Tilmanstone	... E. Kent Col'y Co.	220	A	50
Tisbury (Wilts.)...	Company ...	210	C	—
Tiverton (Devon)	Corporation ...	230, 460	C	—
Todmorden	... Corporation ...	230, 400	A	50
Tonbridge	... U.D.C. ...	220, 440	C	—
		220, 380	A	50
Topsham...	... Company ...	100	C	—
Torpoint	... Company ...	230	A	50
Torquay ...	... Corporation	240, 480	C	—
		500		
		200, 240	A	50
		400, 480		
Totnes ...	... Company ...	225, 450	C	—
Trafford Park	... Company	250, 500	C	—
		240, 400	A	50
Treeton(Rother'm)	R.D.C.	500	A	50
Trowbridge	... W.Wilts.E.S.Co.	230, 400	A	50
Truro ...	... Company ...	240, 415	A	25
Tunbridge Wells	Corporation ...	220	A	50
Turton (Lancs.)...	U.D.C.	230, 400	A	50
Tynemouth	... Corporation	†240, 420		
		480	A	40
Ulverston	... U.D.C.	220, 380	A	50
Upper Beeding	... Steyning Co. ...	‡230, 240	C	—
Uxbridge...	... Company	200, 230		
		400	A	50
Wadebridge	... Company ...	240	A	25
Wakefield	... Corporation	200, 230	A	50
		400		& 60
Walker ...	... Newcastle E.S. Co.	240, 480	C	—
		250, 440	A	40
		500		
Wallasey	... Corporation	200, 230	A	50
		400, 440		
Wallingford	... Wessex Elec.Co.	210, 230	C	—
		400, 420	A	50
Wallsend...	... Newcastle E. S. Co.	240, 480	C	—
		250, 440	A	40
		500		
Walsall ...	... Corporation ...	230, 400	A	50
Walton-on-Naze	U.D.C.	230	C	—
Walton-on-Thames	U.D.C.	240, 480	A	50
Wantage...	... Company ...	230, 400	A	50
Warborough	... Wallingford Co.	210, 230	A	50
		400, 420		
Wareham	... Bournem'th Co.	*220	C	—
Warminster	... Company ...	230, 400	A	50
Warmley...	... R.D.C.	230, 400	A	50
Warrington	... Corporation	230, 460	C	—
		250, 440	A	50
Warwick	... Leamington & Warwick E. Co.	230, 460	C	—
		250, 440	A	50
Watford ...	... Corporation	200, 240	A	50
		350, 415		
Weald (District)	Company ...	230, 400	A	50
Weaverham	... Company	230, 460	A	—
		230	A	50
Wednesbury	... Mid.E.C.forP.D.	200, 400	A	50
		230	C	—
Wellingborough	... Company	230, 460	C	—
		230, 400	A	50
Wellington	... Company ...	230, 400	A	50
Welwyn Garden City ...	... Company ...	240, 415	A	50
Wessex ...	... Wessex E. Co. ...	220	C	—
West Bromwich...	Corporation	230, 460	C	—
		230, 400	A	50
Westbury	...West Wilts. ... E. P. Co.	230, 400	A	50
West Drayton	... Uxbridge Co.	200, 230	A	50
		400		
West Gloucestershire.	W. Glos. P. Co. ...	230, 400	A	50
West Hartlepool	Corporation	230	C	—
		230	A	40†
		230, 460	C	—
Weston-super-Mare.	Company	230, 400	A	50
		460		
Weybridge	... L. & Home C'ntie J. E. Auth. ...	240	A	50
Weymouth	... Corporation	230, 460	A	50
		400		
Whiston ...	... B.I. Cables ...	115	A	50
Whitby (Yorks.)	U.D.C. ...	230, 460	C	—
		230, 400	A	50
Whit'rch-on-Thames.	Company ...	230, 400	A	50
Whitehaven	... Corporation	210, 420	C	—
		230, 400	A	50
Whitley ...	... Newcastle E. S.	240, 480	C	—
(Northumberland)	Co.	250, 500	A	40
Whitley (Yorks)...	U.D.C.	230, 460	A	—
Whitstable	... Company... ...	230, 400	A	50
Whittington	... Chesterfield ...	240, 415	A	50
Whitwood	... U.D.C.	230, 400	A	50
Whitworth	... U.D.C.	230, 400	A	50
Wick ...	... Corporation ...	230, 460	C	—
Wickwar	... W. Glos. P. Co. ...	230, 400	A	50
Widnes ...	... Mersey Pr. Co. ...	250, 440	A	50
Wigan ...	... Corporation	230, 460	C	—
		280, 400	A	50
		230	C	—
Wilmslow	... Company	230	A	50
Wilton ...	... Company ...	230, 400	A	50
		250	C	—
Wimborne	... Company	200, 230	A	100
		400		
Winchester	... Corporation	210, 420	C	—
		230, 400	A	50
Windermere	... Company ...	100, 200	A	100
Windsor ...	... Company	230, 400	A	50
		230	C	—
Winscombe...	... E. L. & P. Co. ...	230, 400	A	50
Wisbech ...	... Company ...	240, 480	C	—
Witney ...	... Corporation	220	C	—
		230, 400	A	50
Woking ...	... Company ...	200	A	50
Wolverhampton	Corporation ...	230, 400	A	50
Woodbridge	... Company ...	230, 400	A	50
Woodstock	... Company ...	230	A	50
Worcester	... Corporation	200, 346	A	50
		440		
Workington	... Corporation ...	240, 416	A	50
Worksop	... U.D.C. ...	220, 440	C	—
		220, 380	A	50
Worthing	... Corporation	230, 460	C	—
		230, 400	A	50
Wrexham	... Corporation	230, 400	A	50
		230, 460	C	—
Yarmouth, Gt.	... Corporation	200, 346	A	50
		400		
Yeovil ...	... Company ...	240, 480	C	—
York ...	... Corporation	230, 460	A	50
		230, 460	C	—
Ystradgynlais	... Company ...	220, 240	C	—

† Changing to 50 Cycles. * Changing to A/50. ‡ Changing to A/50.

SCOTLAND.

TOWN.	Authority.	Supply Voltage	System.	Cycles.
Aberdeen	Corporation	220, 440	C	—
		230, 400	A	50
Alloa	Scottish Central E. P. Co.	250, 440	A	50
Arbroath	Arbroath E. L.& P. Co.	250, 500	C	—
		250, 440	A	50
Ayr (County)	Ayrshire Ey.Bd.	240, 480	C	—
		240, 415	A	50
Ballater (Aberdeen)	Duncan's ES. Co.	220	C	—
Bathgate	Scot. Mid. Co.	250, 440	A	50
Beauly	Company	240	C	—
Blair Atholl	Duke of Atholl	110, 220	C	—
Bo'ness (Borrow Stouness)	Corporation	230, 460	C	—
Bonnybridge	Scot.Cen.E.P.Co.	250, 440	A	50
Bothwell	Clyde Valley Co	230, 250	A	25 & 50
Brechin	N. Scotland E. L. P. Co.	240, 480	C	—
Brora	T. M. Hunter, Ld.	110, 220	C	—
Broxburn	County Council	230	C	—
		230, 250	A	50
		400		
Coatbridge	Coatbridge & Airdrie E.S.Co.	240, 480	C	—
		220, 440	A	25
Crieff	Company	240	C	—
Dalbeattie	Company	200	C	—
Dalkeith	Corporation	230, 400	A	50
Denny	Corporation	230, 415	A	50
Dingwall	Rosshire E.S.Co.	230, 400	—	—
		200, 346	A	50
Dollar	Scott C.E.P. Co.	225	C	—
		240	A	50
Dumbarton	Company	240, 480	C	—
		240, 415	A	50
		230	C	—
Dumfries Burgh	Corporation	230, 400	A	50
Dumfries County	C.C.	230, 400	A	50
Dundee	Corporation	200, 400	C	—
		200, 346	A	50
Dunfermline*	Fife E.P. Co.	250, 440	A	50
Edinburgh	Corporation	230, 400	A	50
		230, 460	C	—
Edinburgh	Lothians E.P. Co.	230, 400	A	50
Elgin	Company	240, 480	C	—
Ellon (Aberdeen)	Duncan's E.S. Co.	220	C	—
Evanton	Ross-shire E.S. Co.	230, 400	A	50
Falkirk	Corporation	230, 460	C	—
		250, 440	A	50
Fochabers	Company	200, 400	C	—
Fort William	Company	150, 300	C	—
Galashiels	Scot. Southern E.S. Co.	250, 440	A	50 & 25
Glasgow	Corporation	250, 6,500	C	—
		250, 440	A	50
Gourock	Corporation	250, 500	C	—
		250, 440	A	50
Grangemouth	Company	250, 440	A	50
Grantown-on-Spey	Company	200	C	—
Greenock	Corporation	250, 500	C	—
		250, 440	A	50
Greenlaw	Company	210	C	—
Hamilton	Corporation	240, 480	C	—
Hawick	Urban E.S. Co.	240, 480	C	—
Invergordon	Corporation	220	C	—
Inverness	Corporation	240, 480	C	—
Jedburgh	Company	230, 400	A	
		400	C	—
Kilmacolm	Company	230, 250	A	50
Kilpatrick	Company	230, 400	A	
Kingussie	Company	250, 440	A	50
Kinfore	Duncan's E.S. Co.	220	C	—
Kirkcaldy	Corporation	230, 460	C	—
		230, 400	A	50
Kirkwall	Corporation	220, 440	C	—
Leith	Corporation	230, 400	A	50
		230, 460	C	—
Lochaber	Lochaber Power Co.	440	A	50
Lossiemouth	Corporation	230	C	—
Montrose	N. Scot. E.P. Co.	240, 480	C	—
Motherwell	Corporation	230, 240	C	—
		460, 480		
Musselburgh	Company	230, 460	C	—
		230, 400	A	50
Newcastleton	Company	110	C	—
North Berwick	Corporation	230, 400	A	50
Oban	Corporation	230, 460	C	—
Paisley	Corporation	200, 250	A	50
		440		
Perth	Corporation	230 460	C	—
Port Glasgow	Corporation	250, 500	C	—
		250, 440	A	50
Renfrew	Clyde Valley E.P. Co.	230, 250	A	25 & 50
Ross	Company	230	C	—
		230, 430	A	50
Rothesay	Corporation	240, 480	C	—
St. Andrews	E. S. Corporation	225, 450	C	—
†Scottish Cnt. E.P.	Co. & St. Mid. E.S. Co.	250, 440	A	50
Skelmorlie	Company	200, 400	C	—
		230, 400	A	50
Stirling	Corporation	230, 460	C	—
Tain	Corporation	230, 400	A	50
Tobermory	Municipal	220	C	—
Uphall	County Council	230, 440	C	—
West Lothian	County Council	230, 460	C	—
Wick	Corporation	230, 460	C	—
Wishaw	Corporation	230, 460	C	—
		240, 480		

* Burgh of Dunfermline only 220, 440/A/51.

† Covering whole of Clackmannanshire, Linlithgowshire and most of Stirling,‡ with the exception of certain Burghs.

N. IRELAND AND I.F.S.

TOWN.	Authority.	Supply. Voltage.	System.	Cycles.
Ahoghill	Private	220	C	—
Ardara	Company	220	C	—
Ardee	Company	220	C	—
Armagh	U.D.C.	220, 380	A	50
Athenry	Private	220	C	—
Athy	Private	220	C	—
Ballaghaderreen	U.D.C.	220	C	—
Ballinrobe (Co. Mayo)	Company	230	C	—
Ballyclare	Private	220	C	—
Ballyconnell	Company	220	C	—
Ballyshannon	Ballyshannon & Bundoran S. Co.	240, 480	C	—
Banbridge	Company	220	C	—
Bandon (Co. Cork)	Company	250	C	
Bantry (Co. Cork)	Company	250	C	
Belleek	R.D.C.	110	C	—
Belfast	Corporation	220, 440	C	—
		220, 380	A	50
Belturbet	J. C. Cave	110	C	—
Birr	Company	220, 440	C	—
Blackrock (Co. Dublin)	—	200, 346	A	50

SUPPLY VOLTAGE DATA

TOWN.	Authority.	Supply. Voltage.	System.	Cycles.
Borrisoleigh (Tippy)	Company ...	220, 380	C	—
Bray (Co. Wicklow)	District Council ...	100, 200	A	60
Buncrana ...	Company ...	230, 460	C	—
Bundoran ...	Myles & Co. ...	220	A	50
Cahir	Company ...	200	C	—
Cahirciveen (Co. Kerry)	Company ...	220	C	—
Callan	Transit & Development Co.	220	C	—
Carlow	Alex. E. Wks ...	200	C	—
Carrickmacross ...	Company ...	220	C	—
Carrick-on-Shannon	Private	250, 500	C	—
Castlewellan ...	Company ...	220	C	—
Cavan	Company ...	220	C	—
Charlestown ...	Private	110	C	—
Charleville ...	Private	220	C	—
Clogheen ...	Private	100	C	—
Clogher	Company ...	230	C	—
Clonakilty (Co. Cork)	Company ...	220	C	—
Clones	Company ...	220	C	—
Clonmel	Corporation ...	230, 400	A	50
Cloughjordan ...	Company ...	110	C	—
Cookstown ...	Company ...	220, 440	C	—
Cork	Company ...	230	C	—
		230	A	50
Crumlin (Antrim)	Private ...	220	C	—
Dromore (Co. Down)	Company ...	220	C	—
Dublin	E. S. Board ...	220, 380	A	50
Dundalk	U.D.C.	115, 230, 460	C	—
Dungarvan ...	E. S. Board ...	220	C	—
Dunmanway ...	Company ...	100	C	—
Enniscorthy ...	U.D.C.	220, 440	C	—
Enniskillen ...	Company ...	220, 440	C	—
Fethard (Tipperary)	E. S. Board ...	220	C	—
Fivemiletown ...	Company ...	220	C	—
Galway	E. S. Board ...	220, 380	A	50
Greystones ...	Company ...	100, 200	A	50
Kildare	Corporation ...	200	C	—
Kilkee	Company ...	200	C	—
Kilkenny ...	E. S. Board ...	220	C	—
Killarney ...	Company ...	100, 200	A	100
Killorglin (Co. Kerry)	Company ...	220	C	—
Killybegs	Private	200	C	—
Kilrea	Private	220	C	—
Kilrush	Company ...	220	C	—
Kingstown (Dun Laoghaire)	E. S. Board ...	220, 380	A	50
Larne	Company ...	220, 440	C	—
Limavady ...	Private	220, 380	A	50
Limerick ...	Corporation ...	230, 460	C	—
Lisburn	Company ...	230, 400	A	50
Listowel	Company ...	220	C	—
Londonderry ...	Corporation	220, 440	C	—
		220, 380	A	50
Loughrea ...	Company ...	220	C	—
Lurgan	U.D.C.	400, 230	A	50
Macroom... ...	Private	230	C	—
Maghera	Private	220	C	—
Manorhamilton ...	Company ...	220	A	50
Moate	E. S. Board ...	100	C	—
Mohill	Private	110	C	—
Monaghan ...	Company ...	220	C	—
Monastereven ...	W. A. Tynan ...	220	C	—
Navan	U.D.C.	220	C	—
Nenagh	Company ...	220	C	—
Newcastle, Co. Down	Company ...	220	C	—
Newcastle West...	Company ...	220	C	—
New Ross (Wexford)	Company ...	220	C	—
Pembroke(Dublin)	District Council ...	220, 440	C	—
Portaferry ...	Company ...	220	C	—
Portarlington ...	Company ...	230, 460	C	—
Portrush ...	Corporation ...	440, 600	C	—
Portstewart ...	U.D.C.	220	C	—
Portumna ...	Company ...	230	C	—
Queenstown ...	Cork E.S. Co. ...	230, 460	C	—
Rathmines ...	E.S. Board ...	220, 440	C	—
Roscrea	Company ...	220	C	—
Skerries	Private	220	C	—
Skibbereen ...	Company ...	230, 460	C	—
Swinford (Co. Mayo)	R.D.C.	220	C	—
Tandragee ...	Company ...	220	C	—
Thurles	U.D.C.	230, 400	A	50
Tobermore ...	T. C. McKee Co....	50	C	—
Tuam	Company ...	220	C	—
Tullamore ...	Company ...	220	C	—
Waterford ...	Municipal ...	220, 400	A	50
Wexford ...	E. S. Board ...	220	A	50
Whitehead ...	Private	220	C	—
Wicklow	U.D.C.	220	C	—

CORRECTIONS AND ADDITIONS

The Editor will be glad to receive particulars of any additions or corrections which should be made to these tables during the course of the year, and would be grateful if traders would communicate such information to the Editor, the *Broadcaster Radio Trade Annual*, 93, Long Acre, London, W.C.2.

MAINS AND BATTERY SET MARKET SURVEY

A comprehensive survey of the households of Great Britain shows that 38.5 per cent. are available for mains receivers, while 61.5 represents the extent of the market for battery sets.

To obtain the figures given below, 635 out of the 661 authorised undertakings have contributed data. The figures are official with a very few exceptions which are marked with an asterisk (*).

A new departure is the indicating of a synchronous A.C. supply with a sign, thus †.

Where an undertaking covers an area of 25,000 households or more, indication is given by printing the name in bold characters.

Homes.	Great Britain.	England.	Wales.	Scotland.
Total ..	11,197,620	9,338,729	648,253	1,210,639
On A.C. ..	3,241,389	2,861,927	190,254	189,208
On D.C. ..	1,068,340	892,162	67,271	108,907
Unwired ..	6,887,891	5,584,640	390,728	912,523

Name of Supply Authority	Total No. of Householders in Area	Number of Households on A.C.	on D.C.	for Battery Sets.
GREATER LONDON which includes the Counties of London and Middlesex and parts of the Counties of Essex, Hertfordshire, Kent and Surrey).				
Barnes	11,000	—	9,400	1,600
Barking	14,800	6,100*†	4,100*	4,600
Barnet, East Barnet Valley and Totteridge	7,871	5,842†	29	2,000
Battersea	44,618	6,671	10,300	27,647
Beckenham	12,500	10,785†	—	1,715
Bermondsey	17,000	—	10,500	6,500
Bexley and District ..	10,000	9,010†	—	990
Brentford	5,000*	1,725	—	3,275
Brompton and Kensington Company ..	12,000	11,760†	—	240
Bromley	10,500	6,530†	—	3,970
Chelsea	16,332	2,531†	5,181	8,620
Cheshunt, Cuffley, Upshire and Waltham Abbey	5,287	1,184†	—	4,103
Chislehurst	2,346	481	—	1,865
Chiswick	12,060	244	5,730	6,096
City of London	20,500*	6,544†	3,083	10,873
County of London Co. ..	194,990*	87,186*†	3,000*	104,804
Croydon	58,279*	25,500*	5,500*	27,279
Ealing	20,440	13,579†	—	6,861
East Ham	30,000	3,040†	17,000	9,960
Edmonton	18,125	7,125†	—	11,000
Egham and Staines ..	28,000	7,752†	—	20,248
Enfield	15,097	3,961	636	10,500
Epsom	4,402	985†	2,615	802
Erith	7,200	5,600†	—	1,600
Finchley	14,500	—	11,300	3,200
Foots Cray Co. ..	2,500	1,430†	—	1,070
Friern Barnet	4,332	2,703	—	1,629
Fulham	34,883	28,362†	—	6,521
Hackney	27,613	—	20,000	7,613
Hammersmith	28,345*	19,487†	—	8,858
Hampstead	23,709	19,487	—	4,222
Harrow	8,450	—	5,891	2,559
Heston and Isleworth ..	19,338	—	7,380	11,958
Hendon	28,369	25,000†	—	3,369
Hornsey	22,457	—	14,138	8,319
Hendon Rural and Kingsbury	12,277	11,524†	—	753
Ilford	32,397	6,662†	17,495	8,240
Islington	63,960	21,536†	—	42,424
Kensington and Knightsbridge Co.	7,341	509†	6,573	259
Kingston-on Thames ..	9,700	6,748†	—	2,952
Leyton	25,165	11,100†	8,200	5,865
London Elec. Supply Corporation	83,188*	40,410*	8,000*	34,778
Met. Elec. Supply Co. ..	91,000*	60 000*	10,000*	21,000
Northwood	4,600	3,723†	—	877
Notting Hill	22,500	2,486†	9,642	10,372
Poplar	23,240*	—	17,452	5,788
Richmond, Kew and District	9,600	4,500	500	4,600
St. James and Pall Mall Company	8,157*	Not known		
St. Marylebone ..	16,500	3,640†	8,770	5,090
St. Pancras	27,280	312	20,099	6,869
Shoreditch	25,156	—	14,685	10,471
South London Supply Corporation (Lambeth)	33,000*	16,000†	—	17,000
South Met. E.L. and P. Company	30,000*	21,000†	—	9,000
South Mimms Rural ..	2,099	1,424	—	675
Southgate and District	16,500	12,380†	—	4,120
Southwark	29,542	3,072	—	26,470
Stepney and Bethnal Green	82,573	4,509	16,243	61,821
Stoke Newington ..	13,500	—	9,000	4,500
Sutton and District (Formerly South Met. Co.)	32,178	20,871†	—	11,307
Surbiton	—	—	—	—
Tottenham	27,091	9,091†	—	18,000
Twickenham, Teddington, Hampton Court, Esher, Claygate and District	23,766	9,982	4,300	10,584
Uxbridge	18,000*	13,000*	—	5,000
Walthamstow	32,000	11,500†	6,500	14,000
Wembley and Wealdstone	22,227	20,040	—	2,187
West Ham	58,914	21,067†	—	37,847
Westminster Co. ..	21,000*	9,500*	8,500*	3,000
Willesden	37,500	24,000†	3,000	10,500
Wimbledon	32,000	26,800†	—	5,200
Wood Green	16,298	1,220	4,000	10,078
Woolwich	38,176	11,130*	741*	26,305
BEDFORDSHIRE				
Bedford	20,000	9,829†	—	10,171
Beds, Cambs, and Hunts Electricity Co. (Beds. Section)	200	82†	—	118
Luton	30,150	4,500	9,000	16,650
BERKSHIRE				
Abingdon ..	3,600	1,199	—	2,401
Ascot	6,800*	600	1,072	5,128
Maidenhead	7,267	1,694†	1,416	4,157
Newbury	3,406	152*	1,126*	2,128
Reading	26,100	3,200	1,800	20,100
Thames Valley Co. (Berks Section) ..	4,250*	250*	—	4,000
Wantage	1,604	294	—	1,310
Wessex Co.	(See "Large Supply Companies.)			
Windsor	4,882	1,240	806	2,836
BUCKINGHAMSHIRE				
Aylesbury and Rural District	13,108	6,327	950	5,831
Chesham and District	9,255	4,000†	—	5,255
Cookham and District (Bourne End) ..	3,500	1,474†	—	2,026
Northampton Elec. Power Co. (Bucks Section)	14,000	5,050	—	8,950
Slough and Datchet ..	12,242	5,148†	—	7,094
Wycombe	8,850	1,087	3,725	4,038
CAMBRIDGESHIRE AND ELY				
Beds, Cambs and Hunts Elec. Co. (Cambs Section) ..	7,800	2,945†	40	4,815
Cambs. Elec. Supply Co.	16,000	10,260†	—	5,740
Craven Hydro-Electric (Linton)	500	—	320	180
Newmarket Co. ..	2,578	684	—	1,894
Wisbech	4,600	—	509	4,091
CHESHIRE				
Alderley Edge and Wimslow Bd. ..	4,010	1,400†	500	2,110
Altrincham	14,731	6,908	—	7,823
Birkenhead	43,650	9,800†	19,308	14,542
Bredbury and Romiley	3,350	2,450†	—	900
Cheadle and Gatley ..	5,660	4,052†	—	1,608
Chester	16,117	5,000†	4,530	6,587
Congleton	4,800	1,400†	—	3,400
Crewe	12,625	4,620	2,890	5,115
Hazel Grove and Bramhall	3,400	2,300†	—	1,100
Hoylake and West Kirby	4,350	3,925	—	425

SET MARKET SURVEY

Name of Supply Authority	Total No. of House-holders in Area	Number of Households on A.C.	on D.C.	for Battery Sets.
Macclesfield	14,000	1,500†	3,000	9,500
Marple	2,200	540†	—	1,660
Northwich, Knutsford, Middlewich and Winsford (Mid-Cheshire Co.)	17,500	3,544	2,210	11,746
Runcorn and District (Mersey Power Co.)	21,800	7,500†	—	14,300
Sale	4,000	3,200†	—	800
Stalybridge, Hyde, Mossley and Dukinfield Board	28,000	8,303†	2,184	17,513
Stockport	38,523	5,080†	7,502	25,941
Wallasey	24,334	20,480†	—	3,854
CORNWALL				
Bodmin	1,400*	—	424	976
Bude	1,450	—	1,000	450
Callington	570	387	—	183
Camborne, Redruth and Illogan	8,800	1,513	—	7,287
Delabole	334*	—	230	104
East Cornwall Co.	4,000	1,400	—	2,600
Falmouth	3,100	—	860	2,240
Launceston	1,000	—	742	258
Looe	—	—	—	—
Liskeard	1,339	—	512	827
Mevagissey	550	—	275	275
Newquay	1,850	—	1,554	296
Penzance	3,146	709	—	2,437
Redruth	8,850	1,520	—	7,330
St. Austell and District	11,122	710†	398	10,014
Truro	2,000	400	—	1,600
West Cornwall Co.	30,144	4,124	—	26,020
CUMBERLAND				
Carlisle	19,000	6,310†	1,000	11,690
Keswick	1,000	730	—	270
Millom	1,981	230†	—	1,751
Penrith	2,393	—	450	1,943
South Cumberland Co.	4,300*	630	—	3,670
Whitehaven	5,540	200	3,444	2,096
Workington	5,425	1,350	—	4,075
DERBYSHIRE				
Bolsover	1,975	1,260	—	715
Buxton	3,625	—	1,845	1,780
Chesterfield	14,904	6,750†	4,500	3,644
Clay Cross	2,400	276	—	2,124
Derby	44,000	23,420†	200	20,380
Derbyshire and Notts. Elec. Power Co	(see "Large Power Companies.")			
Glossop	5,650	—	821	4,829
Hope (Yorkshire Elec. Power Co.)	793	110	—	683
Long Eaton	6,000	1,200	3,000	1,800
Staveley	4,534*	1,400	—	3,134
Trent Valley and High Peak Co.	10,847	2,143†	—	8,704
New Mills	6,200	2,000	—	4,200
DEVONSHIRE				
Axminster U.D.	12,000*	941	—	11,059
Barnstaple	3,838*	—	1,650	2,188
Bideford	4,200*	1,183	—	3,017
Braunton	800	—	650	150
Brixham Gas Co.	2,350	—	612	1,738
Chudleigh	500	—	200	300
Crediton	1,040*	476†	—	564
Cullompton (Culm Valley Co.)	4,000*	810†	—	3,190
Dartmouth and Kingswear	2,110	769†	—	1,341
Dawlish	1,250	1,000†	—	250
Exeter	18,193	9,441†	—	8,752
Exe Valley Co., East Devon Co. and associated companies.	—	5,139	730	not known
Holsworthy	1,960*	—	200	1,760
Honiton	1,015	—	467	548
Ilfracombe	2,600	—	766	1,834
Ivybridge	530	—	154	376
Lynton and Lynmouth	600	543	—	57
Paignton	5,018	3,104†	—	1,914
Plymouth	60,000	30,530†	2,850	26,620
Plympton St Mary R.D.C.	6,400	2,210†	—	4,190
Salcombe and Kingsbridge	1,580	213†	25	1,342
Seaton	2,000	—	800	1,200
Teignmouth	5,195	1,726†	—	3,469
Tiverton	2,410	—	701	1,709
Torquay	26,000	12,000	—	14,000
Totnes	1,127	—	333	794
West Devon Co.	2,000*	—	500*	1,500
DORSET				
Blandford	1,000*	—	361	639
Bridport	5,000	590	—	4,410
Dorchester	2,350	—	627	1,723
Lyme Regis	862	—	380	482

Name of Supply Authority	Total No. of House-holders in Area	Number of Households on A.C.	on D.C.	for Battery Sets.
Portland	1,200	562	—	538
Swanage	2,000	821	—	1,179
Wessex Company	(see "Large Supply Companies.")			
Weymouth and Melcombe Regis	5,900	1,242	2,364	2,294
DURHAM				
Annfield Plain	3,800	2,500	—	1,300
Auckland	528	80	—	448
Crook	1,615	1,560	—	55
Darlington	18,721	8,000	1,000	9,721
Houghton-le-Spring	19,000*	4,122	—	14,878
North Eastern Supply Company	(see "Large Supply Companies.")			
Seaham Harbour	3,696	2,826	—	870
South Shields	27,000	24,000	—	3,000
Stockton-on-Tees	15,309	4,000	12	11,297
Sunderland	29,000	9,000	—	20,000
West Hartlepool	15,000	4,000	2,000	9,000
ESSEX (exclusing Greater London)				
Brentwood	2,950*	—	2,500*	450
Brightlingsea (Frinton Co.)	1,400	550†	—	850
Chelmsford	9,100	3,770†	—	5,330
Clacton	6,000	1,820	3,739	441
Colchester	21,970	8,796†	5,360	7,914
East Anglian Elect. Supply Co. (Braintree, Kelvedon, Halstead, Hatfield-Peveril and District)	12,852	2,291†	—	10,561
Frinton (Frinton Co.)	997	—	710	287
Grays	3,623	1,040†	1,761	822
Harwich	3,138	2,367	—	771
Maldon	2,201	—	1,011	1,190
Saffron Walden	1,600	—	485	1,115
Shoeburyness	1,366	674†	—	692
Southend	29,207	12,494†	12,641	4,072
Wickford and District Co.	2,200*	375*	375*	1,450
Tilbury	5,230*	2,042	—	3,288
GLOUCESTERSHIRE				
Bristol	91,943	37,825	—	54,118
Cheltenham	15,000	8,496†	—	6,504
Cirencester	1,700	560†	—	1,140
Gloucester	11,500	3,000†	4,000	4,500
North Leach	267*	—	120	147
S. W. & S. Co.	3,000*	700*	—	2,300
Stroud	2,250	672†	—	1,578
Tetbury	777	—	145	632
Tewkesbury	1,267*	407	—	860
Warmley R.D.	2,300	1,000†	—	1,300
West Gloucestershire Power Co.	20,000	5,131†	—	14,869
HAMPSHIRE				
Aldershot	4,277	709	513	3,055
Alton	1,550	365	—	1,185
Andover	3,000	430	—	2,570
Basingstoke	8,438	855	1,945	5,638
Bournemouth and Poole	45,000	19,000	1,000	25,000
Fareham	3,227*	1,347†	—	1,880
Gosport and Alverstoke	10,000	—	3,500	6,500
Lymington and District	2,954	880	—	2,074
Milford-on-Sea	927	—	378	549
Petersfield	1,049	435	—	614
Portsmouth and District	81,411	39,943†	—	41,468
Ringwood	2,600	740	—	1,860
Romsey and District (West Hants Co.)	11,600	3,000†	—	8,600
Southampton	46,940*	20,000*†	5,000*	21,940
Winchester and District	7,805	75	2,973	4,757
HEREFORDSHIRE				
Kington	480*	—	170	310
Leominster	1,450	360†	—	1,090
Ledbury	895	272	—	623
S. W. & S. Co.	18,000*	2,000*	—	16,000*
HERTFORDSHIRE (excluding Greater London)				
Bishops Stortford	2,406	284†	—	2,122
Hertford, Hoddesdon and District	10,467	3,682†	—	6,785
Hitchin	3,815	786†	—	3,029
Letchworth and District	8,263	2,180†	720	5,363
Rickmansworth (Colne Valley Co.)	3,750	1,350	—	2,400
Royston and District	2,729	670†	—	2,059
St. Albans and District	15,323	5,328†	631	9,364
Stevenage and District	5,032	2,032†	—	3,000
Watford and District	24,000	14,825†	—	9,175
Welwyn	2,600	2,600†	—	Nil.
HUNTINGDON				
Beds. Cambs. and Hunts. Elec. Co. (Hunts Section)	4,000	1,048	—	2,952

Name of Supply Authority	Total No. of House-holders in Area	Number of Households on A.C.	on D.C.	for Battery Sets.
KENT (excluding Greater London)				
Ashford	10,000	5,450†	—	4,550
Canterbury	6,493	230	3,420	2,843
Dartford	6,109	453†	2, 83	3,173
Deal, Walmer and District	4,200*	800	—	3,400
Dover	10,000	6,768	—	3,232
Faversham	3,013*	—	956	2,057
Folkestone and District	8,700	3,000†	5,000	700
Gravesend	9,034	5,000	2,500	1,534
Gillingham	17,500	10,400†	—	7,100
Herne Bay	5,110	1,335	—	3,775
Keot Power Co.	18,000	3,000	—	15,000
Margate, Broadstairs, Westgate and District	13,685	622	7,043	6,020
Maidstone	13,000	3,000†	2,000	8,000
Ramsgate	8,000	—	2,759	5,241
Sevenoaks and District	13,280	4,802†	—	8,478
Sheerness	4,979*	1,000*	500	3,479
South East Kent Co.	3,000*	1,200*	—	1,800
Tonbridge	6,336	1,960	366	4,010
Tunbridge Wells	14,000	7,700	—	6,300
Weald Elec. Supply Co., Hawkhurst	28,000	5,000	—	23,000
West Kent Electric Co.,	Not known	9,000	12	—
Whitstable	4,000	3,700†	—	300
LANCASHIRE				
Accrington	22,886	8,096	—	14,790
Ashton-in-Makerfield	4,250	300†	—	3,950
Ashton-under-Lyne	19,210	1,900	1,200	15,110
Atherton	4,934	1,636	—	3,298
Bacup	6,138	2,029	—	4,109
Barrow	15,500	1,500†	6,400	7,600
Birkdale and District Co.	6,670*	Not	Known	—
Blackburn	40,479*	8,553†	1,500	30,426
Blackpool	40,000	24,000†	—	16,000
Bolton	47,366	14,936†	1,931	30,499
Brierfield	2,580	890†	—	1,690
Bury	16,800	5,000*	1,000	10,800
Burnley	26,500	4,900†	7,400	14,200
Cark and District	1,200	300†	—	900
Cleetborpes	7,219	2,300	—	4,919
Clitheroe	4,678	1,736†	—	2,942
Colne	8,680	2,151†	765	5,764
Darwen	10,497	1 140	4,110	5,247
Eccles	11,250	3,000†	—	8,250
Farnworth	7,683	2,819†	1,399	3,465
Fleetwood	5,908	1,065	3,877	966
Formby	2,016	1,831	—	185
Grange	600	400	—	200
Haslingden	5,000	3,000	—	2,000
Heywood	8,542	1,017	578	6,947
Hindley	5,140	1,032†	4	4,104
Lancashire Elec. Power Co.	62,020	21,049†	—	40,971
Lancaster	15,000	3,539	—	11,461
Leigh	11,051	1,250	1,750	8,051
Littleborough	3,580	1,156†	—	2,424
Liverpool	213,300	54,640†	27,320	131,340
Lytham St. Annes	6,658	3,805†	1,973	880
Manchester	200,261	46,171†	3,064	151,026
Mersey Power Co. (See Runcorn, Cheshire)				
Middleton	7,500	2,450	700	4,350
Milnrow	2,500	950†	—	1,550
Morecambe and Heysham	7,301	5,819†	108	1,374
Nelson	10,000	5,939†	500	3,561
Newton-in-Makerfield	4,917	1,300†	—	3,617
Oldham	54,200	28,600†	4,500	21,100
Ormskirk	1,900	722	—	1,178
Padiham	3,270	609†	—	2,661
Prescot	6,480	2,615	8	3,857
Preston	38,026	16,890†	—	21,136
Radcliffe	7,000	1,750†	1,250	4,000
Rawtenstall	7,000	2,700†	—	4,300
Rochdale	32,500	9,800†	—	22,700
St. Helens	26,600*	7,000*	1,000*	18,600
Salford and Prestwich	57,377	9,950†	3,142	44,285
Southport	16,611	10,222	—	6,389
Stretford Elec Board	24,167	11,718	4,550	7,899
Swinton	8,730	2,117	1,200	5,413
Thornton Cleveleys	2,950	2,213†	—	737
Turton	3,024	1,250†	—	1,774
Ulverston	2,400	600†	—	1,800
Warrington	28,360	8,050†	150	20,160
West Lancs. R.D.C.	2,000	750	—	1,250
Whitworth	2,542	650†	—	1,892
Wigan and District	32,682	5,654†	1,557	25,471
LEICESTERSHIRE				
Leicester	79,000	33,100†	—	45,900
Leicestershire and Warwickshire E.P o.	(See " Large Supply Companies.")			
Loughborough	7,579	1,986†	3,973	1,620
Melton Mowbray	2,950	—	1,420	1,530
LINCOLNSHIRE				
Barton-on-Humber	1,600	—	300*	1,300
Boston and District	8,000	2,470†	—	5,530
Cleethorpes	8.667*	1,172	—	7,495

Name of Supply Authority	Total No. of House-holders in Area	Number of Households on A.C.	on D.C.	for Battery Sets.
Gainsborough	4,300	809	—	3,491
Grantham	5,290	—	1,637	3,653
Grimsby	21,170	2,782*†	6,845*	11,543
Lincoln	17,426	1,800	850	14,776
Louth	3,200*	540	—	2,660
Scunthorpe and Frodingham	7,548	3,400	—	4,148
Sleaford	1,805	—	530	1,275
Stamford	3,068	—	855	2,213
Spalding	3,700	1,000	—	2,700
NORFOLK				
East Anglian Electric Supply Co. (including Cromer, Thetford, etc.)	38,924	1,570	1,326	36,028
East Dereham U.D.C.	800*	370*	—	430
King's Lynn	6,474	689†	3,451	2,334
Norwich	55,490	26,428	3,554	25,508
Sheringham and District	1,509	427	—	1,082
Yarmouth and Rural District	29,831	14,689†	—	15,142
NORTHAMPTON (including Peterborough and Rutland)				
Kettering	20,000	6,595†	3,944	9,461
Northampton Electric Light & Power Co. (Northampton Section)	42,000	15,600†	2,500	23,900
Peterborough	15,000	5,160†	840	9,000
Rushden and District	11,200	2,200†	700	8,300
Wellingborough	8,100	1,600†	1,000	5,500
NORTHUMBEERLAND				
Amble	1,117	850	—	267
Berwick-on-Tweed	2,786	—	805	1,981
Hexham	2,500	930	—	1,570
Newcastle	66,529	5,356	283	60,890
North Eastern Supply Co.	(see " Large Supply Companies.")			
Tanfield	2,771	1,794	—	977
Tynemouth	16,062	9,371	—	6,691
NOTTINGHAMSHIRE				
Derbyshire and Notts Co. (Notts Section)	(see " Large Supply Companies ")			
East Retford	8,600	2,600†	—	6,000
Newark	5,400*	1,400*	—	4,000
Nottingham	93,000	17,000†	36,000	40,000
Worksop U.D.C.	6,400*	600*	3,000*	2,800
Mansfield	14,650	2,500†	2,909	9,241
OXFORDSHIRE				
Banbury	3,730*	1,050*	—	2,680
Burford	465	—	260	205
Chipping Norton	1,067*	—	483	584
Oxford	14,000	5,872†	—	8,128
Thames Valley Co. (Oxon Section)	3,400*	438*	—	2,962
Wessex Company	(see " Large Supply Companies.")			
Whitchurch	683	215	—	468
Witney	953	400*†	200*	353
Woodstock and District	481	213	—	268
SHROPSHIRE				
Market Drayton	1,200	—	800	400
Oswestry	3,044	668	755	1,621
Shrewsbury	7,984	—	2,750	5,234
Shropshire, Worcestershire and Staffordshire Supply Co. (Shropshire section)	30,000*	3,500*	500*	26,000*
SOMERSET				
Bath	15,500	7,500†	400	7,500
Burnham and District	1,697*	773	—	924
Bridgewater and District	9,000*	—	1,350	7,650
Frome	3,230	—	776	2,454
Minehead	5,203	2,031†	—	3,172
North Somerset Electric Supply Co.	31,600	8,109	—	23,491
Porlock	260	—	230	30
South Somerset Electric Supply Co.	22,750	5,689	—	17,061
Street (Mid-Somerset Elec. Supply Co.)	1,000	718	—	282
Taunton	10,926	5,500	—	5,426
Weston-super-Mare	6,500	2,000†	1,707	2,793
Yeovil	4,750	—	725	4,025
STAFFORDSHIRE				
Burton-on-Trent	23,277	13,996	—	9,281
Cannock	10,657	3,388†	—	7,269
Chasetown and District	6,600	3,900	—	2,700
Lichfield	2,269	1,217†	—	1,052
Leek	4,986	172†	2,602	2,212
N. W. Midlands, J.E.A.	—	1,200	—	—
Newcastle-under-Lyme	6,200	390†	1,400	4,410
Shropshire, Worcestershire and Staffordshire Co. (Staffs. section)	100,000*	8,500*	1,000*	90,500
Stafford	7,500	3,205	636	3,659
Stoke-on-Trent	59,144	6,778†	2,138	50,228
Stone	2,500	600†	—	1,900
Tamworth	8,000	6,400	200	1,400
Walsall	24,000	9,000†	400	14,600
West Bromwich	18,538	3,188	2,008	13,342
Wolverhampton	38,500	23,579†	—	14,921

SET MARKET SURVEY

Name of Supply Authority	Total No. of House-holders in Area	Number of Households on A.C.	on D.C.	for Battery Sets.
SUFFOLK				
Aldeburgh	750	—	462	288
Bungay	750	200	—	550
Bury St. Edmunds	4,499	754†	1,572	2,173
East Anglian Elect. Supply Co. (Beccles, Framlingham, Burstall, Stowmarket, etc.)	48,624	3,229†	430	44,965
Felixstowe	3,707	2,150†	813	744
Ipswich	27,200	9,500*	2,500*	15,200
Leiston (East Suffolk Elec. Distribution)	5,130	1,439†	—	3,691
Lowestoft	12,000	961	4,166	6,873
Mildenhall	2,035	—	150	1,885
Southwold	1,235	—	840	395
Woodbridge and District	1,700	600†	—	1,100
SURREY (excluding Greater London)				
Camberley	7,000	1,600	—	5,400
Cranleigh	2,100	170†	—	1,930
Dorking	4,800	208	1,654	2,938
Farnham	6,993*	1,720†	—	5,273
Guildford	14,000	6,300†	1,200	6,500
Horley	3,867*	500†	—	3,367
Leatherhead	6,800	1,555†	2,200	3,045
Reigate	7,711	4,188	—	3,523
Weybridge	1,800	1,500	—	300
Woking	15,870	8,291†	—	7,579
Woldingham	2,057	303	—	1,752
SUSSEX				
Bexhill	5,515	23	5,142	350
Bognor Regis	7,750	2,898†	440	4,412
Brighton	45,000	800†	28,200	16,000
Burgess Hill	1,705	—	918	787
Central Sussex Elec. Co.	5,000*	1,500	—	3,500
Chichester	7,000	3,000	—	4,000
Crawley	1,050	150	150	750
Eastbourne	14,000	12,000†	—	2,000
East Grinstead	2,500	312	1,200	988
Hastings	22,500	14,000	—	8,500
Horsham	3,467*	1,000*	500*	967
Hove	15,200	3,559	7,369	4,272
Lewes	3,200	—	1,395	1,805
Peacehaven	1,100	500	—	600
Shoreham	3,920	1,240†	—	2,680
Steyning	5,600*	484†	—	5,116
Sussex Elec. Supply Co.	—	Not	Known	—
Uckfield	5,600	320†	—	5,280
Worthing	12,328	3,000	8,270	1,058
WARWICKSHIRE				
Barford	1,000	271	—	729
Birmingham	254,000	45,000	40,000	169,000
Coventry	53,956	25,358†	—	28,598
Leamington	4,400	400	270	3,730
Leicester and Warwick E.P. Co.	(see "Large Supply Companies.")			
Nuneaton	11,000	4,378†	3,740	2,882
Rugby	6,713	3,527†	—	3,186
S. W. & S. Co.	5,000*	800*	—	4,200
Stratford-on-Avon	2,780*	—	953	1,827
Sutton Coldfield	10,000	700	5,000	4,300
WESTMORLAND				
Kendal	4,248	789	457	3,002
Windermere and District	2,700	1,508	—	1,192
ISLE OF WIGHT				
Newport and Cowes	8,445	1,180†	—	7,265
Ryde	4,662	1,404†	—	3,258
Sandown	2,975	1,207†	—	1,768
Ventnor	1,629	800†	—	829
Rural Area	6,097	436†	—	5,616
WILTSHIRE				
Amesbury	500	—	300	200
Bradford-on-Avon (See West Wilts Co.)	—	—	—	—
Calne	900	—	155	745
Malmesbury	641	—	163	478
Marlborough	1,179	1	446	732
Salisbury	7,500	—	2,702	4,798
Swindon	18,202	5,264†	5,789	7,149
Tisbury Co.	628	—	148	480
Warminster	1,531	387	—	1,144
West Wilts Elec. Co. (Chippenham)	19,185	6,500†	—	12,685
Wilton	520	78†	—	442
WORCESTERSHIRE				
Kidderminster	7,710	2,200	2,400	3,110
Malvern	4,400	1,870	—	2,530
Shropshire, Worcestershire and Staffordshire Co. (Worcestershire section)	80,000*	14,000*	2,000*	64,000
Worcester	13,376*	5,515	—	7,861

Name of Supply Authority	Total No. of House-holders in Area	Number of Households on A.C.	on D.C.	for Battery Sets.
YORKSHIRE				
Adwick le Street	5,000	3,500	—	1,500
Askrigg and Reeth	420	124	125	171
Aysgarth	100*	—	54	46
Barnoldswick	3,068	408†	—	2,660
Barnsley	17,119	6,578†	700	9,841
Batley	9,950	2,799	1,050	6,101
Bingley	5,000	3,000	—	2,000
Bradford	81,456	25,749†	2,546	53,161
Bridlington	5,300	500	3,349	1,451
Brighouse	6,000	1,820†	—	4,180
Dearne District	9,130	1,949†	—	7,181
Dewsbury	14,750	4,000†	800	9,950
Doncaster	20,317	9,530	851	9,936
Earby	1,602	379†	—	1,223
Electrical Distribution of Yorkshire, Ltd.	164,000	51,000†	—	113,000
Elland	3,300	900	1,100	1,300
Eston	6,550	4,300	—	2,250
Guisborough	1,500	1,000†	—	500
Halifax	28,000	7,323†	1,464	19,213
Harrogate	18,851	9,622	—	9,229
Hawes	261	208†	—	53
Hebden Bridge	2,050	800†	—	1,250
Heckmondwike	2,500	—	1,923	577
Holme	—	—	—	—
Holmfirth	2,694	1,950†	—	744
Huddersfield	40,500	23,000	—	17,500
Hull	90,000	16,162†	15,041	58,797
Ingleton Co.	667	—	130	537
Ilkley	2,638	1,175†	530	933
Keighley	13,500	3,346	1,055	9,099
Leeds	131,500	78,700†	—	52,800
Leyburn	243	—	150	93
Mexborough	5,028	—	3,110	1,918
Middlesbrough	30,200	14,800†	—	15,400
Mirfield	3,000	1,916†	—	2,084
Morley	6,239	4,000	—	2,239
New Mill	956	700†	—	256
Normanton	3,527	976†	—	2,551
Pontefract	4,000	550†	—	3,450
Pudsey	5,116	2,753†	—	2,363
Redcar	5,560	3,750	—	1,810
Richmond	1,100	714†	—	386
Ripon	4,500	900†	—	3,600
Rotherham	25,000	11,000†	—	14,000
Scarborough	14,619	6,193†	—	8,426
Sheffield	137,971	60,000†	—	77,971
Shipley	7,000	3,500	500	3,000
Slaiden (Yorkshire Electric Power Co.)	1,245	400	—	845
Skelton and Brotton	3,200	1,904	—	1,296
Skipton	4,000	1,500†	—	2,500
Slaithwaite	1,328*	600*	—	728
Spenborough	3,996	1,293†	—	2,703
South East Yorkshire Light & Power Co. (Hornsea)	5,100	1,500†	—	3,600
Stanley	11,000*	2,500*	—	8,500
Tadcaster	1,200*	—	447	753
Todmorden	6,537	1,683	—	4,854
Wakefield	14,510	10,200	—	4,310
Wensley	62	—	43	19
Whitby	4,006	45	1,759	2,202
Whitwood	1,680	656	—	1,024
York	20,463	10,274	5,536	4,653
GUERNSEY	9,866	—	2,442	7,424
IS. OF MAN (Douglas)	4,936	400	2,100	2,436
JERSEY (St. Helier)	7,000	1,521	—	5,479
WALES AND MONMOUTH				
Aberangel	125*	—	90	35
Aberdare	11,225	7,300	3,000	925
Aberayron	400	—	176	224
Aberystwyth	2,300	—	1,544	756
Abertillery	6,764	610	1,900	4,254
Ammanford	1,750	—	1,260	490
Bangor	2,000	1,560	—	440
Bargoed and District	11,270	6,400	—	4,870
Bedwas	2,000	1,273	—	727
Bedwellty	6,800	4,669†	—	2,131
Barry	10,200*	240	—	9,960
Bettws-y-Coed	192	170	—	22
Bethesda	1,500	550	—	950
Blaenau Festiniog (Yale E.P. Co.)	3,250*	—	1,250*	2,000
Brecon	1,461	—	1,045	416
Bridgend	5,200	3,894	—	1,306
Brynamman	4,200	2,000	—	2,200
Caerphilly	9,350	1,000	—	8,350
Cardiff	44,000	27,500	500	16,000
Cardiff R.D.C.	5,800	3,187	—	2,613
Carmarthen	2,740	385	1,782	573
Caernarvon	2,426	1,267	—	1,159
Chepstow	1,273	598	—	675
Colwyn Bay	5,000	3,275	800	925

Name of Supply Authority	Total No. of House-holders in Area	Number of Households on A.C.	on D.C.	for Battery Sets.
Conway	2,800	2,070	—	730
Denbigh (British Power and Light Corporation)	80,000*	12,363	—	67,637
Ebbw Vale	6,095	—	5,262	833
Elect. Distribution of N. Wales	52,000*	12,500†	—	39,500
Gorseinon	6,200	2,000	1,000	3,200
Hawarden	6,880	2,900	—	3,980
Holyhead	2,760	—	1,100	1,660
Lampeter	574*	—	250	324
Llandilo	500	—	400	100
Llandrindod Wells	750	—	690	60
Llandudno	3,834	—	3,050	784
Llandyssul	267	—	167	100
Llanelly	16,000*	2,000*	2,000*	12,000
Llangollen	918	—	300	618
Llantarnam	1,550	—	1,145	405
Llanrwst	1,077	110	340	627
Llwyngwril	133*	—	124*	9
Maesteg	5,500	5,329	—	171
Mardy Co. (Glam.)	1,534	640	—	894
Menai Bridge	568	298†	—	270
Merthyr	16,000	942	2,065	12,993
Milford Haven	2,000	—	1,000	1,000
Mold	1,600	1,150	—	450
Monmouth	1,211	413†	—	798
Mountain Ash	8,055	7,800	—	255
Mynyddislwyn	3,500	2,100	—	1,400
Neath Cpn.	8,155	1,558	—	6,597
Neath R.D.	4,367	2,078	—	2,289
Newcastle Emlyn	800*	—	350†	450
Newport	25,220	11,180†	8,000	6,040
New Radnor	54*	—	49	5
Ogmore	2,900	2,600	—	300
Penarth	4,700	80	1,500	3,120
Pennaenmawr	1,280	1,000†	—	280
Pontardawe	6,846	23	2,238	4,585
Pontypool	6,250	850	—	5,400
Pontypridd	8,000	904	1,100	5,996
Porthcawl	2,000	462	—	1,538
Port Talbot	7,971	717	—	7,254
Prestatyn	1,440	920	—	520
Rhondda	28,840	10,164†	—	18,676
Risca	3,942	1,600†	—	2.342
Ruthin	900	—	557	343
South Wales E.P. Co.	30,000	15,000	—	15,000
S. W. & S. Co.	8,000*	1,000*	—	7,000*
Swansea	41,098	16,331	1,800	22,967
Tonyrefail	6,667	2,200	—	4,467
Wrexham	4,737	1,600	1,000	2,137
Ystradgynlais (Glantawe E.L. Co.)	5,000	—	1,100	3,900
SCOTLAND.				
Aberdeen	9,197	5,600*	9,900*	33,697
Arbroath Co.	5,000	170	330	4,500
Ayrshire Board (Ardrossan, Kilmarnock, Largs, etc.)	71,295	20,116	3,020	48,159
Ballater	300	—	290	10
Bo'ness	2,160	—	641	1,519
Brechin	2,230	—	390	1,840
Brora	502	—	150	352
Buckie	2,500	—	250	2,250
Cambuslang	6,216	2,000	—	4,216
Clyde Valley E.P. Co.	Not known	20,167	Not known	
Coatbridge and Airdrie	18,905*	—	2,200*	16,705
Crieff	1,200	—	220	980
Dalbeattie	3,000	—	1,200	1,800
Denny and Dunipace	1,136	495	—	641
Dumbarton	5,800	108	648	5,044
Dumfries Burgh	5,795	453†	1,994	3,348
Dumfries County	13,000	480†	—	1.2520
Dundee T.C.	46,822	9,500*	2,500*	34,822
Edinburgh	107,400	26,562†	10,000	70,838
Elgin	1,000	—	250	750
Ellon	347	—	290	57
Falkirk	7,000	2,385	—	4,615
Fife Company	62,000	9,200†	—	52,800
Fochabers	331	—	325	6
Fort William	950	—	400	550
Glasgow	243,350	29,300†	36,400	177,650
Grangemouth	2,667	690†	—	1,977
Grantown-on-Spey	432*	—	270	162
Greenlaw	185	—	175	10
Greenock	22,826	5,070†	5,415	12,341
Hamilton	8,000	89	1,262	6,649
Hawick	4,890	—	1,000	3,890
Invergordon T.C.	488	—	310	178
Inverness	6,060	—	2,500	3,560
I. of Mull (Tobermory)	320	—	98	222
Kintore	200*	—	180*	20
Kirkaldy	10,000	1,120	280	8,600
Kirkwall and District	960	—	461	499
Lairg Co.	261	48	40	173
Lochaber Power Co.	118	117	1	Nil
Lossiemouth	1,200	—	820	380
Lothians Elec. Power Co.	29,795	4,324†	—	25,471
Montrose	3,436	—	500	2,936
Motherwell and Wishaw	17,739	1	4,904	12,834
Musselburgh	4,292	11	1,116	3,165

Name of Supply Authority	Total No. of House-holders in Area	Number of Households on, A.C.	on D.C.	for Battery Sets
Newcastleton	200	—	95	105
North Berwick	1,255	296†	—	959
North of Scotland Elec. Power Co. (see Brechin)	—	—	—	—
Oban	1,733*	—	749	980
Orkney (see Kirkwall)				
Paisley	22,000	2,820†	—	1,218
Perth	9,162	—	3,373	5,789
Peterhead	3,000	204	—	2,796
Rothesay	4,000	—	750	3,250
Ross-shire Elec. Supply Co.	3,250	860	—	2,390
St. Andrews	2,608	—	700*	1,908
Scottish Central Co.	3,954	571	271	3,112
Scottish Midlands Co.	36,800	3,000	—	33 800
Scottish Southern	14,904	1,790	460	12,654
Skelmorlie	1,000	150	100	750
Stirling	5,371	—	2,219	3,162
Strathclyde Elec. Co.	Not known	31,361	Not known	
Tain	400	150	—	250
West Lothian C.C.	3,000	—	500	2,500
Wick and District	1,850	—	830	1,020

LARGE SUPPLY COMPANIES.

Most of the large companies in the following list give supply in more than one county. Wherever possible, the figures have been sub-divided and placed under their respective counties in the general tables.

In certain cases, however, no reliable county allocations were obtainable. Such cases are indicated by printing the names of the companies in CAPITAL LETTERS.

Bedfordshire, Cambridgeshire and Huntingdonshire Elec. Co.	12,000	4,075	40	7,885
Clyde Valley E. P. Co.	—	20,167	—	—
County of London Co.	194,990*	87,186	3,000*	104,804
DERBYSHIRE & NOTTS E. P. Co.	25,533	14,800	1,200	9,533
East Anglian E. S. Co.	100,400	7,090	1,756	91,554
Electrical Distribution of Yorkshire	164,000	51,000	—	113,000
LEICESTERSHIRE AND WARWICKSHIRE E. P. Co.	100,000*	22,500*	—	77,500
London Elec. Supply Corpn.	83,188	40,410	8,000	34,778
Metropolitan Electric Supply Co.	91,000*	60,000*	10,000*	21,000
NORTH EASTERN SUPPLY COMPANY	573,000	100,000	10,000	463,000
Northampton E. L. & P. Co.	56,000	20,650	2,500	32,850
North Metropolitan E. S. Co.	170,399	92,033	1,026	77,340
Shropshire, Worcestershire and Staffordshire E. P. Co.	244,000*	30,500*	3,500*	210,000
South Wales E. P. Co.	30,000	15,000	—	15,000
Strathclyde Co.	—	31,361	—	—
WESSEX Co.	87,210	8,048	—	79,162

IRISH FREE STATE AND NORTHERN IRELAND.

The figures given here, relating to a few supply undertakings in the Irish Free State and Northern Ireland, are included for purposes of comparison only. No attempt has been made to cover the above area adequately, and it has been found impossible to provide any figures which will, with any degree of accuracy, show the extent of domestic electrification.

The following figures are not included in the general summary given at the beginning of this Survey. They do not, therefore, affect the accuracy of the total statistics for England, Scotland and Wales.

Ardara (Donegal)	116	—	84	32
Ballymoney (Wexford)	650	—	350	300
Cork	20,000*	—	6,000*	14,000
Dublin	80,000*	20,000*†	—	60,000
Dundalk (Louth)	3,000*	—	1,250*	1,750
Galway	3,750*	1,500*	—	2,250
Killarney (Kerry)	1,330*	500*	—	830
Kilrush (Clare)	800*	—	300*	500
Manorhamilton (Leitrim)	180	—	100	80
Navan (Meath)	900*	—	275*	625
Nenagh (Tipperary)	1,100*	—	275*	825
Newcastle West (Limerick)	700	—	230	470
Queenstown (Cork)	1,500*	—	500*	1,000
Skibbereen (Cork)	650*	—	300*	350
Tullamore	1,000*	—	250*	750
Ballyclare (Antrim)	756	—	425	331
Belfast	95,000	9,000†	6,000	80,000
Clogher (Tyrone)	100	—	80	20
Dronmore (Down)	630	—	606	24
Electricity Board (N. Ireland)	15,427	2,883	—	12,544
Fivemiletown (Tyrone)	200	—	125	75
Limavady (Londonderry)	750	647	—	103
Lisburn (Antrim)	4,500	2,000	—	2,500
Londonderry	9,761	779	2,683	6,299
Lurgan (Armagh)	3,000*	850*	—	2,150
Maghera (Derry)	250	—	100	150
Port Stewart (Londonderry)	722	—	598	124

The Broadcaster

This is arranged in eight sections, as follows:—Screen grid; general purpose triodes; small power triodes; power and high power triodes; pentodes; rectifiers; double grid valves; multiple valves.

In each section the types are grouped by manufacturers, and then by filament voltages in the following order:—2 volt.; 4 volt; 6 volt; A.C.; D.C.

The following makers are included:—Clarion—The Clarion Radio Valve Co., Ltd. Cossor—A. C. Cossor, Ltd. Dario—Impex Electric Ltd. Eta—Electrical Trading Association, Ltd. Fotos—Concerton Radio & Electrical Co., Ltd. Lissen—Lissen, Ltd. Loewe—Loewe Radio,

SCREEN GRID AND PENTODE RADIO FREQUENCY VALVES

For Radio Frequency Amplification or in Suitable Detector and LF Circuits

Name.	Type.	Fil. volts.	Fil. amp.	Anode Volts. max.	Impedance (ohms).	Amp. factor.	Slope (ma/v.).	Grid bias (max.).	Price.
Clarion ..	SG2	2.0	0.15	150	250,000	200	0.8	—3	12/6
	*AC8G	4.0	1.0	200	350,000	500	1.4	—3	16/—
Cossor	215SG	2.0	0.15	150	300,000	330	1.1	—1.5	16/6
	220SG	2.0	0.2	150	200,000	320	1.6	—1.5	16/6
	220VSG	2.0	0.2	150	M/R variable from 1.6		to .01 ma/v		16/6
	410SG	4.0	0.1	150	800,000	800	1.0	—1½	20/—
	610SG	6.0	0.1	150	200,000	200	1.0	—1½	20/—
	*MSG/HA	4.0	1.0	200	500,000	1,000	2.0	—1½	19/0
	*MSG/LA	4.0	1.0	200	200,000	750	3.75	—1½	19/—
	*41/MSG	4.0	1.0	200	400,000	1,000	2.5	—1½	19/—
	*MVSG	4.0	1.0	200	M/R variable from 2.5		to .01 ma/v		19/—
	*MS/Pen.A	4.0	1.0	200	——	——	4.0	—2½	20/—
Dario ..	Screenodion Bivolt ..	2.0	0.15	150	200,000	200	1.0	—	12/6
	Var. Mu. ScreenBivolt	2.0	0.15	150	——	——	——	——	13/6
	†D.C. Screenodion ..	20	0.18	200	360,000	400	1.1	—2	15/—
	*A.C. Screenodion ..	4	1.0	200	600,000	700	1.1	—1.3	13/6
	*A.C. Super Screenodion.	4	1.0	200	300,000	900	3.0	—2	13/6
	*Var.Mu. Screenodion	4	1.0	200	300,000	300	1.0	—2	13/6
Eta	BY6	2.0	0.15	150	300,000	330	1.1	—1½	12/6
	*DW6	4.0	1.0	200	800,000	1,000	1.2	—1	15/6
	*DW7	4.0	1.0	200	200,000	600	3.0	—2	15/6
	*DW8	4.0	1.0	200	M/R variable from 2.0		to .01 ma/v		15/6
	*EY624..	2.5	1.75	180	400,000	400	1.0	—2	16/—
	*EY635..	2.5	1.75	250	M/R variable from 1.1		to .01 ma/v		17/6
Fotos ..	B.C. 150	2.0	0.16	200	150,000	150	1.0	—	12/6
	*S.4150	4.0	0.1	200	660,000	1,000	1.5	—	14/6
	*S.4150c	4.0	0.1	200	500,000	500	1.0	—	14/6
Lissen	SG215	2.0	0.15	150	900,000	1,000	1.1	—1½	12/6
	SG2V	2.0	0.15	150	M/R variable from 1.7		to 0.01 ma/v		12/6
	SG410	4.0	0.1	150	200,000	180	0.9	—3	12/6
	*AC/SG	6.0	1.0	200	640,000	1,600	2.4	—1½	19/—
	*AC/SGV	4.0	1.0	200	M/R variable from 2.4		to 0.01 ma/v		19/—
Marconi ..	S21	2.0	0.1	150	200,000	220	1.1	—1½	16/6
	S22	2.0	0.2	150	200,000	330	1.75	—1½	16/6
	VS2	2.0	0.1	150	M/R variable from 1.2		to .01 ma/v		16/6
	S410	4.0	0.1	150	200,000	180	0.9	—1½	20/—
	S610	6.0	0.1	150	200,000	210	1.05	—1½	20/—
	*MS4	4.0	1.0	200	500,000	550	1.1	—3	19/—
	*MS4B	4.0	1.0	200	350,000	1,120	3.2	—1	19/—
	*VMS4	4.0	1.0	200	M/R variable from 2.4		to .01 ma/v		19/—
	†D8	16.0	0.25	200	500,000	550	1.1	—3	19/—
	†D8B	16.0	0.25	200	350,000	1,120	3.2	—1	19/—
	†VD8	16.0	0.25	200	M/R variable from 2.4		to .01 ma/v		19/—
Mazda.. ..	SG215	2.0	0.15	150	455,000	500	1.1	—1½	16/6
	S215A	2.0	0.15	150	727,000	800	1.1	—1½	16/6
	S215B	2.0	0.15	150	334,000	700	2.1	—1½	16/6
	S215VM	2.0	0.15	150	M/R variable from 2.0		to 0.01 ma/v		16/6
	*AC/SG	4.0	1.0	200	——	1,700	3.0	—3	19/—
	*AC/S2	4.0	1.0	200	——	3,000	5.0	—1½	19/—
	*AC/SIVM	4.0	1.0	200	M/R variable from 1.1		to .01 ma/v		19/—
	*AC/SGVM	4.0	1.0	200	M/R variable from 3.0		to .01 ma/v		19/—
	†DC2/SG	20.0	0.1	200	——	1,200	2.0	—3	19/—
	†DC/8G	6.0	0.5	200	——	1,000	2.75	—1½	19/—
	†DC2/SGVM	20.0	0.1	200	M/R variable from 2.2		to 0.01 ma/v		19/—
Mullard ..	PM12a..	2.0	0.18	150	330,000	500	1.5	—1½	16/6
	PM12	2.0	0.15	150	180,000	200	1.1	—1½	16/6
	PM12v	2.0	0.15	150	M/R variable from 0.7		5 to 0.01 ma/v		16/6
	PM14	4.0	0.1	150	230,000	200	0.87	—1½	20/—
	PM16	6.0	0.1	150	200,000	200	1.0	—1½	20/—
	*MM4v	4.0	1.0	200	M/R variable from 3.0		to 0.01 ma/v		19/—
	*VM4v	4.0	1.0	200	M/R variable from 1.2		to 0.005 ma/v		19/—
	*S4v	4.0	1.0	200	909,000	1,000	1.1	—3	19/—
	*S4va	4.0	1.0	200	——	1,000	2.0	—2	19/—
	*S4vb	4.0	1.0	200	——	750	2.5	—3	19/—
North London	2SG	2.0	0.2	180	200,000	200	1.0	—1½	13/—
	2VS	2.0	0.2	180	150,000	150	1.0	—1½	13/—
	4SG	4.0	0.1	180	200,000	200	1.0	—1½	13/—
	4VS	4.0	0.1	180	150,000	150	1.0	—1½	13/—
	6SG	6.0	0.1	180	200,000	200	1.0	—1½	13/—
	6VS	6.0	0.1	180	150,000	150	1.0	—1½	13/—
	*ASG	4.0	1.0	200	330,000	1,000	3.0	—1	15/—
	*AVS	4.0	1.0	200	——	——	2.5	——	15/—
	*Y224	2.5	1.75	200	400,000	500	1.25	—2	16/—

Valve Data Chart

Ltd. Marconi—Marconiphone Co., Ltd. Mazda—Edison Swan Electric Co., Ltd. Mullard—Mullard Wireless Service Co., Ltd. North London—North London Valve and B.U.R.T.S., Ltd. Octron—Octron, Ltd. Osram—General Electric Co., Ltd. Pix—British Pix, Ltd. Philips—Philips Lamps, Ltd. Six-Sixty—Six-Sixty Radio Co., Ltd. Standard—Standard Telephones and Cables Ltd. Triotron—Triotron Radio Co., Ltd. Tungsram—Tungsram Electric Lamp Works (G.B.), Ltd.

* Indicates indirectly heated A.C. valve. † Indicates indirectly heated D.C. valve.
**Indicates directly heated A.C. valve.

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts (max.).	Impedance (ohms).	Amp. factor.	Slope (ma/v).	Grid bias (max.).	Price.
N. London cont.	*Y235	2.5	1.75	200	400,000	400	1.0	—2	17/–
Octron	S62	2.0	0.15	150	250,000	200	0.8	—3	12/6
	*AC8G	4.0	1.0	200	350,000	500	1.4	—3	16/–
Osram	S21	2.0	0.1	150	200,000	220	1.1	—1½	16/6
	S22	2.0	0.2	150	200,000	330	1.75	—1½	16/6
	VS2	2.0	0.1	150	M/R variable from 1.		to .01 ma/v		16/6
	S410	4.0	0.1	150	200,000	180	0.9	—1½	20/–
	S610	6.0	0.1	150	200,000	210	1.05	—1½	20/–
	*MS4	4.0	1.0	200	500,000	550	1.1	—3	19/–
	*MS4B	4.0	1.0	200	350,000	1,120	3.2	—1	19/–
	*VMS4	4.0	1.0	200	M/R variable from 2.4		to .01 ma/v		19/–
	†DS	16.0	0.25	200	500,000	550	1.1	—3	19/–
	†DSB	16.0	0.25	200	350,000	1,120	3.2	—1	19/–
	†VDS	16.0	0.25	200	M/R variable from 2.4		to .01 ma/v		19/–
Pix	258G	2.0	.15	150	190,000	250	1.3	—1½	11/6
	458G	4.0	0.1	150	200,000	250	1.25	—1½	11/6
	*AC/4508G	4.0	1.0	200	400,000	1,250	3.13	—2	15/6
	215VSG	2.0	0.15	150	M/R variable from 0.7		5 to 0.01 ma/v		16/6
Six-Sixty	215SG	2.0	0.15	150	190,000	200	1.05	—1½	16/6
	218SG	2.0	0.18	150	357,000	500	1.4	—1½	16/6
	407SG	4.0	0.075	150	220,000	190	0.87	—1½	20/–
	607SG	6.0	0.075	150	210,000	190	0.9	—1½	20/–
	*4SGAC	4.0	1.0	200	1,000,000	1,000	1.0	—2	19/–
	*4XSGAC	4.0	1.0	200	333,000	1,000	3.0	—2	19/–
	*4YSGAC	4.0	1.0	200	——	——	3.5	—	19/–
	*4MMAC	4.0	1.0	200	M/R variable from 3.0		to 0.01 ma/v		19/–
Triotron	S208	2.0	0.15	200	M/R variable to		0.8 ma/v	—15	13/6
	*S431N	4.0	1.0	200	M/R variable to		3 ma/v	—20	13/6
	*S415N	4.0	1.0	200	M/R variable to		1.5 ma/v	—35	13/6
	†S2010N	2.0	0.18	200	150,000	150	1.0	—	15/–
Tungsram	S210	2.0	0.12	200	333,000	400	1.2	—1	12/6
	S407	4.0	0.07	200	330,000	330	1.0	—1	15/–
	S410	4.0	0.1	200	333,000	330	1.0	—1	15/–
	*AS494	4.0	1.0	200	667,000	1,000	1.5	—1½	14/6
	*AS495	4.0	1.0	200	428,000	1,500	3.5	—1½	14/6
	*AS4100	4.0	1.0	200	180,000	250	1.5	—1½	14/6
	*AS4105	4.0	1.0	200	M/R variable from 1.2		to 0.01 ma/v		14/6
	*ASX2350	2.5	1.75	180	M/R variable from 1.2		to 0.01 ma/v		17/6
	*ASX2240	2.5	1.75	180	400,000	420	1.0	—1½	16/–
	*S2018	2.0	0.18	200	333,000	400	1.2	—1.5	14/6

GENERAL PURPOSE TRIODES

For use as detectors and L.F. amplifiers followed by transformer, choke or r.c. coupling; as oscillators in superheterodyne circuits as h.f. amplifiers in neutrodyne or semi-aperiodic radio frequency circuits.

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts (max.).	Impedance (ohms).	Amp. factor.	Slope (ma/v.). (max).	Grid bias. (max.)	Price.
Clarion	H2	2.0	0.1	150	20,000	20	1.0	—3	5/–
	HL2	2.0	0.1	150	10,000	10	1.0	—7½	5/–
	*ACHF	4.0	1.0	200	14,000	35	2.5	—3	9/6
	*ACG	4.0	1.0	200	6,000	16	2.7	—7½	9/6
Cossor	210RC	2.0	0.1	150	50,000	40	0.8	—1½	7/–
	210HL	2.0	0.1	150	22,000	24	1.1	—3	7/–
	210HF	2.0	0.1	150	20,000	22	1.1	—3	7/–
	210Det	2.0	0.1	150	13,000	15	1.5	—4½	7/–
	210LF	2.0	0.1	150	10,000	14	1.4	—6	7/–
	410RC	4.0	0.1	150	50,000	40	0.8	—1½	8/6
	410HF	4.0	0.1	150	20,000	22	1.1	—3	8/6
	410LF	4.0	0.1	150	10,000	17	1.7	—4½	8/6
	610RC	6.0	0.1	150	50,000	40	0.8	—1½	8/6
	610HF	6.0	0.1	150	20,000	20	1.0	—3	8/6
	610LF	6.0	0.1	150	7,500	15	2.0	—4½	8/6
	*41MRC	4.0	1.0	200	19,500	50	2.6	—1½	15/–
	*41MH	4.0	1.0	200	18,000	72	4.0	—2	13/6
	*41MHF	4.0	1.0	200	14,500	41	2.8	—1½	15/–
	*41MHL	4.0	1.0	200	11,500	52	4.5	—2	13/6
	*41MLF	4.0	1.0	200	7,900	15	1.9	—6	15/–
Dario	Universal Bivolt	2.0	0.1	150	8,000	10	1.25	—	5/–
	Super H.F.	2.0	0.1	150	20,000	32	1.6	—	5/–
	Detector	2.0	0.1	150	25,000	25	1.0	—	5/–
	Sup. Det.	2.0	0.15	150	7,500	15	2.0	—	5/–
	†D.C. Sup. Det.	20	0.18	200	11,000	38	3.5	—3	11/6
	*A.C. Sup. H.F.	4.0	1.0	200	20,000	40	2.0	—2	9/6
	*A.C. Sup. Det.	4.0	1.0	200	7,500	24	3.2	—6	9/6
Eta	BY2020	2.0	0.11	150	20,000	20	1.0	—3	5/6
	BY1814	2.0	0.12	150	14,000	18	1.3	—3	5/6
	BY1210	2.0	0.11	150	10,000	12	1.2	—5	5/6
	*DW4023	4.0	1.0	200	23,000	40	1.75	—3	11/–
	*DW1508	4.0	1.0	200	7,500	15	2.0	—6	11/–
	*EY627	2.5	1.75	180	9,000	9	1.0	—13½	11/6

VALVE DATA CHART—*(Contd.)*

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts (max.).	Impedance (ohms).	Amp. factor.	Slope (ma/v.).	Grid bias. (max.).	Price.
Fotos	B.C. 9 and B.C. 9D ..	2.0	0.16	200	7,000	9	1.3	—	5/- each
	B.C. 18 and B.C. 18D	2.0	0.16	200	14,000	18	1.3	—	5/- each
	B.C. 40	2.0	0.16	200	30,000	36	1.2	—	5/-
	*S. 440	4.0	0.1	200	18,000	40	2.2	—	9/6
	*T. 425	4.0	0.1	200	7,000	25	3.5	—	9/6
Lissen	H210	2.0	0.1	150	50,000	35	0.7	—1½	5/6
	HL210	2.0	0.1	150	20,000	20	1.0	—4½	5/6
	L210	2.0	0.1	150	10,000	12	1.2	—7½	5/6
	H410	4.0	0.1	150	60,000	40	0.67	—1½	5/6
	HLD410	4.0	0.1	150	21,000	25	1.2	—3	5/6
	L410	4.0	0.1	150	8,500	15	1.8	—6	5/6
	H610	6.0	0.1	150	60,000	40	0.67	—1½	5/6
	HLD610	6.0	0.1	150	21,000	25	1.2	—3	5/6
	L610	6.0	0.1	150	8,000	16	2.0	—6	5/6
	*AC/HL	4.0	1.0	200	11,200	35	3.0	—3	13/6
Marconi	H2	2.0	0.1	150	35,000	35	1.0	—1½	7/-
	HL2	2.0	0.1	150	18,000	27	1.5	—3	7/-
	HL210	2.0	0.1	150	23,000	20	0.87	—3	7/-
	L210	2.0	0.1	150	12,000	11	0.92	—7½	7/-
	H410	4.0	0.1	150	60,000	40	0.66	—1½	8/6
	HL410	4.0	0.1	150	20,800	25	1.2	—4½	8/6
	L410	4.0	0.1	150	8,500	15	1.77	—4½	8/6
	H610	6.0	0.1	150	60,000	40	0.66	—1½	8/6
	HL610	6.0	0.1	150	30,000	30	1.0	—1½	8/6
	L610	6.0	0.1	150	7,500	15	2.0	—4½	8/6
	*MH4	4.0	1.0	200	11,100	40	3.6	—3	13/6
	*MHL4	4.0	1.0	200	8,000	20	2.5	—6	13/6
	†DH	16.0	0.25	200	10,800	40	3.7	—3	13/6
Mazda	H2	2.0	0.1	150	45,000	50	1.1	—1½	7/-
	HL210	2.0	0.1	150	18,500	26	1.4	—3	7/-
	HL2	2.0	0.1	150	21,000	32	1.5	—1½	7/-
	L2	2.0	0.1	150	10,000	19	1.9	—3	7/-
	H607	6.0	0.07	150	30,000	40	0.45	—1½	8/6
	H610	6.0	0.1	150	66,000	40	0.6	—1½	8/6
	HL610	6.0	0.1	150	20,000	22	1.1	—3	8/6
	*AC/HL	4.0	1.0	200	11,700	35	3.0	—3	13/6
	*AC/2HL	4.0	1.0	200	11,500	75	6.5	—1½	13/6
	†DC3/HL	26.0	0.1	200	11,700	35	3.0	—3	13/6
	†DC/HL	6.0	0.5	200	13,000	35	2.7	—3	13/6
Mullard	PM1A	2.0	0.1	150	41,600	50	1.2	—1½	7/-
	PM1HF	2.0	0.1	150	22,500	18	0.8	—4½	7/-
	PM1HL	2.0	0.1	150	20,000	28	1.4	—3	7/-
	PM1LF	2.0	0.1	150	12,000	11	0.9	—7½	7/-
	PM2DX	2.0	0.1	150	12,000	18	1.5	—6	7/-
	PM3A	4.0	0.075	150	55,000	38	0.66	—1½	8/6
	PM3	4.0	0.075	150	13,000	14	1.05	—6	8/6
	PM4DX	4.0	0.1	150	7,500	15	2.0	—6	8/6
	PM5B	6.0	0.075	150	49,000	40	0.85	—1½	8/6
	PM5D	6.0	0.075	150	20,000	26	1.3	—3	8/6
	PM5X	6.0	0.075	150	14,700	17.5	1.2	—4½	8/6
	PM6D	6.0	0.1	150	9,000	18	2.0	—4½	8/6
	*904v	4.0	1.0	200	34,000	75	2.2	—2	13/6
	*354v	4.0	1.0	200	12,000	36	3.0	—4	13/6
	*164v	4.0	1.0	200	4,850	16	3.3	—8	15/-
North London ..	2E	2.0	0.1	200	50,000	35	0.7	—3	6/-
	2H	2.0	0.1	150	20,000	22	1.1	—3	6/-
	2D	2.6	0.1	150	13,000	17	1.3	—4½	6/-
	2L	2.0	0.1	150	11,000	12	1.1	—6	6/-
	4E	4.0	0.1	200	50,000	35	0.7	—3	6/-
	4H	4.0	0.1	150	20,000	22	1.1	—3	6/-
	4D	4.0	0.1	150	13,000	17	1.3	—4½	6/-
	4L	4.0	0.1	150	11,000	12	1.1	—6	6/-
	6R	6.0	0.1	200	50,000	35	0.7	—3	6/-
	6H	6.0	0.1	150	20,000	22	1.1	—3	6/
	6D	6.0	0.1	150	13,000	17	1.3	—4½	6/-
	6L	6.0	0.1	150	11,000	12	1.1	—6	6/-
	*AHL	4.0	1.0	200	25,000	75	3.0	—1½	10/-
	*ALP	4.0	1.0	200	10,000	40	4.0	—3	10/-
	X201A	5.0	0.25	150	10,000	12	1.2	—6	9/-
	X226	1.5	0.6	150	7,000	10	1.3	—7½	10/-
	*Y227	2.5	1.75	200	8,000	12	1.5	—6	10/-
Octron	H2	2.0	0.1	150	20,000	20	1.0	—3	5/-
	HL2	2.0	0.1	150	10,000	10	1.0	—7½	5/-
	*ACHF	4.0	1.0	200	14,000	35	2.5	—3	9/6
	*ACG	4.0	1.0	200	6,000	16	2.7	—7½	9/6
Osram	H2	2.0	0.1	150	35,000	35	1.0	—1½	7/-
	HL2	2.0	0.1	150	18,000	27	1.5	—3	7/-
	HL210	2.0	0.1	150	23,000	20	0.87	—3	7/-
	L210	2.0	0.1	150	12,000	11	0.92	—7½	7/-
	H410	4.0	0.1	150	60,000	40	0.66	—1½	8/6
	HL410	4.0	0.1	150	20,800	25	1.2	—1½	8/6
	L410	4.0	0.1	150	8,500	15	1.77	—4½	8/6
	H610	6.0	0.1	150	60,000	40	0.66	—1½	8/6
	HL610	6.0	0.1	150	30,000	30	1.0	—1½	8/6
	L610	6.0	0.1	150	7,500	15	2.0	—4½	8/6
	*MH4	4.0	1.0	200	11,100	40	3.6	—3	13/6
	*MHL4	4.0	1.0	200	8,000	20	2.5	—6	13/6
	†DH	16.0	0.25	200	10,800	40	3.7	—3	13/6
Pix	4RC	2.0	0.1	150	32,000	30	0.9	—1½	4/6
	2HF	2.0	0.1	150	13,000	12	1.0	—6	4/6
	3LF	2.0	0.1	150	10,000	20	2.0	—3	4/6
	11RC	4.0	0.07	150	28,000	35	1.3	—1½	4/6
	9HF	4.0	0.07	150	14,000	15	1.1	—4½	4/6

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts. (max.)	Impedance (ohms).	Amp. factor.	Slope (ma/v.)	Grid bias. (max.).	Price.
Pix (Contd.)	10LF	4.0	0.07	150	8,000	15	1.9	—4½	4/6
	*AC/90HF	4.0	1.0	200	9,000	30	3.3	—3	11/6
Six-Sixty	210RC	2.0	0.1	150	45,400	50	1.1	—1½	7/-
	210HF	2.0	0.1	150	25,000	19	0.75	—4½	7/-
	210HL	2.0	0.1	150	20,000	26	1.3	—3	7/-
	210LF	2.0	0.1	150	12,500	10.5	0.85	—7½	7/-
	210D	2.0	0.1	150	10,000	18	1.8	—4½	7/-
	4075RC	4.0	0.075	150	58,000	37	0.64	—1½	8/6
	4075HF	4.0	0.075	150	12,500	13.5	1.1	—6	8/6
	410D	4.0	0.1	150	7,250	14.5	2.0	—6	8/6
	6075RC	6.0	0.075	150	58,000	42	0.7	—1½	8/6
	6075HF	6.0	0.075	150	15,200	17	1.1	—4½	8/6
	610D	6.0	0.1	150	9,250	18.5	2.0	—4½	8/6
	*4DXAC	4.0	1.0	200	36,000	75	2.1	—1½	13/6
	*4GPAC	4.0	1.0	200	12,000	36	3.0	—3	13/6
	*4LAC	4.0	1.0	200	5,000	16	3.2	—8	15/-
Standard	HLA1	4.0	1.0	200	10,000	80	8.0	—1	15/6
Triotron	†A2030N	20	0.18	200	14,500	38	2.6	—	11/6
Tunzaram	R208	2.0	0.1	200	50,000	35	0.7	—3	5/6
	H210	2.0	0.1	200	25,000	25	1.0	—3	5/6
	L210	2.0	0.1	200	16,000	16	1.0	—6	5/6
	LG210	2.0	0.1	150	10,000	10	1.0	—8	5/6
	PD220	2.0	0.2	150	10,000	17	1.7	—6	6/-
	H407	4.0	0.07	200	25,000	35	1.4	—3	6/
	HR406	4.0	0.065	200	17,000	25	1.5	—3	6/
	HR410	4.0	0.1	200	17,000	25	1.5	—4	6/-
	LD408	4.0	0.085	200	8,500	17	2.0	—6	6/-
	LD410	4.0	0.1	200	7,500	15	2.0	—6	6/-
	HR607	6.0	0.07	200	15,500	30	2.0	—3	6/-
	LG607	6.0	0.07	200	8,250	16.5	2.0	—7½	6/-
	*AR4100	4.0	1.0	200	17,000	33	2.0	—4½	9/6
	*AR4101	4.0	1.0	200	13,300	40	3.0	—2	10/6
	*AR495	4.0	1.0	200	17,000	85	5.0	—1.5	10/6
	*AG4100	4.0	1.0	200	8,000	16	2.0	—4	9/6
	†R2018	20.0	0.18	200	13,300	40	3.0	—3	10/6
	†G2018	20.0	0.18	200	7,000	25	3.5	—7	10/6

SMALL POWER VALVES.

For Receivers having a Limited High-Tension Supply.

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts (max.).	Impedance (ohms).	Amp. factor.	Slope (ma/v.).	Grid bias. (max.).	Price
Clarion	LP2	2.0	0.1	150	5,500	6	1.1	— 9	6/9
	*ACL	4.0	1.0	200	3,000	9	3.0	—10	9/6
Cossor	215P	2.0	0.15	150	4,000	9	2.25	— 9	8/9
	220P-A	2.0	0.2	150	4,000	16	4.0	—4½	8/9
	220P	2.0	0.2	150	4,000	8	2.0	— 9	8/9
	410P	4.0	0.1	150	4,000	8	2.0	— 9	10/6
	610P	6.0	0.1	150	3,500	8	2.3	— 9	10/6
Dario	Sup. Power	2.0	0.18	150	3,000	6	2.0	—	6/6
	†D.C. Super.	20	0.18	200	2,400	6	2.5	18	12/6
	*A.C. Super	4	1.0	200	3,000	9	3.0	12	10/-
Eta	BW1304	2.0	0.2	150	4,000	13	3.2	— 6	7/6
	BX604	2.0	0.2	150	4,000	6	1.5	—12	8/-
	*DW704	4.0	1.0	200	4,500	7	1.5	—14	11/-
Fotos	B.D. 9	2.0	0.25	200	3,600	9	2.5	—	6/6
	F. 10	4.0	0.50	300	1,800	10	5.5	—	10/-
Lissen	P220	2.0	0.2	150	4,000	7	1.75	—12½	7/3
	P410	4.0	0.1	150	4,000	8	2.0	—10½	7/3
	P610	6.0	0.1	150	3,200	8	2.5	—10½	7/3
Marconi	P215	2.0	0.15	150	5,000	7	1.4	—10½	8/9
	LP2	2.0	0.2	150	3,900	15	3.85	— 4½	8/9
	P410	4.0	0.1	150	5,000	7.5	1.5	—10½	10/6
	P610	6.0	0.1	150	3,500	8	2.3	— 9	10/6
Mazda	P220	2.0	0.2	150	3,700	12.5	3.4	— 4½	8/9
Mullard	PM2	2.0	0.2	150	4,400	7.5	1.7	—12	8/9
	PM2a	2.0	0.2	150	3,600	12.5	3.5	— 6	8/9
	PM4	4.0	0.1	150	4,000	8	2.0	— 8	10/6
	PM6	6.0	0.1	150	3,550	8	2.25	— 9	10/6
North London	2PA	2.0	0.2	150	5,000	11	2.2	— 9	7/-
	4PA	4.0	0.1	150	5,000	11	2.2	— 9	7/-
	6PA	6.0	0.1	150	5,000	11	2.2	— 9	7/-
	X112a	5.0	0.25	150	5,000	10	2.0	— 9	11/-
Octron	LP2	2.0	0.1	150	5,500	6	1.1	— 9	6/9
	*ACL	4.0	1.0	200	3,000	9	3.0	—10	9/6
Osram	P215	2.0	0.15	150	5,000	7	1.4	—10½	8/9
	LP2	2.0	0.2	150	3,900	15	3.85	— 4½	8/9
	P410	4.0	0.1	150	5,000	7.5	1.5	—10½	10/6
	P610	6.0	0.1	150	3,500	8	2.3	— 9	10/6
PIX	20P	2.0	0.15	150	4,000	10	2.5	— 7½	6/6
	40P	4.0	0.1	150	4,000	9	2.4	— 7½	6/6
	*AC/100 LF	4.0	1.0	200	4,000	15	3.8	— 7	11/6
Six-Sixty	220P	2.0	0.2	150	4,800	7.2	1.5	—12	8/9
	220PA	2.0	0.2	150	3,700	13	3.5	— 6	8/9
	410P	4.0	0.1	150	4,100	7.8	1.9	—10½	10/6
	610P	6.0	6.1	150	3,400	7.8	2.3	— 9	10/6
Triotron	E235	2.0	0.15	200	3,500	12.25	3.5	—	7/-

VALVE DATA CHART—*(Contd.)*

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts (max.).	Impedance (ohms).	Amp. factor.	Slope (ma/v.).	Grid bias.	Price.
Tungsram ..	P215	2.0	0.2	150	3,500	5	1.5	—18	7/-
	L414	4.0	0.15	200	3,300	10	3.0	—10	8/-
	P610	6.0	0.1	200	3,300	6.6	2.0	—18	8/-
	P615	6.0	0.15	200	3,300	10	3.0	—12	8/-
	*AG495..	4.0	1.0	200	6,250	24	4.0	— 6	10/6
	*LX2260	1.5	1.0	100	6,000	9	1.5	— 5	1/6
	*PX1120	5.0	0.25	180	4,000	8	2.0	—12	11/6
	*AGX2270	2.5	1.75	200	6,000	9	1.5	—14	11/6

POWER AND HIGH-POWER VALVES.

Triode Output Valves for Larger Receivers, up to 100 Watts Anode Dissipation.

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts (max.).	Impedance (ohms).	Amp. factor.	Slope (ma/v.).	Grid bias.	Price.
Clarion	P2	2.0	0.2	150	2,850	4	1.4	—20	8/6
	PX2	2.0	0.2	150	1,850	2.75	1.5	—28	8/6
	*ACP	4.0	1.0	200	2,000	6	3	—17	10/-
Cossor	230XP..	2.0	0.3	150	1,500	4.5	3.0	—18	12/-
	415XP..	4.0	0.15	150	1,500	4.5	3.0	—18	13/6
	425XP..	4.0	0.25	150	2,000	7.0	3.5	—10½	13/6
	610XP..	6.0	0.1	150	2,000	5.0	2.5	—15	13/6
	625P	6.0	0.25	150	2,500	7.0	2.8	—10½	13/6
	*41MP	4.0	1.0	200	2,500	18.7	7.5	—6	15/-
	*41MXP	4.0	1.0	200	1,500	11.2	7.5	—10	17/6
	**680XP..	6.0	0.8	400	2,750	3.0	1.1	—67	25/-
	**620T	6.0	1.6	400	1,400	3.2	2.3	—60	30/-
	**4XP	4.0	0.6	200	1,200	4.8	4.0	—20	17/6
	**660T	6.0	4.5	500	1,000	2.5	2.5	—100	105/-
Dario	Hyper Power	2.0	0.2	150	2,400	7	3.0	—	7/-
Eta	BW602	2.0	0.32	150	1,900	6.5	3.4	—12	8/-
	DX502	4.0	0.15	150	2,100	5	2.4	—17	9/6
	DW702	4.0	0.23	200	2,250	7	3.2	—20	10/6
	**DW602	4.0	0.6	250	2,000	8	4.0	—25	12/6
	**DW302	4.0	1.05	250	1,800	3.5	1.95	—50	11/6
	*DW1003	4.0	1.0	200	3,300	10	3.3	—12	11/-
	*EX645..	2.5	1.5	250	1,750	3.5	2.0	—49	14/-
	**EX650..	7.5	1.25	450	1,800	3.8	2.1	—80	45/-
	**EX610..	7.5	1.25	425	3,500	7.5	2.1	—39	45/-
Fotos	B.D. 5	2.0	0.32	200	2,500	5	2.0	—	7/-
Lissen	PX240..	2.0	0.4	150	2,000	4	2.0	—24	8/-
	P425	4.0	0.25	200	1,600	4.5	2.8	—22	8/-
	P625	6.0	0.25	200	2,500	7.5	3.0	—15	8/-
	P625a	6.0	0.25	200	1,500	4.5	3.0	—36	8/-
	*AC/P	4.0	1.0	200	—	—	—	—	15/-
Marconi	P2	2.0	0.1	150	2,150	7.5	3.5	—10½	12/-
	P415	4.0	0.15	150	2,080	5.0	2.4	—16½	13/6
	P425	4.0	0.25	150	2,300	4.5	1.95	—16	13/6
	P625	6.0	0.25	250	2,400	6.0	2.5	—28	13/6
	P625a	6.0	0.25	200	1,600	3.7	2.3	—39	13/6
	*ML4	4.0	1.0	200	2,880	12.0	4.2	—10	15/-
	**PX4	4.0	1.0	250	830	5.0	6.0	—34	17/6
	**LS5a	5.25	0.8	400	2,750	2.5	0.9	—112	25/-
	**PX25	4.0	2.0	400	1,265	9.5	7.5	—30	25/-
	**LS6a	6.0	1.6	400	1,300	3.0	2.3	—93	30/-
	**DA60	6.0	4.0	500	835	2.5	3.0	—135	110/-
	†DL	16.0	0.25	200	2,660	12.0	4.5	—8	15/-
Mazda	P220A	2.0	0.2	150	1,850	6.5	3.5	—12	12/-
	P240	2.0	0.4	150	1,900	7	3.7	—10½	12/-
	P425	4.0	0.25	150	1,950	3.5	1.8	—21	13/6
	P625A	6.0	0.25	200	1,600	4	2.5	—25	13/6
	P625B	6.0	0.25	200	2,500	7	2.8	—15	13/6
	*AC/P	4.0	1.0	200	2,650	10	3.75	—10	15/-
	*AC/P1..	4.0	1.0	200	1,450	5.4	3.7	—19	17/6
	**PP3/250	4.0	1.0	250	1,000	6.5	6.5	—30	17/6
	**PP5/400	4.0	2.0	400	1,500	9	6.0	—32	25/-
	†DC2/P..	30.0	0.1	200	2,650	10	3.75	—10	15/-
	†DC/P	8.0	0.5	200	2,220	10	4.5	—10	15/-
Mullard	PM202..	2.0	0.2	150	2,000	7	3.5	—15	12/-
	PM252..	2.0	0.4	150	1,900	7	3.7	—15	12/-
	PM254..	4.0	0.2	150	2,150	6.5	3.0	—21	13/6
	PM256..	6.0	0.25	250	1,850	6	3.25	—27	13/6
	PM256a	6.0	0.25	200	1,400	3.6	2.6	—33	13/6
	*104v	4.0	1.0	200	3,000	12	4.0	—12	15/-
	*054v	4.0	1.0	200	1,250	5	4.0	—24	17/6
	**AC104	4.0	1.0	200	2,850	10	3.5	—14	16/-
	**AC064	4.0	1.0	200	3,000	6	3.0	—21	16/-
	**AC044	4.0	0.7	200	1,150	4	3.5	—32	17/6
	**DO10	6.0	0.85	400	2,850	2.4	0.85	—130	25/-
	**DO20	7.5	1.1	425	2,000	5	2.5	—66	30/-
	**DO24	4.0	2.0	400	1,390	9	6.5	—34	25/-
	**DO25	6.0	1.1	400	800	3	3.75	—112	30/-
	**DO60	6.0	4.0	500	1,000	3.5	3.5	—95	110/-
	**DO75	10.0	2.0	1,000	2,000	12	6.0	—55	160/-

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts (max.).	Impedance (ohms).	Amp. factors.	Slope (ma/v.)	Grid bias.	Price.
North London ..	2PX	2.0	0.3	150	2,800	7	2.5	—12	9/-
	4PX	4.0	0.15	150	2,800	7	2.5	—12	9/-
	6PX	6.0	0.1	150	2,800	7	2.5	—12	9/-
	*APX	4.0	1.0	200	3,000	12	4.0	—8	12/-
	X171	5.0	0.6	150	2,500	4.5	1.8	—30	12/-
	X171a	5.0	0.25	200	1,800	3.5	2.0	—30	12/-
	X245	2.5	1.2	300	1,800	4.5	2.5	—50	13/-
	X210	7.5	1.2	500	5,000	12	2.4	—30	40/-
	X250	7.5	1.2	500	1,800	5.5	3.0	—80	40/-
	625P	6.0	0.25	300	2,500	7.5	3.0	—12	12/6
	15PA	6.0	0.7	350	2,400	3.5	1.5	—50	20/-
	25PA	6/7.5	1.4	350	1,200	3.5	3.0	—70	25/-
	40PA	6/7.5	1.4	500	1,200	5	4.0	—50	75/-
	60PA	6/7.5	2.1	500	1,200	5	4.0	—50	100/-
	100PA	6/12	2.4	600	1,000	5	5.0	—70	150/-
Octron	P2	2.0	0.2	150	2,850	4	1.4	—20	8/-
	*ACP	4.0	1.0	200	2,000	6	3	—17	10/-
Osram	P2	2.0	0.1	150	2,150	7.5	3.5	—10½	12/-
	P415	4.0	0.15	150	2,080	5.0	2.4	—16½	13/6
	P425	4.0	0.25	150	2,300	4.5	1.95	—16	13/6
	P625	6.0	0.25	250	2,400	6.0	2.5	—26	13/6
	P625a	6.0	0.25	200	1,600	3.7	2.3	—39	13/6
	*ML4	4.0	1.0	200	2,850	12.0	4.2	—10	15/-
	**PX4	4.0	1.0	250	830	5.0	6.0	—34	17/6
	**LS5a	5.25	0.8	400	2,750	2.5	0.9	—112	25/-
	**PX25	4.0	2.0	400	1,265	9.5	7.5	—30	25/-
	**LS6a	6.0	1.6	400	1,300	3.0	2.3	—93	30/-
	**DA60	6.0	4.0	500	835	2.5	3.0	—135	110/-
	†DL	16.0	0.25	200	2,660	12.0	4.5	—8	15/-
Pix	120SP	2.0	0.2	150	2,000	7	3.5	—10½	8/6
	140SP	4.0	0.15	150	2,500	6	2.4	—12	8/6
Six-Sixty.. ..	220SP	2.0	0.2	150	2,060	7	3.4	—12	12/-
	240SP	2.0	0.4	150	1,900	6.6	3.5	—12	12/-
	420SP	4.0	0.2	200	2,150	6.5	3.0	—18	13/6
	625SPA	6.0	0.25	200	1,500	3.9	2.6	—33	13/6
	625SP	6.0	0.25	250	1,780	5.8	3.25	—14	13/6
	*4PAC	4.0	1.0	200	3,170	12	3.8	—12	15/-
	**4SPAC..	4.0	1.0	200	1,250	5	4.0	—28	17/6
	**HV4/1..	4.0	1.0	200	2,100	6.3	3.0	—21	16/-
	**HV4/2..	4.0	0.7	200	1,200	4.1	3.4	—42	17/6
	**HV6/5..	6.0	1.8	400	1,200	3.2	2.65	—95	30/-
Standard.. ..	PA1	4.0	1.0	200	1.050	12.6	12	—11	17/6
Tungsram ..	SP230	2.0	0.3	180	2,500	5	2.0	—23	8/6
	SP414	4.0	0.15	200	1,700	5	3.0	—25	9/-
	P430	4.0	0.3	250	2,200	5	2.5	—30	11/6
	P460	4.0	0.6	220	1,100	4	3.5	—35	13/6
	P4100	4.0	1.0	400	1,400	7	5.0	—35	14/-
	P615	6.0	0.15	200	3,300	10	3.0	—12	8/-
	SP614	6.0	0.15	200	2,300	6	2.6	—22	9/-
	*AP495	4.0	1.0	250	2,500	10	4.0	—18	13/-
	PX1710	5.0	0.25	180	1,500	3	2.0	—45	11/6
	**PX2450	2.5	1.5	250	1,750	3.5	2.0	—50	14/-
	**PX2100	7.5	1.25	425	3,600	7.8	2.2	—35	25/-
	**PX2500	7.5	1.25	450	1,900	3.8	2.0	—85	32/6
	†P2018	20.0	0.18	200	2,800	7	2.5	—20	13/-

PENTODE OUTPUT VALVES.

Name.	Type.	Fil. volts.	Fil. amp.	Anode, volts, max.	Slope, ma/v.	Grid bias.	Price.
Cossor	220PT	2.0	0.2	150	2.5	— 9	17/6
	220HPT	2.0	0.2	150	2.5	— 4½	17/6
	230PT	2.0	0.3	150	2.0	—15	17/6
	230HPT	2.0	0.3	150	1.8	—12	17/6
	415PT	4.0	0.15	150	2.0	—15	17/6
	410PT	4.0	0.1	150	2.5	— 9	17/6
	615PT	6.0	0.15	150	2.0	—15	17/6
	*MP/Pen	4.0	1.0	250	4.0	—12	20/-
	**PT41	4.0	1.0	250	3.0	—12	20/-
	**PT41B	4.0	1.0	400	2.25	—40	22/6
Dario	Polyodion	2.0	0.2	150	1.5	—	12/6
	†D.C. Polyodion	20	.18	200	2.5	18	15/6
	*A.C. Polyodion	4.0	1.0	250	3.5	15	13/6
Eta	DW3	4.0	0.25	300	1.6	—19	19/-
	DW9	4.0	1.0	300	3.0	—10½	16/-
	*EY647	2.5	1.5	250	2.5	—	19/-
Fotos	**D100N	4.0	0.25	300	2.0	—	14/6
Lissen	PT225	2.0	0.25	150	1.4	— 6	12/6
	PT240	2.0	0.4	150	2.0	— 9	16/-
	PT425	4.0	0.25	150	2.0	—10½	16/-
	PT625	6.0	0.25	150	2.5	—12	16/-
	PT611	6.0	—	—	—	—	16/-
	*AC/PT	4.0	1.0	250	2.6	—	20/-
Marconi	PT2	2.0	0.2	150	2.5	— 4½	17/6
	PT425	4.0	0.25	200	2.0	— 7½	17/6
	PT625	6.0	0.25	250	1.85	—15	20/-
	**PT4	4.0	1.0	250	2.85	—16	20/-
	*MPT4	4.0	1.0	250	3.0	—11	20/-
	**PT25	4.0	2.0	400	4.0	—22	45/-
	†DPT	16.0	0.25	200	3.0	—10	20/-

VALVE DATA CHART—*(Contd.)*

Name.	Type.	Fil. volts.	Fil. amp.	Anode, volts. max.	Slope. ma/v.	Grid. bias.	Price.
Mazda	Pen220	2.0	0.2	150	2.5	— 4½	17/6
	Pen220A	2.0	0.2	150	2.5	— 9	17/6
	Pen230	2.0	0.3	150	1.5	— 7½	17/6
	Pen425	4.0	0.25	200	2.4	—10½	17/6
	*AC/Pen	4.0	1.0	250	2.5	—10	20/—
	*DC2/Pen	35.0	0.1	250	2.5	—10	20/—
	†DC/Pen	8.0	0.5	250	3.5	—10	20/—
Mullard	PM22A	2.0	0.2	150	2.5	— 4½	17/6
	PM22	2.0	0.3	150	1.3	—10	17/6
	PM24	4.0	0.15	150	1.75	—11	17/6
	PM26	6.0	0.17	150	2.0	—17	17/6
	*Pen4v	4.0	1.0	250	3.0	—10	20/—
	**PM24A	4.0	0.275	300	2.0	—22½	20/—
	**PM24B	4.0	1.0	400	2.1	—40	22/6
	**PM24C	4.0	1.0	250	3.0	—28	22/6
	**PM24M	4.0	1.0	400	3.0	—18	20/—
	PM24D	4.0	2.0	500	4.0	—35	45/—
North London	2VN	2.0	0.3	180	1.7	—12	14/—
	4VN	4.0	0.15	180	1.7	—12	14/—
	6VN	6.0	0.1	180	1.7	—12	14/—
	*AVN	4.0	1.0	300	3.0	—10	16/—
Osram	PT2	2.0	0.2	150	2.5	— 4½	17/6
	PT425	4.0	0.25	200	2.0	— 7½	17/6
	PT625	6.0	0.25	250	1.85	—15	20/—
	**PT4	4.0	1.0	250	2.85	—16	20/—
	*MPT4	4.0	1.0	250	3.0	—11	20/—
	**PT25	4.0	2.0	400	4.0	—22	45/—
	†DPT	10.0	0.25	200	3.0	—10	20/—
Six-Sixty	220Pen	2.0	0.2	150	2.5	— 6	17/6
	230PP	2.0	0.3	150	1.25	—12	17/6
	415PP	4.0	0.15	150	2.2	—12	17/6
	617PP	6.0	0.17	150	1.9	—15	17/6
	*4PenAC	4.0	1.0	250	3.0	—15	20/—
	**4PenM	4.0	1.0	250	3.0	—12	20/—
Triotron	*P440N	4.0	1.2	300	4.0	—	13/6
	†P2020N	20	0.18	200	2.0	—	15/6
Tungsram	PP230	2.0	0.3	200	1.8	—16	14/—
	PP415	4.0	0.15	200	1.8	—12	14/—
	PP416	4.0	0.15	200	2.0	— 9	14/—
	**PP430	4.0	0.3	300	2.5	—20	15/—
	**PP4100	4.0	1.0	400	3.0	—40	16/—
	PP610	6.0	0.1	200	1.5	—12	14/—
	*APP4100	4.0	1.0	400	3.0	—40	17/—
	*PPX247	2.5	1.75	250	2.5	—15	25/—
	†PP2018	20.0	0.18	200	2.5	—22	17/—

RECTIFIERS.

Name.	Type.	Fil. volts.	Fil. amp.	Max. Anode volts.	Max. Rect. current.	Price.
Clarion	UF4	4.0	1.0	250+250	60	10/6
	UH4	4.0	1.0	250	40	10/6
Cossor	44SU	4.0	0.4	200	20	15/—
	412SU	4.0	1.0	250	70	15/—
	660SU	6.0	4.0	1,000	150	63/—
	408BU	4.0	1.0	250+250	30	12/6
	612BU	6.0	0.4	250+250	50	20/—
	506BU	4.0	1.0	250+250	60	12/6
	412BU	4.0	1.0	250+250	70	20/—
	442BU	4.0	2.5	350+350	120	15/—
	624BU	6.0	2.0	500+500	60	20/—
	460BU	4.0	2.5	500+500	120	20/—
	825BU	7.5	2.0	500+500	120	22/6
Dario	FW1	4.0	1.0	250+250	60	9/—
	FW2	4.0	2.0	350+350	120	11/—
	FW3	4.0	2.0	500+500	120	14/—
Ets	D3-50B	4.0	0.7	300+300	50	10/—
	D3-80B	4.0	2.0	450+450	80	10/—
	D5-125B	4.0	2.1	500+500	125	17/6
	EX680	5.0	2.0	400+400	125	14/—
	EX681	7.5	1.25	700	85	35/—
Fotos	V6	4.0	0.1	300+300	60	9/—
Hivac	UU41	4.0	1.0	300+300	75	17/6
	U650	6.0	0.5	300	40	12/6
Loewe	4NG	4.0	0.7	300+300	80	14/
	8NG	2.5	1.0	300+300	100	17/6
	12NG	4.0	0.25	300+300	30	16/—
	10NG	4.0	0.25	300	30	15/—
Marconi	U10	4.0	1.0	250+250	60	12/6
	U12	4.0	2.5	350+350	120	15/—
	U14	4.0	2.5	500+500	120	20/—
	GU1	4.0	3.0	1,000	250	25/—
Mazda	UU2	4.0	1.0	250+250	60	12/6
	UU60/250	4.0	2.0	250+250	60	12/6
	UU120/350	4.0	2.5	350+350	120	15/—
	UU120/500	4.0	2.5	500+500	120	20/—

Name.	Type.	Fil. volts.	Fil. amp.	Max. anode, volts.	Max. rect. current.	Price.
Mazda (Contd.)	UU30/250	4.0	1.0	250+250	30	12/6
	U30/250	4.0	1.0	250	30	12/6
	U75/300	4.0	2.0	300	75	15/-
	U65/550	7.5	1.25	550	65	17/6
Mullard	DW2	4.0	1.0	250+250	60	12/6
	DW3	4.0	2.0	350+350	120	15/-
	DW4	4.0	2.0	500+500	120	20/-
	DW6	4.0	4.0	1,000+1,000	120	60/-
North London	30RB	4/6	0.8	500+500	80	10/6
	50RB	4/6	1.5	500+500	150	15/-
	40RS	6/7.5	1.5	600	130	42/6
	60RS	6/7.5	2.3	600	200	55/-
	100RS	6/12	3.0	700	300	75/-
	X280	5.0	1.2	500+500	130	13/-
	X281	7.5	1.2	800	120	33/-
Octron	UF4	4.0	1.0	250+250	60	10/6
	UH4	4.0	1.0	250	40	10/6
Osram	U10	4.0	1.0	250+250	60	12/6
	U12	4.0	2.5	350+350	120	15/-
	U14	4.0	2.5	500+500	120	20/-
	GU1	4.0	3.0	1,000	250	25/-
Philips	1801	4.0	0.5	250+250	30	12/6
	1821	4.0	1.0	250+250	60	12/6
	1807	4.0	2.0	350+350	120	15/-
	1561	4.0	2.0	500+500	120	20/-
	506K	4.0	1.0	300+300	75	20/-
	1560	5.0	2.0	300+300	125	22/6
	1817	4.0	4.0	350+350	300	50/-
	375	4.0	1.0	220	40	15/-
	505	4.0	1.0	400	60	15/-
	1562	7.5	1.25	750	110	35/-
Fix	500	4.0	0.8	250+250	50	8/6
Six-Sixty	W462	4.0	1.0	250+250	60	12/6
	W120/350	4.0	2.0	350+350	120	15/-
	W120/500	4.0	2.0	500+500	120	20/-
Standard	R1	4.0	1.0	250+2	60	12 6
Triotron	S4150	4.0	2.0	1.00	150	48/-
Tungsram	U430	4.0	0.3	200	25	10/-
	U495	4.0	1.1	400	70	10/-
	UX2810	7.5	1.25	750	110	25/-
	PU495	4.0	1.1	300+300	70	10/-
	PU4200	4.0	2.0	500+500	125	15/-
	PUX2800	5.0	2.0	300+300	125	14/-

DOUBLE GRID FOUR ELECTRODE VALVES.

For Combined Detector-Oscillator Circuits in Superheterodyne Receivers.

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts (max.).	Impedance (ohms).	Amp. factor.	Slope (ma/v.).	Grid bias.	Price.
Cossor	210DG	2.0	0.1	100	27,000	5.1	0.19	—	20/-
	*41MDG	4.0	1.0	200	40,000	10	0.25	—	19/-
Marconi	DG2	2.0	0.2	80	2,750	4.5	1.2	—4½	20/-
Mullard	PM1DG	2.0	0.1	80	—	—	0.8	—7½	20/-
Osram	DG2	2.0	0.2	80	3,750	4.5	1.2	—4½	20/-
Six-Sixty	210DG	2.0	0.1	80	—	—	—	—	20/-
Triotron	D210	2.0	0.15	80	—	4.5	1.0	—	13/6
Tungsram	DG210	2.0	0.12	100	5,000	5	1.0	—	15/-
	DG407	4.0	0.07	100	5,000	5	1.0	—	15/-
	*DG4100	4.0	1.0	100	5,000	5	1.0	—	17/-

MULTIPLE VALVES.

Valves having more than one set of Electrodes, thus being equivalent to two or more ordinary valves.

Name.	Type.	Fil. volts.	Fil. amp.	Anode volts. (max.).	Impedance (ohms).	Amp. factor.	Slope (ma/v.).	Grid bias.	Price.
Loewe	3NFB	4.0	0.125	200	290,000	57	0.2	—	33/6
					290,000	57	0.2	—	
					3,800	4.5	1.2	—20	
	3NFW	4.0	1.0	200	290,000	57	0.2	—	27/6
					290,000	57	0.2	—	
					1,500	4.5	3.0	—20	
	HF30	4.0	0.125	200	12,000	15.5	1.3	—	33/6
					12,000	15.5	1.3	—	

WORKS HOP HINTS

by *The Broadcaster* Technical Staff

Altering Ebonite Panels.

Modifications to early types of sets with large ebonite panels frequently necessitate moving components and fitting new ones. This leaves a number of ugly holes, and very frequently a panel is discarded because of this fact.

Holes can be filled almost invisibly with ordinary black cobblers heel ball.

To fill a hole, the panel should be placed on a flat table with the front uppermost. The wax should then be melted into the hole by holding a hot rod against the stick of wax, taking care that the rod is not too hot or the wax will be burnt. Rather more than is required should be used, as the wax tends to set with a slight dell. When it is perfectly hard, the surplus wax can be shaved away with an old safely razor blade drawn backwards across the panel so as not to risk scratching the surface. A final polish with a slightly oily rag is all that is required.

Renovating the Interior of Sets.

When any repairs have been done to the interior of a set, it always pays to make it look as clean as possible. Every trace of flux should be carefully removed from any freshly soldered joints.

It is also most important to remove all traces of dust, since this gives the set an exceptionally businesslike appearance. This can only be done satisfactorily by blowing out. A vacuum cleaner arranged for blowing with a small nozzle is the best arrangement. Satisfactory results can be obtained from a motor car foot pump with the aid of an assistant. The set should be blown out in one direction only, working from one side to the other.

Paint for the Interior of Receivers.

If many alterations have been carried out to a set, or if it has been completely re-built, the wooden base board and the interior of the cabinet can be greatly improved in appearance if the wood is given a thin coat of quick drying dead black paint.

One of the best paints to use is known as "Drop Black," ground in gold size. It dries very quickly with a dull matt surface. Another paint which gives a neat appearance is aluminium. This is more expensive and it must be remembered is a conductor.

Metal cases of transformers and similar components which may have become dirty or chipped with age can be brightened up by using a thin coat of one of the well-known proprietary celluloid enamels. This should be applied quickly and liberally working in one direction only, no attempt being made to lay if off, as is done in ordinary painting or varnishing.

Repolishing Cabinets.

When a set is sent in for overhaul or repair, it is always a good plan to repolish the cabinet.

A qualified French polisher will quickly run over a cabinet for quite a small sum. If the work, however, is undertaken by a wireless service man, a little practice is necessary. The golden rule in French polishing is to use only polish of the finest quality, using it sparingly, and rubbing evenly and rapidly.

Drilling Glass Panels.

Dealers are frequently asked to make holes in glass panels for lead-in wires or lead-in tubes.

Many methods of drilling glass have been suggested, but that by which a special drill consisting of a short length of copper tube, is used gives the best results. The end of the copper tube is notched with a triangular file, and cutting is carried out by an abrasive compound such as carborundum powder, preferably moistened with water or turpentine.

The secret of success lies in using only a very light pressure on the drill. Any attempt to force the drill or press hard upon the glass will prevent proper cutting action taking place.

In order to prevent the drill from wandering to begin with, it is preferable to arrange some centering arrangement. This is best done be finding a short length of rod over which the tube will slide easily. The rod is held firmly in position on the glass with one hand, while the tube is rotated about the rod with the fingers of the other hand.

As soon as the tube has begun to make a sort of channel or notch in the glass, drilling can be carried out very rapidly by mounting the copper tube in an ordinary hand drill.

There should not be the slightest possiblity of cracking the glass if these precautions are rigidly adhered to.

Universal Cement.

Cement which is suitable for almost any purpose can be made from a celluloid basis.

Scrap celluloid should be cut into small shreds and placed in a fairly wide neck

bottle. The celluloid can be dissolved in amyl acetate or acetone. If acetone is used, the cement will dry very quickly, but, at the same time, it is more liable to dry up when not in use. Acetone and amyl acetate may be mixed together, when an intermediate drying time is obtained. Many people prefer a 50 per cent. mixture.

The solvents should be poured on to the scrap celluloid so that only a small layer of the liquid is left above the celluloid. The solution should be of a treacly consistency. án mixing the cement, it should be remembered that the solvent is highly inflammable, and evaporates more easily than petrol.

Mending Celluloid Accumulator Cases.

Celluloid accumulator cases can be easily mended with celluloid cement. Before carrying out any repairs, however, the accumulator should be completely emptied, so that any acid tends to drain away from the cracks. It is preferable to enlarge the crack by drawing the tip of a triangular file along the edge. It should then be filled with very thick celluloid cement and allowed to dry thoroughly, leaving it overnight if possible before refilling the cell with acid.

A very big crack should be patched with a thin sheet of celluloid. The crack should first be filled in the manner previously described, and before putting on the patch any cement which projects above the surface of the case should be scraped level. The patch should then be placed in position and cemented neatly round the edges.

The object of the patch is really to reinforce the side of the case, and a case repaired in this manner will be found to be really quite strong.

Extending the Range of a Voltmeter.

A good quality voltmeter consists of a moving coil connected in series with a resistance mounted inside the voltmeter case, A low reading voltmeter has only a small resistance, while a high reading voltmeter has a much larger resistance.

To increase the range of a voltmeter, it is only necessary to connect it in series with an additional resistance. The easiest plan is to arrange the resistance so that the voltmeter reads to double, treble, or perhaps four times its original reading. For example, if we wish to make a 100 volt voltmeter read to 200 volts, it is only necessary to connect it in series with a resistance of substantially the same value as that of the instrument itself.

To do this, the voltmeter should be connected to a high tension battery so that exactly 100 volts are recorded. The meter should then be connected in series with a resistance, the value of which is adjusted till the meter reads 50 volts. After this, the meter and resistance can be used to read up to 200 volts, it being necessary, of course, to double the reading.

Extending the Range of an Ammeter or Milliammeter.

The moving coil of an ammeter or milliammeter is never connected directly in circuit. It is always shunted by an accurately determined resistance. The range of a meter which measures currents can easily be extended by providing it with an external shunt. This is simply a low value resistance connected in parallel with the terminals of the meter.

In order to make, for example, a doubling shunt so that a meter reads double its normal range, it should be connected with a battery and variable resistance which is altered until a full scale deflection is obtained. A short length of resistance wire capable of carrying the full current to be dealt with should be connected to one terminal and the wire tapped on to the other terminal at odd points so that the meter reads somewhere near half value.

To obtain a correct reading, it is important that a perfect contact over a large area is obtained between the shunt and the normal meter terminals. It is preferable to obtain two heavy spade terminals connected to a strip of ebonite, the resistance wire being soldered to tags.

Final adjustment of the value can be obtained by altering the exact position of soldering, when the approximate amount of wire has been determined.

Cone Mounting.

Many diaphragms are held on a circular rim of flexible material such as linen, rubberised tape, or thin leather.

A satisfactory and extremely rapid method of mounting a cone is to rest the edge against a layer of felt or cotton wool, both of which can be obtained in strip or tubular formation. It is only necessary to cut off a length of this material and stick it to a baffle board. If the cone is of doped or similar paper material. this may be attached to the cotton wool in a similar manner.

Making Cone Diaphragms.

Excellent diaphragms can be made from ordinary cartridge paper providing it is not too thick and heavy. The radial seam can be stuck with liquid glue, while the paper should be waterproofed by doping.

The dope can be made similar to celluloid cement, using a greater proportion of solvent. Too much should not be applied, a quantity sufficient to close the interstices in the surface being all that is required. The dope is best applied with a brush, working circularly from the centre outwards.

WORKSHOP HINTS

Universal Flux.

On no account should acid flux be used for soldering anywhere in a wireless set. Undoubtedly the best flux to use from an electrical point of view is ordinary resin. The resin should not be dissolved or made into a paste, but should be used as obtained.

It should be remembered that when using resin as a flux, the metal should be perfectly clean as the solder does not tend to run as well as it does with some liquid preparations.

Temporary Soldered Connections.

A satisfactory makeshift soldered joint can be carried out with medium gauge wires in the following manner. The wires should be scraped perfectly clean, and twisted together. They should then be wrapped several times with a strip of tin foil, which can be melted into the joint by holding the twisted wires over two or three matches which are held together and simultaneously lighted. No flux is used. The joint should, of course, be replaced by a proper one at the earliest possible moment.

Joining Fine Wires.

When re-winding a pick-up or speaker bobbin, great care should be taken in making connection to the fine wire. Intermediate size wire is joined to the end of the fine wire, and it is bound firmly into position, the intermediate wire being brought out to the terminals or tags.

The joint between the two wires should not be soldered, but welded.

This welded joint can very easily be made by twisting the ends of the fine wire round the end of the intermediate wire. There is no necessity to remove the enamel insulation from the fine wire. The ends of the twisted wire should then be held in a small spirit lamp or gas flame, when it will be seen that the points of the wire fuse together forming a little globule of molten metal.

This joint has the advantage of eliminating any possibility of corrosion, or of nicking the fine wire should an attempt be made to scrape off the enamel.

Stopping Valve Ring.

Some valves are very microphonic, and the only way to stop the ringing is to prevent the sound from the speaker falling on to the valve, or alternatively, to damp the valve. The best material to use is cotton wool, which should be packed round the valve.

Sometimes quite a small amount of damping is all that is required, and a piece of soft plastic wax or modelling wax simply struck on to the glass valve will completely stop the ringing.

Protecting Earth Connections.

Connections to an earth plate or tube should be provided with a hermetically sealed protection. If this is not done, corrosion will occur, particularly in the case of a connection which is permanently under the ground. When the metals employed are different, such, for example, as a copper wire connected to a galvanised tube, then the chance of corrosion is increased tremendously. Provided a joint only soldered with a non-acid flux is well covered, it will last for a long time.

Any fairly flexible form of plastic matter such as a bituminous compound is suitable. Wax and pitch should not be employed, as these will probably break and crack. If no compound is available, several coats of heavy thick paint or thick celluloid cement form a very good substitute.

Fixing Coil Covering.

Sometimes a protective layer of silk, paper, or similar material over a winding of a transformer or other type of coil becomes loose. It can readily be fixed in position again with a very small spot of Chattertons compound, or similar cement which requires heating.

When Bias Resisters Break.

Next time a fault occurs in a mains set suspect the automatic bias resisters. Often one has a vague idea that if anything was wrong in that direction the valve concerned would saturate and indicate the state of affairs by becoming extremely hot.

It is not so. When a bias resister breaks the cathode is no longer connected in the circuit, and consequently no anode current passes.

With power valves this itself is a pointer to the trouble, because the valve remains cooler than it should be. But with low consumption valves, screen-grid types for example, this doesn't apply.

The only real danger with automatic bias is that of the resistance changing in value to such a degree as to considerably underbias the valve.

Adjusting Trimmers.

Trimmers should always be adjusted at the bottom end of the condenser scale, preferably on a station which is just audible.

Usually, alteration of trimming capacity is effected by the variation of a star-shaped rotor connected on the main condenser housing. This adjustment should always be carried out by means of a long piece of insulating material such as ebonite.

When trimming, the main tuning condenser should also be varied slightly until maximum signal strength is obtained.

Having trimmed the condenser, it may be found that the trimmers are nearly fully in. This should be corrected by reducing each in

turn, again using the main condenser while so doing.

Minimum trimmer capacity should always be used, for the following reasons.

Wider Tuning Range.

The maximum trimmer capacity is generally several times the minimum of the main condenser. Thus the effective minimum with a fully inserted trimmer is high, giving a high minimum wavelength on the condenser.

Trimmers usually have a far higher dielectric loss than the main condenser, and so again it is advisable for them to be as far out as possible.

When trimming at the bottom of the scale, remember that the trimmer capacity may be higher than the tuning capacity, therefore trim very slowly. After trimming, do not change the aerial connection or the circuits will be thrown out of tune.

Reading a Distortion Meter.

When a milliammeter is connected in the anode circuit of a low-frequency valve it should be steady all the time signals are being received.

If it kicks upward or downward the valve is not properly biased and distortion is occurring.

Kicks upward indicate that the bias should be reduced. Downward jerks mean that the grid is not negative enough.

If the pointer flickers both ways the valve is simply overloaded, and both anode and grid voltages must be increased if permissible or a larger valve fitted.

Sometimes when the speaker rattles and it sounds as if the armature is hitting the pole pieces the real trouble is overloading of the output valve.

Misleading Measurements.

When conducting rapid tests with an inexpensive moving-iron meter, never forget that it consumes an appreciable amount of current. At full scale deflection this can be as much as 50 milliamps.

If an attempt to measure an anode voltage is made, the current taken by the meter will cause a large voltage drop across components in the anode circuit, and a totally misleading value will be read off.

High-Frequency Hum.

There is a special sort of hum which is often troublesome with A.C. sets.

It only becomes really noticeable when a carrier wave is tuned in.

Actually, it is due to high-frequency currents, and it can almost invariably be cured by connecting a small condenser between the negative of the set and one side of the input of the mains transformer.

How to Connect a Speaker.

There are right and wrong ways of connecting a speaker to a set which has no output circuit.

In a single-acting reed speaker, the reed is permanently attracted to the pole, which carries a winding. The anode current of the last valve passes through this winding and increases or decreases the attraction according to the direction in which it flows.

It is essential for the current to flow so that it increases the attraction.

The speaker should be temporarily connected in circuit and the adjustment moved until the armature is just beginning to hit the pole piece when signals are coming through. The leads should then be reversed. The result will be that the armature is either touching or completely clearing the pole.

If the former is the case the second connection is right, and if the latter occurs the original connection was correct.

Installing Receivers.

Customers often require their sets to be installed in some position necessitating long mains, aerial or earth leads.

It is always wisest to take these wires round the wainscoting even if carpets offer a shorter and apparently safer route. This applies particularly to mains wires.

In the latter case, if a short circuit occurs —as it well might through wear or the driving through it of, for example, a drugget pin— fire may easily result.

Sometimes aerial and earth leads can be brought into a house very neatly by passing them through an air brick or ventilation grating and up through a couple of neat holes in a floor board just inside the wall.

Frequently it will be found most convenient to take leads from one room to another via the outside walls. The windows are used for both exit and entry, of course, and shielded cable is employed outside the house.

Correct Decoupling Values.

For correct decoupling, the stopping resistance should be high compared with the reactance of the by-pass condenser at the lowest frequencies.

Here are the theoretical condenser values required by various resistances :—5,000 ohms, 7.5 mfd. ; 10,000, 4 mfd. ; 15,000, 2.5 mfd. ; 20,000, 2 mfd. ; 25,000, 1.5 mfd. ; 30,000, 1.3 mfd. ; 35,000, 1 mfd. ; 40,000, .95 mfd. ; 45,000, .85 mfd. ; 50,000, .8 mfd.

It should always be made certain that decoupling resistances can carry the current and that the condensers can withstand the maximum available voltage.

METERS FOR TESTING

For testing receivers the following meters are recommended :

(1) Milliammeter, reading to 5 mA.
(2) Milliammeter, reading to 100 mA.
(3) Voltmeter to 6 volts.
(4) Voltmeter to 250 or 300 volts.
(5) Hydrometer.

The above apply to battery receivers and direct current mains receivers, or those used with D.C. eliminators.

The meters should be of a good quality moving-coil type. There is no objection to a double-range meter. For example, the two voltmeters mentioned may be embodied in one with a push button for the lower range.

Item (1) covers the anode current or emission of the smaller or intermediate valves in a receiver.

Item (2) the total high tension current ; power valves or circuits.

The voltage of filament supplies and accumulators are taken with (3).

The last, item (4), is for measuring the voltage of high tension batteries, eliminators and other mains units, and also the D.C. mains.

With a high tension battery in series, the high-reading voltmeter may also be used for continuity tests.

Where the internal resistance of the latter voltmeter is known—it is often stated on the dial—we may actually calculate the resistance of a circuit.

First, by taking the voltage used (call this VI) ; second, by taking the voltage after the current has passed through a component (call this V2) ; third, deduct the latter from the former ; fourth, dividing the result by V2, and lastly, multiplying by the resistance of the meter.

In mathematical form, the calculation is like this :

$$\frac{VI - V2}{V2} \times \text{resistance (of meter)}$$

= resistance of circuit tested.

Item (5) is, of course, for trying the specific gravity of accumulator acid. If the acid has been correctly mixed in the first place, the hydrometer will tell you whether the accumulator wants charging or not.

In A.C. districts the wise dealer will also have a high-reading A.C. voltmeter to check the voltage of the mains. Also he will have a low-reading voltmeter (Item No. 3, for A.C. as well as D.C.

With the foregoing equipment the service man may have every confidence that he will find the fault when one exists.

INSURANCE FOR RADIO

Policies covering the risks and electrical failures of receiving apparatus are issued by the Yorkshire Insurance Co., Ltd., of 66, Cornhill, London, E.C.3.

The risks covered are divided into three sections. First, there is public liability, by which claims for personal injury to or damage to the property of third parties resulting from breakdown of the aerials, supports or any part of the installation are covered up to £500 for any one accident.

This cover costs 2s. 6d. a year, while similar risks covered to a limit of £1,000 cost 3s. 6d. a year.

In connection with this section legal expenses agreed by the company are paid in addition.

The second section covers loss of or damage to the whole of the apparatus, both indoors and outdoors, from such causes as fire, lightning, storm, malicious damage, or theft, together with damage caused by the installation to the structure of buildings. Cover for this section on amounts of £500 and £1,000 costs 4s. and 5s. a year respectively.

This section can only be taken in conjunction with the first.

Electrical failure of receivers costing up to £50 is covered by the final section for £1 a year. This includes the renewal or repair of condensers, transformers, choke coils or any part of the receiver damaged by electrical action.

The repair of faulty connections is also covered.

A slightly higher premium is charged for more expensive receivers.

RECOMMENDED RADIO TEXT BOOKS

These Books may be obtained from Odhams Press, Ltd., Technical Book Dept., 85, Long Acre, London, W.C.2.

Prices quoted do not include postage. Five per cent. should be added to the price of the book in all cases to cover this item.

	s.	d.
Wireless Faults, their Cause and Cure. By W. E. WATSON	1	0
Mast and Aerial Construction for Amateurs. By F. J. AINSLEY, A.M.I.C.E. This book contains the essential points of outdoor, indoor and frame aerials. Second Edn. 70 diagrams and illustrations. (1924)	1	6
Wireless Receivers, the Principles of their Design. By C. W. OAKLEY, M.A., M.Sc. Deals with the fundamental principles involved in the design of wireless receivers	2	6
The Physical Principles of Wireless. By J. A. RATCLIFFE, M.A. Second Edn.	2	6
Radioactivity and Radioactive Substances. By J. CHADWICK, M.Sc. With a Foreword by Sir ERNEST RUTHERFORD, F.R.S. An introduction to the study of radioactive substances and their radiations. (1931)	2	6
Continuous Wave Wireless Telegraphy. By B. E. G. MITTELL, A.M.I.E.E. A non-mathematical introduction to wireless telegraphy from the engineer's point of view. (1923)	2	6
Wireless Valve Receivers and Circuits in Principle and Practice. By R. D. BANGAY and N. ASHBRIDGE, B.Sc., A.M.I.C.E. A book that will add to the pleasure of the wireless experimenter by extending his theoretical knowledge of the whys and wherefores of valve receivers. (1925)	2	6
Successful Crystal and One Valve Circuits. By J. H. WATKINS. A book for wireless experimenters and all who wish to improve the performance of their crystal receivers. 86 illustrations. (1926)	3	6
Automobile and Radio Batteries. A Practical, Up-to-date Handbook. By HAROLD H. U. CROSS, E.E. Being the second edition, enlarged, of "Automobile Batteries." 53 illustrations	3	6
Radio Data Charts. By R. T. BEATTY, M.A., B.E., D.Sc. (1930)	4	6
Wireless Telephony: A Simplified Explanation. By R. D. BANGAY. Reliability of information, thoroughness of treatment, and simplicity of expression are the outstanding features of the book. 79 diagrams and illustrations. 2/6. De Luxe edition, with 25 plates. (1923)	5	0
The Wireless Manual. By Captain JACK FROST. Contains simple explanations of wireless reception, and gives instructions regarding the selection and maintenance of all kinds of wireless accessories, etc. Fully illustrated. Third Edn., revised by HOWARD V. GIBBONS. (1932)	5	0
Primary Batteries: Their Theory, Construction and Use. By W. R. COOPER, M.A., B.Sc. Second Edn., revised and enlarged	5	0
Modern Radio Communication. By J. H. REYNER. Specially written to cover the syllabus of the City and Guilds Examination. Illustrated. Fourth Edn. Thoroughly revised	5	6
Radio Engineering. By WEDMORE AND REYNER	7	0
Radio for Everybody. By AUSTIN C. LESCARBOUAR. Edited by R. L. SMITH ROSE. Explains the new development of wireless telephony or broadcasting. 163 illustrations	7	6
The Cable and Wireless Communications of the World. By F. J. BROWN, C.B., C.B.E., M.A., B.Sc. (Lond.). Director of The International Cable Companies' Association. Second Edn. (1930)	7	6
The Electron Theory: A Popular Introduction to the New Theory of Electricity and Magnetism. By E. E. FOURNIER, B.Sc. (Lond.), A.R.C.Sc., M.R.I.A. With a Preface by G. JOHNSTONE STONEY, M.A., D.Sc., F.R.S. Frontispiece and 35 Diagrams. (1925)	7	6
Selenium Cells. The Construction, Care, and Use of Selenium Cells, with special reference to the "Fritts" Cell. By T. W. BENSON. 18 illustrations. (1919)	9	0
Elementary Principles of Wireless Telegraphy and Telephony. By R. D. BANGAY. An indispensable textbook for wireless students and beginners. Well illustrated. (1930)	10	6
Elem. Manual of Radio-Teleg. and Radio-Teleph. By FLEMING	10	6
Testing Radio Sets. By J. H. REYNER, M.Inst.R.E. Of the greatest value both to the amateur experimenter and the professional designer. Second Edn. (1932)	10	6
Navigational Wireless. By S. H. LONG, D.Sc., M.I.E.E. The book fills a hitherto vacant place in the literature of wireless, as it is the first dealing in the English language with direction finding by means of a single frame. (1927)	12	6
Induction Coil Design. By M. A. CODD. 161 illustrations. (1922)	15	0
Electric Rectifiers and Valves. By Prof. A. GUNTHER SCHULZE. A physical and practical study of rectifiers and valves. (1927)	15	0
Foundations of Radio. By RUDOLPH L. DUNCAN. Covers only the elementary theory of electricity and allied subjects that apply to and comprise the essentials of Radio. (1931)	15	6
Wireless Principles and Practice. By L. S. PALMER. (1928)	18	0
Elements of Radio Communication. By JOHN H. MORECROFT, of Columbia University. Practically no mathematical training more advanced than Algebra is required for the mastery of this elementary text. (1929)	18	6
Wireless Direction Finding. (Second Edition.) By B. KEEN, B.Eng. (Hons.), Sheffield, A.M.I.E.E. Deals with the principles of the subject and describes the principles of Direction and Position Finding in this country. Numerous photographs and diagrams. (1927)	21	0
Wireless Telegraphy and Telephony. By TURNER. New Edn. (1931)	25	0
Handbook of Technical Instruction for Wireless Telegraphists. By H. M. DOWSETT. Fourth Edn. (1930)	25	0
The History of Radio Telegraphy and Telephony. By G. G. BLAKE, M.I.E.E., F.Inst.P. A comprehensive and unbiased review of the historical aspect of Wireless Telegraphy and Telephony. (1929)	25	0
Electrical Condensers. By PHILIP R. COURSEY, B.Sc., F.Inst.P., M.I.E.E. A complete treatise on the design, construction and uses of electrical condensers. 514 illustrations and 8 inset plates. (1927)	37	6
Principles of Radio Communication. By JOHN H. MORECROFT, assisted by A. PINTO and W. A. CURRY. Second Edition. 831 illustrations. (1927)	37	6
Radio Telegraphy and Telephony. By RUDOLPH L. DUNCAN, M.Inst. of Radio En. Everything relative to Broadcasting and reception and of broadcasting units is described. (1931)	46	6

A RADIO DICTIONARY
OF DEFINITIONS

Admittance is a measure of the alternating current passed by a circuit. It is the reciprocal of Impedance and is measured in MHO.

Aerial resistance is the sum of (a) radiation resistance; (b) a resistance factor covering dielectric losses, and (c) ohmic resistance. The product of each of these components and the square of the aerial current, gives (A) the useful signal power radiated into space; (B) the dielectric losses, and (C) the power converted into heat in the aerial wire.

Amplification factor of a valve.—The ratio of the change of plate voltage to grid voltage necessary to bring about a given increase in plate current. For instance, if an addition of 1 volt to the grid creates the same change of plate current as an increase of 10 volts on the plate then the amplification factor is 10.

Anode.—That electrode in a thermionic valve on which the electron stream from the filament is collected.

Anode rectification. The use as a rectifier of a three-electrode valve with its grid potential adjusted to the "knee" or bend of the characteristic curve. No grid condenser or leak is used.

Antenna.—The complete aerial system as used either for wireless transmission or reception.

Atmospherics.—Stray ether waves due to natural causes, e.g., distant lightning and the movement of electric charges in the air.

Attenuation.—The gradual reduction in amplitude of an ether wave, or alternating current, due to resistance losses.

Autodyne.—Self-oscillating valve with the plate and grid circuits back-coupled through a common inductance coil.

Band-pass filter.—A series of inductances and condensers designed to pass a more or less narrow band of frequencies (as distinct from the single frequency of a sharply-tuned circuit) with a sharp "cut-off" at each end of the band. Used as an input circuit to a receiver, or as an intervalve coupling between H.F. amplifiers.

"Beam" system.—A highly-directional system of short-wave signalling.

Beat note.—A rise and fall in amplitude due to the combination of two different frequencies.

Bellini-Tosi system.—A method of direction-finding by wireless depending upon the use of two aerials placed at right-angles to each other.

Blind spots.—Places where wireless reception is abnormally weak, owing to peculiarities of the soil or to other reasons.

Blue glow.—A blue light occurring inside a valve and caused by ionization.

Capacity reactance.—The opposition offered by a condenser to the passage of alternating current through it. For a given condenser, the higher the frequency the lower is the reactance, and the greater the current that passes.

Carrier-wave.—The continuous high-frequency wave upon which the speech currents are imposed in wireless telephony.

Cathode of a valve.—The filament, or source of the electron stream.

Characteristic curve.—A curve which shows the relation between two variable quantities. The standard or "static" characteristic curve of a thermionic valve indicates the manner in which the plate current changes with variations in the applied grid voltage.

Choke.—A coil wound to have a high reactance at a given frequency. A low-frequency choke is usually iron-cored whilst a high-frequency choke is not.

Conductance is a measure of the direct current passed by a circuit (cf. admittance). It is the reciprocal of resistance.

Converter.—A dynamo-electric machine for converting alternating into direct current, or vice versa.

Counterpoise.—A number of insulated conductors so connected to an aerial as to form a capacity earth. Sometimes called an "artificial" earth.

Cross modulation.—An interference effect between two broadcast programmes, not due to any lack of selectivity in the receiver, but arising from the curved characteristic of one of the high-frequency valves, generally a screened-grid valve.

Cymometer.—An instrument for measuring frequencies or wave-lengths.

Damping.—A term to express the rate at which an oscillation dies away. Sometimes applied to the resistance which causes the falling-off in amplitude.

Dead end.—The end turns in a variable inductance which are out of circuit and do not carry the main current.

Decibel.—The practical unit of sound intensity. A tenfold increase in power represents a gain of one "Bel" or ten "Decibels." When the audible power increases from A1 to A2 the gain in decibels = ten times the logarithm of (A2 divided by A1).

Decoupling.—Isolating the plate and grid circuits of a multi-valve set from the common H.T. supply by means of series resistances and shunt capacities. The object is to prevent audible self-oscillation or motor-boating.

Detector.—A device for converting modulated high-frequency signals into audible form.

Dielectric.—Any insulator, more particularly that between the plates of a condenser.

Direction-finder.—A wireless installation designed to determine the direction of travel of received waves.

Displacement current.—A movement of electrons in the dielectric of a condenser, caused by the potential difference between the two plates.

Dynamic curve.—The characteristic curve of a valve taken under working conditions, i.e., with current flowing between filament and plate.

Electrode.—The point at which current enters or leaves any electrical apparatus, particularly a thermionic valve.

Electron.—The fundamental unit of electricity. An electric current consists of a number of elctrons moving in a definite direction.

Emission.—The rate at which electrons leave the heated filament of a valve. The current passing through a valve.

Ether.—An all-pervading medium which scientists have invented in an attempt to explain the observed phenomena of electro-magnetism.

Eureka wire.—A high-resistance wire composed of an alloy of copper and nickel. Its resistance is practically unaffected by temperature.

Fading.—Fluctuations in signal strength, due principally to the action of the Heaviside layer.

Filter circuit.—A circuit tuned to select or reject, by resonance effect, certain definite frequencies from a number of others.

Forced oscillations are those maintained in a tuned circuit from an outside source of energy, and usually at a frequency different from that to which the circuit is tuned.

Free oscillations are those which occur in a tuned circuit at the natural or resonance frequency of the circuit.

Ganging.—Coupling together the various tuning-condensers of a multi-stage H.F. amplifier so that they can all be operated simultaneously from a single "master" control.

Glow-discharge tube.—A form of electron discharge tube or relay in which a heavy current is initiated by a small change in the potential of the grid or control electrode.

Gramophone "Pick-up."—An electromagnetic device for converting the mechanical movements of a gramophone needle into corresponding electric voltages, which are then applied to a thermionic amplifier for reproduction.

Grid.—An electrode interposed between the filament and plate to control the passage of electrons through a thermionic valve.

Grid emission.—Sometimes produced in a mains-driven (A.C.) valve by overdriving the filament. Excessive heat from the filament raises the temperature of the adjacent grid to a point at which it starts to emit free electrons, which interfere with the normal cathode stream and so mask the signals.

Grid leak.—A high resistance inserted between the grid and filament of a valve or across the grid condenser.

Grid rectification.—The use of a three-electrode valve for demodulating high-frequency signals by utilising the one-way conductivity of the grid-filament circuit. The grid is partially insulated by means of a condenser shunted by a high resistance or leak. The resistance serves to depress the mean voltage-level of the grid during the impact of a train of waves, and so reduces the value of the plate circuit at an audible frequency, corresponding to modulation components in the original signal wave.

Heaviside layer.—An accumulation of ionised particles in the upper regions of the atmosphere. It serves to reflect back to earth the space-wave component of signals which would otherwise escape into outer space. The presence of the Heaviside layer makes it possible to transmit wireless signals over long distances, by forcing the waves to follow the curvature of the earth's surface.

Henry.—The practical unit of inductance.

Heterodyne reception.—A method of receiving wireless signals by utilising the "beat" note or interference effect between the incoming waves and a second series of waves generated locally and having a slightly different frequency to that of the signal wave.

Howling.—A sustained low-frequency note set up in a valve receiving-set by undesired or fortuitous back-coupling between the same or different stages of amplification.

Impedance.—The total opposition offered by a circuit to the passage of alternating current. It may comprise the combined effects of inductance, resistance and capacity.

Inductance.—The property of a conductor by virtue of which it opposes any alteration in the value of the current flowing therein. The current sets up a magnetic field which links with the conductor itself. Any alteration in the value of the current alters the flux-linkage, which, in turn, creates a back e.m.f. opposing the change. This action in a single circuit is called self-inductance. If it occurs between two adjacent circuits, it is called mutual inductance.

Inter-electrode capacity.—The electrodes of a valve are located so close to each other that they form the plates of a condenser. Unless suitable precautions are taken (such as neutrodyning or screening the grid), this will give rise to capacity-coupling between the input and output circuits, and may set the valve into self-oscillation.

Internal impedance of a valve.—The total resistance of the path between plate and filament inside the bulb. It is practically independent of the frequency of the current, and for this reason the term internal resistance is to be preferred.

Ionisation.—The liberation of electrons in a valve by the violent impact of electrons against the molecules of any residual gas.

Jamming.—Interference caused by signals other than those desired.

Jar.—A unit of capacity equal to the one nine-hundredth part of a microfarad.

Kilocycle.—A measure of frequency indicating 1,000 cycles per second. A wavelength of 300 metres has a frequency of approximately one thousand kilocycles, or a million cycles.

Kilowatt.—The electrical unit of power—1,000 watts, i.e., the work done by a current of one ampere supplied at a pressure of 100 volts.

Kilowatt-hour.—The Board of Trade unit of electrical energy. It corresponds to the consumption of 1 kilowatt for a period of one hour.

Lines of force.—The imaginary lines in an electrostatic or magnetic field along which the respective forces act.

Litzendraht.—Compound wire made of a number of fine strands, each insulated from the other, so as to have a low resistance to high-frequency currents.

Megger.—An instrument for measuring high resistances of the order of megohms.

Megohm.—A resistance of one million ohms.

Mho.—The unit of admittance (AC) and also of conductance (DC).

Micro.—A prefix meaning the millionth part of.

Milli.—A prefix meaning the thousandth part of.

Modulation.—The variation at audio frequency of the amplitude of a radio-frequency or carrier wave, as used in wireless telephony.

Motor-boating.—Audible self-oscillation in a multivalve set due to feed-back across the H.T. battery, or across any other resistance or impedance common to the plate or grid circuits of two or more of the valves.

Neon tube.—A bulb containing two electrodes and neon gas under reduced pressure. A discharge takes place across the two electrodes when the voltage between them is raised to a certain critical value.

Neutrodyne.—A receiving circuit in which the capacity-coupling between the plate and grid electrodes inside the valve is counterbalanced by external circuit connections.

Node.—A point of zero amplitude either as regards current or voltage. Applied to stationary wave formations, as in an aerial.

Ohm's law states that the current flowing in a D.C. circuit is directly proportional to the applied electromotive force and inversely proportional to the resistance of the circuit.

Oscillograph.—An instrument for measuring or recording in visible form the amplitude variations of alternating currents.

RADIO DICTIONARY

Pentode.—A five-electrode valve with two screening-grids, one of which is earthed. The valve will pass a heavy current, and is particularly suitable for the final or power stage of amplification, though it has also found application on the H.F. side.

Permeability.—The ratio of the magnetic flux produced in any substance to the applied magnetising force. It is a measure of magnetic conductivity, and is often referred to as "mu."

Pick-up.—See Gramophone pick-up.

Potentiometer.—A resistance fitted with a sliding contact so that any desired fraction of the voltage applied across the outer terminals can be tapped off.

Power is the rate of doing work. It is measured by the product of volts into amps. in a D.C. circuit.

Power-factor.—A number, less than unity, by which the product of volts and amps in an A.C. circuit must be multiplied to give the real power in that circuit. The correction is necessary because in an A.C. circuit the current and pressure are not in phase with each other.

Power grid detection.—A modern development of the grid-leak rectifier in which a considerably higher plate potential is used in combination with a smaller grid condenser and leak resistance. Gives excellent results with a large input voltage, but is not so sensitive as the older method.

Pre-selection.—The use of highly-selective circuits preceding the amplifiers in a wireless receiver—to avoid cross-modulations and similar troubles caused by excessive H.F. amplification.

Push-pull amplifier.—Two valves coupled to a common input in such a way that the voltages applied to the grids are 180° out of phase. As the plate current of one valve reaches its maximum, the other sinks to a minimum, and vice versa.

Radiation.—The transfer of energy from an oscillating circuit in the form of ether waves.

Radio beacon.—A wireless station which transmits special signals to assist aerial or marine navigation by means of direction-finding apparatus.

Radio-gonimeter.—A device used in connection with wireless direction-finders.

Reactance.—That part of the total impedance of a circuit which is due either to capacity or inductance, or to both.

Reaction.—A method of back-coupling the plate and grid circuits of a thermionic valve, either inductively or through a condenser, whereby amplification is increased, and, in the limiting case, the valve is set into self-oscillation.

Relaxation oscillations.—A type of oscillation in which the frequency is determined by the time constants of the circuit components (resistance and capacity) as distinct from the ordinary resonance effect due to inductance and capacity. Typical relaxation oscillations are produced by cross-coupling two valves through resistance and capacity (the multi-vibrateur), or when a neon lamp discharges through a circuit containing resistance and capacity.

Reluctance.—The resistance or opposition of a substance to the passage of magnetic flux. It is the reverse of permeability.

Re-radiation.—The overflow of energy from the valves of a receiving set, due to self-oscillation, into the receiving aerial, whereby the latter acts as a miniature transmitter and so causes local disturbance in neighbouring sets.

Screened-grid valve.—A four-electrode valve in which an extra grid, carrying a high positive voltage, is interposed between the plate and the control grid for the purpose of preventing or neutralising inter-electrode coupling.

Secondary emission.—Additional electrons liberated from the plate or grid of a valve by the violent impact of the normal electron stream.

Side bands.—The additional frequencies which appear when a carrier wave is modulated by a low-frequency signal. In broadcasting they extend roughly for 5,000 cycles on each side of the fundamental carrier frequency.

Single side-band telephony.—A form of signalling in which only one of the two normal side-bands is radiated, the other being suppressed at the transmitter. Its advantage is that it occupies a narrower band in the frequency spectrum. In reception a local oscillator is necessary.

Smoothing circuit.—A combination of chokes and condensers designed to remove the "ripples" from rectified current, which would otherwise tend to produce "hum" in the speaker.

Space charge.—The crowd of electrons normally trapped between the filament and grid of a valve, and tending to drive back those electrons that are about to leave the filament. The presence of space charge increases the internal impedance or resistance of the valve.

Specific Inductive Capacity.—The property of a dielectric which determines the capacity of a condenser, other things being equal. It is a measure of the extent to which electrostatic lines of force can pass through the dielectric.

Superheterodyne.—A receiving circuit in which the frequency of the incoming wave is first reduced by a local oscillator or heterodyne valve to produce an intermediate frequency, which is then passed through several stages of amplification prior to rectification.

Super-regenerator.—A receiving circuit in which a back-coupled valve is maintained by means of a local "quenching" valve, at the threshold of oscillation where it operates with increased efficiency.

Tone-corrector.—An inductive shunt inserted across a low-frequency amplifier to compensate for high-note loss due to "cutting" the side-bands in the H.F. tuned circuits.

Variable-mu valve.—A valve designed to operate with variable instead of constant mutual conductance. It gives a straight-line response to strong and weak signals alike.

Variometer.—A variable inductance consisting of two coils or windings, one mounted inside the other. It is characterised by the fact that although the effective inductance can be varied (within wide limits) the length of wire in circuit remains unaltered.

Wave-trap.—A sharply-tuned circuit of inductance and capacity in parallel, inserted in a receiving aerial for the purpose of eliminating or rejecting undesired signals.

Wired-wireless.—A system of transmitting radio-frequency carrier currents over a line-wire, instead of through the ether. Several different carrier-frequencies can be transmitted simultaneously, each modulated with different signals which can be separated out at the receiving end by appropriate filter circuits.

Xs.—A term commonly applied to atmospheric disturbances.

Zero potential.—Although the absolute potential of the earth is not known, it is for practical purposes taken to be zero. Any conductor which is "earthed" is therefore said to be at zero potential.

MISCELLANEOUS DATA

WEIGHTS AND MEASURES AND THEIR EQUIVALENTS.

Linear Measure.

1 inch	= 2·54 centimetres
1 foot	= 30.48 centimetres
1 yard	= ·9144 metre
1 mile	= 1·6093 kilometres
1 centimetre	= ·3937 in.
1 metre	= 3·28 feet
1 kilometre	= ·6214 mile

Square Measure.

1 sq. inch	= 6·4516 sq. cm.
1 sq. foot	= 929·03 sq. cm.
1 sq. yard	= ·8361 sq. metre
1 acre	= ·4047 hectare
1 sq. mile	= 259 hectares
1 sq. cm.	= ·155 sq. in.
1 sq. metre	= 1·196 sq. yards
1 hectare	= 2·4711 acres

CAPACITY AND CUBE MEASURE AND EQUIVALENTS.

1 cub. inch	= 16·39 c.c.
1 cub. foot	= 28·32 litres
1 cub. yard	= 764 litres
1 c.c.	= ·061 cub. in.
1 litre	= 61 cub. in.
1 cub. metre	= 35.315 cub. ft..

4 gills = 1 pint = 17·33 cub. in. = ·568 litre
2 pints = 1 quart = 69·31 cub. in. = 1.1365 litres
4 quarts = 1 gallon = 277·3 cub. in. = 4.546 litres
2 gallons = 1 peck = ·3209 cub. ft. = 9·092 litres
4 pecks = 1 bushel = 1·2837 cub. ft. = 36·37 litres
8 bushels = 1 quarter = 10·27 cub. ft. = 290·9 litres

WEIGHT.

Avoirdupois.

16 oz. = 1 lb. = 453·6 gramme.
112 lb. = 8 stones = 4 qrs. = 1 cwt. = 50.8 kg.
20 cwt = 1 ton = 1016 kilogramme.
1,000 kg. = 1 metric ton = approx. $\frac{2}{3}$ ton.
1 American or short ton = 2,000 lb.

Troy.

1 oz. = 20 dwt.
1 dwt. = 24 grains.
1 grain = ·0648 gramme.

FUNDAMENTAL UNITS.

The fundamental units on which practical units are based are the centimetre, gramme and second in the C.G.S. system, and the foot, pound and second in the British system.

INTERNATIONAL SYMBOLS OF QUANTITIES.

Acceleration of gravity	g
Angles	α, β, γ
Capacity	C
Conductance	G
Current	I
Dielectric constant	ϵ
Difference of potential	V
Efficiency	η
Electromotive force	E
Energy or work	W
Flux density (electrostatic)	D
Flux density (magnetic)	B
Frequency	f
Impedance	Z
Intensity of magnetisation	J
Length	l
Mass	m
Magnetic field	H
Magnetic flux	Φ
Magnetomotive force	*
Mutual inductance	M
Permeability	μ
Phase displacement	ϕ
Power	P
Quantity of electricity	Q
Reactance	X
Reluctance	S
Resistance	R
Resistivity	ρ
Self-inductance	L
Susceptibility	K
Temperature	T
Time	t
Work	A

* Symbol yet to be fixed.

UNITS AND THEIR SYMBOLS.

(Used after numerical values.)

Unit of		
Ampere	Current	A
Coulomb	Quantity	C
Farad	Capacity	F
Henry	Inductance	H
Joule	Energy	J
Ohm	Resistance	O
Volt	Electromotive Force	V
Watt	Power	W

UNITS AND THEIR EQUIVALENTS.

This table shows the relation between electrical and mechanical units. It enables any conversion to be made.

One ft.-lb. ... = 1 lb. raised 1 foot high.
One B.Th.U. ... = 1 lb. of water raised 1° F.
„ ... = 778·8 ft.-lb.
„ ... = 1,005 joules.
„ ... = 0·252 kilogram calories.
One H.P. hour = 0·746 kw. hour.
„ ... = 1,980,000 ft.-lb.
„ ... = 2,545 B.T.U.'s.
One kw. hour = 1,000 watt hours.
„ ... = 1·34 H.P. hours.
„ ... = 3,412 B.T.U.'s.
„ ... = 2,654,200 ft.-lb.
„ ... = 3,600,000 joules.
One H.P. ... = 746 watts.
„ ... = 0·746 kw.
„ ... = 33,000 ft.-lb. per minute.
„ ... = 550 ft. lb. per second.
„ ... = 2,545 B.T.U.'s per hour.
„ ... = 42·4 B.T.U.'s per minute.
„ ... = 0·707 B.T.U.'s per second.

MULTIPLES AND THEIR SYMBOLS.

Multiple.	*Name.*	*Symbol.*
1,000,000	Mega	M
1,000	Kilo	k
100	Hecto	—
$\frac{1}{1000}$	Milli	m
$\frac{1}{1000000}$	Micro	μ

DRILLS FOR TAPPING AND CLEARING B.A. SIZES.

B.A. Size.	Tapping (ins.)	Clearing (ins.)
0	$\frac{13}{64}$	$\frac{17}{64}$
1	$\frac{11}{64}$	$\frac{7}{32}$
2	$\frac{5}{32}$	$\frac{13}{64}$
3	$\frac{9}{64}$	$\frac{3}{16}$
4	$\frac{1}{8}$	$\frac{5}{32}$
5	$\frac{3}{32}$	$\frac{1}{8}$
6	$\frac{5}{64}$	$\frac{7}{64}$
8	$\frac{3}{64}$	$\frac{5}{64}$

COMPARATIVE TABLE OF WIRE GAUGES.

No.	British Standard Gauge S. W. G.	American Gauge A. W. G. or B. & S.	No.	British Standard Gauge S. W. G.	American Gauge A. W. G. or B. & S.
	Diam. Ins.	Diam. Ins.		Diam. Ins.	Diam. Ins.
7/0	·500	—	23	·024	·0226
6/0	·464	—	24	·022	·0201
5/0	432	—	25	·020	·0179
4/0	·400	·4600	26	·018	·0159
3/0	372	·4096	27	·0164	·0142
2/0	·348	·3648	28	·0148	·0126
0	·324	·3249	29	·0136	·0113
1	·300	·2893	30	·0124	·0100
2	·276	·2576	31	·0116	·0089
3	·252	·2294	32	·0108	·0080
4	·232	·2043	33	·0100	·0071
5	·212	·1819	34	·0092	·0063
6	·192	·1620	35	·0084	·0056
7	·176	·1443	36	·0076	·0050
8	·160	·1285	37	·0068	·0045
9	·144	·1144	38	·0060	·0040
10	·128	·1019	39	·0052	·0035
11	·116	·0907	40	·0048	·0031
12	·104	·0808	41	·0044	—
13	·092	·0720	42	·0040	—
14	·080	·0641	43	·0036	—
15	·072	·0571	44	·0032	—
16	·064	·0508	45	·0028	—
17	·056	·0453	46	·0024	—
18	·048	·0403	47	·0020	—
19	·040	·0359	48	·0016	—
20	·036	·0320	49	·0012	—
21	·032	·0285	50	·0010	—
22	·028	·0253			

WHITWORTH THREADS.

Diam.	Diam. at Bottom of Thread.	Threads per inch.	Diam.	Diam. at Bottom of Thread.	Threads per inch.
$\frac{1}{4}$″	·186	20	$1\frac{1}{4}$″	1·067	7
$\frac{5}{16}$″	·295	16	$1\frac{1}{2}$″	1·286	6
$\frac{3}{8}$″	·393	12	$1\frac{3}{4}$″	1·494	5
$\frac{7}{16}$″	·508	11	2″	1·715	$4\frac{1}{2}$
$\frac{1}{2}$″	·622	10	$2\frac{1}{2}$″	2·180	4
1″	·840	8	3″	2·634	$3\frac{1}{2}$

POSTAL REGULATIONS

INLAND

LETTERS.

Not exceeding 2 oz.	1½d.
For every additional 2 oz.	½d.
Postcards { Single	1d.
Postcards { Reply paid	2d.

Maximum size, 2 ft. long, 1 ft. wide or 1 ft. deep ; or in roll form 2 ft. 6 in. long and 4 in. diameter. There is no limit of weight.

PARCELS.

Not exceeding 2 lb.	6d.
2 lb. to 5 lb.	9d.
5 lb. to 8 lb.	1s. 0d.
8 lb. to 11 lb.	1s. 3d.
Registration fee	3d.
Proof of Posting	½d.

The greatest length allowed is 3 ft. 6 in. and the greatest length and girth combined 6 ft. Parcels for the Irish Free State are accepted under the same conditions of rate and size, but a declaration of contents for customs purposes must be made.

POSTCARDS.

No card may exceed 5⅞ in. long and 4⅛ in. wide, or be less than 4 in. long and 2¾ in. wide. Postcards must be of stiff material and must not be folded or enclosed in a cover of any kind,

PRINTED PAPERS.

For every 2 oz. up to 2 lb. .. ½d.

To be dispatched on the day of posting, printed papers must be posted before 4.30 p.m. in London and not later than the special time announced at provincial post offices. Printed papers must be posted in wrappers which allow easy examination of contents by postal officials.

MONEY AND POSTAL ORDERS.

Inland money orders can be obtained for any sum, not comprising a fraction of a penny, up to £40. The poundage rates charged for the orders are :—

Up to £3	4d.
£3 to £10	6d.
£10 to £20	8d.
£20 to £30	10d.
£30 to £40	1s.

Money orders can be telegraphed from 1s. plus an extra fee of 2d.

Single postal orders can be purchased from amounts in sixpenny stages from 6d. to 21s. Poundage charges range from ½d. to 2d. respectively.

SAMPLES.

There is no inland rate for samples, which must be sent at either letter or parcel rate.

BUSINESS REPLY SCHEME.

Instead of stamping all reply envelopes or postcards enclosed in mailing shots dealers may make use of this scheme by which they only pay postage for the replies delivered to them. An account has to be opened with the local post office and the envelopes or cards must be of the approved pattern. The charge of all replies delivered is the normal postage plus ½d. Charges are debited against the account.

REGISTRATION.

The registration fee of 3d. for inland post only covers any postal packet, subject to certain conditions, to compensation for loss or damage not exceeding £5. Higher fees covering higher compensation are 4d. covering up to £20, and a further £20 compensation for every additional 1d. of fee up to a maximum of £400 at 1s. 11d. fee. Packets for registration must be handed in at a post office. Knots in string must be sealed. The maximum limit of compensation for unregistered parcels is £2.

EXPRESS DELIVERY.

Packets will be delivered by special messengers under five services.

All the way, on weekdays only, 6d. a mile plus a weight fee of 3d. on packets weighing more than 1 lb.

After transmission by ordinary postal service to office in district of delivery, 6d. in addition to ordinary postage. This is at sender's request.

Same service at addressee's request, 6d. a mile.

Sunday service letters and postal packets only will be expressed between certain post offices at additional fees according to distance.

Express letters may be dictated by telephone to the office nearest to the addressee where they will be written down and sent by messenger. Fees are usual telephone charge, writing fee 3d. for 30 words and 1d. for every additional 10, and 6d. a mile for delivery.

POSTAL REGULATIONS

CASH ON DELIVERY.

The cash on delivery fees which are in addition to the ordinary postage and registration fees are :—

Amount to be collected not exceeding :—	Fees.
10s.	4d.
£1	6d.
£2	8d.
£5	10d
£10	1s. 0d
£15	1s. 2d.
£20	1s. 4d.
£25	1s. 6d.
£30	1s. 8d.
£35	1s. 10d.
£40	2s. 0d.

The value of an article sent by registered letter or parcel post or unregistered parcel post, can on certain conditions be collected from the addressee by the Post Office and remitted to the sender. The service does not apply to the Irish Free State in either direction. Packets may be posted at any Money Order Post Office.

This service also operates on railways, when the sender must obtain from a Money Order Post Office a combined address label and receipt form for every parcel sent.

The package must be handed to the railway company and the receipt portion signed by the company official sent to the consignee. This must be handed over on delivery. Railway company's charge, 3d. in addition to the usual rail charges.

IMPERIAL AND FOREIGN

LETTERS.

To the British Empire generally, to H.M. Ships of war abroad, Egypt, U.S.A. and the British Post Office at Tangier. — 1½d. first oz. and 1d. each oz. after.

To all other places including Iraq and Transjordan. — 2½d. first oz. and 1½d. each oz. after.

Maximum size for British Dominion Colony or Possession, 2 ft. long by 18 in. wide or deep. For foreign countries limit of size is 18 in. in either direction. In either case a letter in the form of a roll must not exceed 30 in. long and 4 in. in diameter. Weight limit is 4 lb.

POSTCARDS.

Single	1½d.
Reply paid	3d.

Same size and conditions as inland.

SMALL PACKETS.

Limited to certain places. Maximum dimensions 18 in. by 8 in. by 4 in., or in roll form 18 in. long by 6 in. diameter. Weight limit 2 lb.

PRINTED PAPERS, COMMERCIAL PAPERS AND SAMPLES.

Each 2 oz. ½d., minimum for commercial papers 2½d., and samples 1d.

Conditions similar to Inland. Commercial papers may be hand produced or typewritten but must not be in the nature of correspondence.

SAMPLES.

Service restricted to bona fide samples not for sale. Size limit 2 ft. long by 1 ft. wide or deep to British Dominions, etc., and 18 in. long, 8 in. wide and 4 in. deep for foreign countries. In roll form for foreign countries size limit is 18 in. long and 6 in. diameter. Weight limit 5 lb. to British Empire generally and 1 lb. to foreign countries.

PARCELS.

Rates vary considerably. General size limit is 3½ ft. any dimension or 6 ft. combined length and girth. Weight limit 11 lb. Declaration of contents to be made on posting for customs purposes.

CASH ON DELIVERY.

Special rates available.

REGISTRATION.

Fee for letters, printed papers, etc., but not parcels, 3d.

INSURANCE.

Parcels sent to certain countries can be insured.

AIR MAIL.

Full particulars of this service for letters and parcels given on periodical leaflets available at post office.

GENERAL INFORMATION.

Full particulars of postal services together with general regulations concerning types of goods accepted in certain cases are given in the Post Office Guide available at post offices.

RADIO EXPORTS FROM GREAT BRITAIN

September, 1931, to August, 1932.

SUMMARY of the Value in Sterling of Radio and allied goods made in and exported from Great Britain and Northern Ireland to the undermentioned Countries for one year from September, 1931, to August, 1932.

Country.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.
Argentine Republic ..	248	251	1,010	279	227	1,237	1,491	1,936	861	1,174	1,034	1,023
Australia	1,387	1,812	793	4,086	2,735	3,232	3,300	2,637	2,540	3,731	3,909	3,788
Austria	170	312	224	—	—	—	537	374	358	—	—	—
Azores	—	328	—	—	—	—	—	—	—	—	—	—
Belgian Congo	—	110	—	43	176	—	—	—	—	—	—	—
Belgium	3,922	11,324	8,441	10,112	7,624	9,029	6,085	4,552	3,368	5,365	4,047	3,566
Bermudas	6	2,036	511	—	—	—	—	—	—	—	—	—
Brazil	37	146	109	—	—	—	—	25	592	462	23	79
British India	3,728	3,766	8,402	4,731	2,161	6,688	6,875	5,540	5,376	13,040	5,911	4,415
Canada	274	701	367	140	417	331	1,350	1,383	548	1,125	185	1,436
Canary Islands	—	—	—	—	287	467	151	1,151	68	—	—	—
Ceylon	116	217	306	244	277	—	—	—	—	—	—	—
Channel Islands	2,497	3,735	3,882	5,202	3,770	1,718	1,859	1,851	2,143	2,004	1,693	2,979
Chile	143	1,927	73	—	—	—	—	—	—	—	—	—
China	243	370	176	—	—	—	—	—	—	—	—	—
Columbia	—	—	—	—	—	—	—	—	—	45	1,730	—
Czechoslovakia	595	791	614	1,160	436	356	549	1,951	905	2,440	1,523	1,259
Denmark	2,955	2,901	3,339	3,593	1,243	1,602	1,389	3,214	1,003	668	1,482	1,115
Egypt	737	911	908	6,440	4,667	861	4,307	635	383	333	626	351
France	5,602	6,077	8,158	11,987	3,226	20,817	14,552	8,263	10,318	20,785	5,759	6,077
Germany	909	1,105	1,224	1,872	1,523	613	1,117	1,014	1,168	493	462	84
Greece	—	—	—	3,280	138	796	7,979	—	—	—	—	—
Hong Kong	157	424	1,317	255	467	613	383	746	361	1,903	32	525
Iraq	—	—	—	—	—	—	—	—	—	362	1,157	340
Irish Free State	9,177	8,312	13,139	18,834	12,388	7,377	5,369	4,298	25,748	7,618	4,182	4,841
Italy	10,328	20,547	2,708	2,071	4,373	6,654	5,938	7,977	4,327	4,074	5,128	18,374
Japan	376	584	230	301	943	219	1,189	466	2,251	8,644	22	1,107

RADIO EXPORTS FROM GREAT BRITAIN—*(continued)*

Country.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.
Kenya	106	220	184	144	195	132	354	277	228	776	174	335
Malta and Gozo	433	530	106	372	583	551	611	686	320	288	85	97
New Zealand	1,119	989	1,471	1,151	1,498	2,348	1,628	2,426	3,462	3,456	2,014	1,787
Norway	632	574	1,447	1,851	1,349	1,074	528	1,397	414	543	143	836
Netherlands	2,307	4,380	3,741	3,261	4,288	5,091	4,917	4,615	4,432	1,711	10,591	6,363
Persia	—	—	—	—	13	—	—	—	—	—	—	—
Poland	236	1,206	2,046	3,239	348	181	2,030	184	1,564	246	3,665	813
Portugal	109	1,036	133	3,207	532	4,548	449	1,121	872	476	4,377	778
Portuguese East Africa ..	8	354	11	—	—	—	—	—	—	—	—	—
Roumania	199	489	1,359	412	150	1,516	91	1,630	738	5,775	4,724	663
Siam	135	99	229	419	182	292	312	199	112	327	13	313
Soviet Union (Russia) ..	—	—	—	—	—	—	546	3,298	—	—	—	—
Spain	1,464	897	978	1,143	671	2,056	825	672	891	571	888	994
Sweden	2,039	9,979	3,595	6,518	1,966	1,811	3,240	1,492	1,405	2,159	1,383	777
Switzerland	997	1,293	3,261	5,261	2,129	13,429	2,334	2,812	1,550	2,386	694	2,560
Straits Settlements ..	754	552	759	1,061	730	409	885	866	659	501	430	610
Turkey	—	—	—	—	177	1,436	—	—	—	—	—	—
Union of South Africa ..	3,065	4,390	12,342	3,587	1,683	1,967	1,055	3,669	2,685	1,499	1,435	1,730
United States of America	254	262	7	122	211	710	302	292	16	—	—	—
Venezuela	29	266	316	—	—	—	—	—	—	—	—	—
Yugoslavia	4,197	320	33	—	—	—	—	—	—	—	—	—
Other British West Indian Islands	441	736	12	—	113	—	—	—	—	—	—	—
Other Countries	5,523	1,455	7,632	6,082	10,184	7,090	3,416	5,583	4,263	4,985	5,725	6,207
TOTAL .. £	67,654	98,714	95,593	112,460	74,080	107,253	87,943	79,232	85,929	99,965	75,246	76,222

RADIO RE-EXPORTED FROM GREAT BRITAIN

September, 1931, to August, 1932.

SUMMARY of the Value in Sterling of exported Radio and allied manufactures for one year from September, 1931, to August, 1932, from Great Britain and Northern Ireland, which had previously been Imported from these countries.

Country.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.
Australia	125	—	3	—	—	—	—	—	—	—	—	—
Belgium	286	247	162	599	324	219	1,134	702	496	159	—	—
British India	93	334	376	—	—	—	—	—	—	—	—	—
Canada	—	—	—	—	114	50	—	—	—	—	—	—
Denmark	276	80	11	—	—	—	—	—	—	—	—	—
Egypt	—	—	—	1,454	—	—	—	—	—	—	—	—
France	1,528	509	390	517	657	347	677	3,380	165	233	72	12
Germany	3,261	2,042	1,140	1,648	242	1,236	394	2,844	425	96	21	585
Irish Free State	1,315	1,799	2,608	2,044	1,431	393	288	755	1,214	542	227	125
Italy	202	16	49	—	—	—	—	—	—	—	—	—
Netherlands	383	388	446	387	871	615	705	11	—	—	—	—
New Zealand	178	81	3	—	—	—	—	—	—	—	—	—
Spain	210	108	—	—	—	—	—	—	—	—	—	—
Switzerland	180	27	3	84	57	578	26	440	—	148	35	10
Union of South Africa ..	48	74	79	—	—	—	—	—	—	—	—	—
United States of America ..	123	565	385	258	1,114	443	1,655	348	—	3,043	1,152	44
Other Countries	91	216	507	253	637	226	787	349	262	452	272	205
TOTAL .. £	8,299	6,486	6,162	7,244	5,447	4,107	5,666	8,829	2,562	4,673	1,779	981

RADIO IMPORTS INTO GREAT BRITAIN

September, 1931, to August, 1932.

SUMMARY of the Value in Sterling of Radio and allied manufactures imported into Great Britain and Northern Ireland for a year from September, 1931, to August, 1932.

Country.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Australia	45	206	—	150	—	—
Austria	14,582	18,468	29,132	19,394	1,755	3,421
Belgium	1,324	1,782	5,987	117	59	168
Canada	750	387	570	220	9,843	709
Czechoslovakia	275	129	155	307	67	197
Denmark	375	319	280	149	—	—
France	8,483	13,247	15,308	5,913	3,584	4,182
Germany	56,133	69,780	102,167	22,192	13,264	12,633
Hungary	1,399	10,255	4,492	5,569	402	1,397
Irish Free State	—	303	24	—	—	—
Italy	80	203	1,064	16	52	6
Netherlands	27,234	68,585	132,166	25,373	8,243	7,835
Poland	—	249	—	—	—	—
Sweden	250	91	—	—	—	—
Switzerland	3,371	4,617	5,888	1,497	1,316	1,333
United States of America	63,049	181,685	246,879	67,821	49,981	12,182
Other Countries	25	11	163	55	213	268
TOTAL £	177,375	370,317	544,275	148,773	88,779	44,331

Country.	Mar.	April	May	June	July	Aug.
Australia	—	—	—	—	—	—
Austria	8,045	5,203	4,206	2,274	2,059	2,758
Belgium	10	294	—	—	—	1,521
Canada	1,411	213	614	1,339	3,379	5,955
Czechoslovakia	26	95	—	—	—	—
Denmark	—	—	—	—	—	—
France	3,344	2,364	2,462	3,806	1,892	1,699
Germany	8,156	5,523	13,836	13,080	13,164	20,479
Hungary	64	24	45	77	2	—
Irish Free State	—	—	—	—	—	—
Italy	—	—	—	—	—	—
Netherlands	8,717	7,380	8,922	11,986	24,586	34,213
Poland	—	—	—	—	—	—
Sweden	—	—	—	—	—	—
Switzerland	961	643	83	401	1,169	1,334
United States of America	8,538	45,421	9,403	15,770	15,836	35,587
Other Countries	469	1,356	229	281	5,236	346
TOTAL £	39,741	68,516	39,800	49,014	67,323	103,892

HANDLING EXPORT BUSINESS

If it is intended to develop seriously an export trade it will always be found a good plan to establish a separate export department at home. This department should be under the control of an export manager, who would make it his business to be thoroughly conversant not only with the firm's products but also with the theory of foreign marketing and transport problems, and if possible he should be a linguist. He should be adaptable and diplomatic and the type of man who can deal with foreign buyers when they visit his company.

When making quotations for export it should be remembered that long periods may elapse after the date of quoting before an order can materialise. It is also customary to arrange such terms of payment as will reduce to a minimum the risk of bad debts and will avoid losses due to fluctuations in exchange.

Cash Against Documents.

In cases where no previous knowledge of the customer is available, it is a common practice to handle the order on the basis of "cash against documents." In this way the exporter safeguards himself by arranging for the Bill of Lading and other documents which represent the title to the goods to be forwarded to a bank at the port of destination with instructions to collect the amount due before handing the documents over to the consignee. He also gives instructions as to the disposal of the goods in case of default by the consignee.

Procedure for Shipment.

When an order is ready for shipment the following is, generally speaking, the procedure which is adopted. The goods are despatched by road or rail to the port for shipment through a firm of forwarding agents, who arrange for insurance and take out the Bills of Lading. If the terms of sale are F.O.B. (Free on Board)—that is, the customer pays all transport expenses after the goods have been delivered to the ship—it is necessary to add insurance and freight charges to the invoice. A copy of this is sent to the customer with a letter advising shipment. The exporter draws a draft for the amount due and this, with the Bill of Lading (in triplicate), the insurance policy, and a copy of the invoice, is sent to his bankers for collection, with instructions that it shall not be presented for acceptance until the goods have arrived. In the transaction the following documents will be necessary :—

Consignment Note.—This should be in two parts, one of which is retained by the supplier as a receipt for the goods. It is a request to the railway company (or other local transport agent) to deliver the packages to the shipping agent. It should contain the name and address of the consignee (shipping agent), a short description of the packages, their weight and special markings.

Instructions to Shipping Agents.—This takes the form of an advice note and should contain date, name of ship, destination, consignee (customer), special markings, description and dimensions of packages, their contents and net weight, value for customs declaration, value for which insurance is to be effected, and class of insurance, by whom freight is to be paid, and how forwarded to shipping agents.

Bill of Lading.—This is taken out by the shipping agent. It is a shipowner's receipt for goods which he has contracted to convey. It is also a title to the goods and by endorsing it the goods can be transferred to another owner. On the Bill of Lading are set out details of the consignment, the name of ship, destination, and full particulars of the conditions under which the consignment is carried. This document is sent in duplicate, the two copies being sent by different mails in case one may be lost.

Insurance Policy.—This is taken out by the shipping agents.

Marine insurance falls roughly under two main classes known as "with particular average" and "free of particular average." Under the former arrangement the goods are protected against individual loss or damage as distinct from the remainder of the ship's cargo. With the latter arrangement it is only possible to make a claim if the whole of the ship's cargo is lost. The former method of insurance is more expensive than the latter, and it will depend largely on the nature of the goods to be consigned as to which method is adopted. If the goods are fragile and liable to breakage during transport it is worth while to insure under the more expensive scheme. Definite instructions on this point must be given to the shipping agents.

Freight Note.—This document is sent by the shipping agent to the supplier and contains charges for the actual freight, cost of Bills of Lading, insurance and commission charges, so that if necessary these can be embodied in the invoice to the customer.

EXPORT BUSINESS

Primage (5 per cent., 10 per cent., or 15 per cent.) on the net freight will be charged on the freight note in most cases, part or the whole to be returned under certain conditions six or twelve months later. It is a matter of arrangement who has this when collected—the exporter, shipping agent or purchaser.

Invoice.—This, the supplier's invoice to the customer, should contain the date, customer's order number, number of cases, special markings on cases, name of ship, accurate description of contents and details of charges, and gross and net weights.

Wherever possible invoices should be made out in the currency of the country to which the goods are to be sent. The customer prefers also to have weights and measurments in the local units if possible. Gross and net weights should be shown on the invoice.

The number of copies to be prepared depends on the terms of payment, on any particular wishes of the customer, and on the requirements of the customs authorities in the country for which the goods are intended. In some instances the invoices have to be certified by the consul of that country ; it might also be necessary to state what would be the value of the goods if sold for home consumption. The exporter may also be called upon to state the country of origin of the goods.

Documentary Draft.—This is drawn up by the exporters for the amount due and is sent to their bankers with instructions with regard to collection.

Advice of Shipment.—An advice of shipment together with the invoice is sent to the purchaser and this should contain the name of ship, date of despatch, and accurate description of the goods forwarded.

Specification.—This document is for the use of the Customs' authorities and must contain the name of port, name of ship, destination, date of final clearance of ship, markings on packages, number and description of packages, contents, and value. This specification is prepared by the shipping agent and handed in at the Custom House at the port of shipment.

Tariffs.

The tariff list should be carefully studied, as it may be possible to avoid duty on a complete article by merely changing the method of manufacture of one of its details and utilising for that detail material which is not liable to duty in that country.

In some of the British Dominions and Colonies there is a tariff giving preference to British goods. In that case the invoice will need to bear upon it a certificate worded in accordance with the regulations of the importing country, stating that they are of British origin.

Packing.

Too much emphasis cannot be placed on the need for extreme care in packing consignments for long journeys including sea transport. When deciding on the method of packing it should be remembered that the packages will receive rough treatment.

There is also the danger of loss by pilfering, and means should be adopted for making difficult the opening of cases during transit. It is, of course, possible to insure against loss by pilfering.

Wood as an outer protection is almost universally used for large consignments or for those that need special protection from mechanical damage. The use of exterior battens increases the overall measurements of the case and may, therefore, increase the freight charges ; consequently some other method, such as metal bands, should be adopted for obtaining strength.

The cases should be lined with some kind of watertight lining, such as tarred or oiled paper, which is especially manufactured for the purpose. In many instances it is considered advisable to pack goods in cases lined with zinc or tin and hermetically sealed. Zinc lining is more costly than tin lining, but it is sometimes preferred, as it can be more readily used when the case is broken up. It is advisable to avoid the use of packing material which may be subject to duty when arriving at its destination.

In many instances the cost of freight is calculated on the cubical measurements of the packing case ; the importance of compact packing will, therefore, be evident. Every available space should be filled up to prevent the goods from shifting during transit.

Marking of Packages.

The markings which are likely to be required on the packages are the special symbol of the customer, name of port, serial number of the case, gross and net weight, and measurements of the case. All markings should be heavily stencilled or painted on the cases.

Inspection.

The customer may probably arrange for the goods to be examined before despatch, but it is a good plan for the exporter himself to see that the shipments are carefully inspected before they are packed. It is also advisable to insist that, in the event of a claim being made, it should be made within a given period after delivery- A claim should be substantiated by an independent witness apart from the representative of the purchaser.

IMPORT DUTIES ACT

This Act is officially defined as "an act to provide for the imposition of a general *ad valorem* duty of customs and of additional duties on any goods chargeable with the duty aforesaid, for the imposition of duties on goods produced or manufactured in a foreign country which discriminates in the matter of importation as against goods produced or manufactured in the United Kingdom, in certain other parts of His Majesty's Dominions, in protectorates or in mandated territories, and for purposes connected with the matters aforesaid."

Main provisions of the Act are as follows :

PART I.

The Act imposes as from March 1, 1932, a customs duty of 10 *per cent.* of the value of the goods (general *ad valorem* duty) on all goods imported into the United Kingdom with the following exceptions :

(*a*) goods for the time being chargeable under any other Act, but not including (subject to the provisions of this Act) composite goods chargeable under that Act because some of their components are chargeable :

(*b*) goods specified for exemption under this Act.

Under the Act an Import Duties Advisory Committee is set up to advise the Treasury who, after receiving recommendations from the Committee, have the power to add to the schedule of exemptions.

The Treasury may also, after receiving a recommendation from the Advisory Committee, by order direct that additional duties shall be charged on the importation of goods into the United Kingdom by reference to value or weight or any other measure of quantity, for any period or without limit of period, at different rates for different periods or parts of periods.

In the case of countries which are Dominions within the meaning of the Statute of Westminster, 1931, and India and Southern Rhodesia, or territories which are being administered by those countries, products which have been consigned from any part of the British Empire and grown or manufactured in any of the above countries, are not subject to the duty before November 15, 1932, or any later date which may be fixed by Parliament.

At any time after that date the Treasury may, on the recommendation of the Secretary of State, direct that the general *ad valorem* duty or any additional duty or both of such duties shall not be chargeable or shall be chargeable only at some specified rate less than the full rate.

Section 5 of the Act provides that neither the general *ad valorem* duty nor any additional duty shall be chargeable in respect of goods consigned from any part of the British Empire and grown, produced or manufactured in

(*a*) any part of His Majesty's Dominions outside the United Kingdom, other than a country to which the preceding paragraph dealing with preference for Dominions applies, or

(*b*) any territory which is under His Majesty's protection.

For the purpose of ascertaining whether goods are free from general *ad valorem* or additional duty, goods are not considered to be manufactured in the British Empire unless a certain portion of their value as prescribed by regulations is derived from materials grown or produced or from work done within the British Empire.

Goods manufactured in a bonded factory in the United Kingdom from chargeable material produced in the British Empire are free from duty to the extent to which they have been manufactured by such material.

The Commissioners have the right to require the importer to furnish proof that the goods were grown, produced, or manufactured in a part of the British Empire.

The Treasury may, on the recommendation of the Board of Trade, direct that goods of foreign origin shall not be subject to duty or only to some specified rate less than full rate.

In such cases the Board of Trade may require the importer to furnish proof of the country of origin.

Where composite goods would be chargeable under this Act or under some other Act, the general *ad valorem* duty is chargeable only up to the amount by which it exceeds the duty chargeable under that other Act.

Section 9 of the Act empowers the Board of Trade to demand from any manufacturer a return for information purposes with reference to goods chargeable under the Act, giving information on the following :

(*a*) Quantity and value of output.

(*b*) Quantity and cost of materials used.

(*c*) Quantity and cost of fuels and electricity consumed.

(*d*) Number of persons employed.

No information obtained in this way will, without the consent of the owner of the business, be disclosed except to members

of the Committee or to a Government Department requiring the information.

Goods consigned direct to a registered shipbuilding yard for repairing or refitting ships in that yard may, by complying with the conditions, be imported free.

PART II.

If it is found that a foreign country is discriminating between goods produced in the United Kingdom (or other territory under His Majesty's protection or in respect of which a mandate is being exercised by the British Government) and those produced by another foreign country, the Treasury may direct that additional duty shall be charged on goods imported into the United Kingdom from that foreign country.

These additional duties may be charged by reference to value or to weight or any other measure of quantity and shall not exceed 100 per cent. of the value of the goods.

The Commissioners may demand proof of the country of origin of the goods in question.

PART III.

Where it is proved that goods are imported solely with a view to re-exportation after undergoing a process in the United Kingdom which will not change the form and character of the goods, or after transit through the United Kingdom or by way of trans-shipment, the Commissioners may allow such goods to be imported free of any duty chargeable under this Act.

Section 14 of the Act states that section 6 of the Customs and Inland Revenue Act, 1879, shall not apply to goods chargeable with duty under this Act, but where chargeable goods are re-imported into the United Kingdom and it is shown that any duty chargeable was duly paid or that no drawback of any such duty was allowed on exportation, or that any drawback allowed has been repaid by the Exchequer, then the goods are exempt from duty if they have not undergone any process abroad.

If they have undergone a process abroad without changing their form or character the goods shall be chargeable as if the amount of the increase in value of the goods due to the process represented their whole value.

The value of any imported goods is the price which an importer would give for them in the open market delivered to him at the port of importation, freight, insurance, commission and all other costs incidental to the purchase, except duties, having been paid, and duty is to be paid on that value as fixed by the Commissioners.

Any disputes arising as to the value of goods have to be referred to an arbitrator appointed by the Lord Chancellor.

If at any time it is found that any duty chargeable under this Act by reference to value could be levied with greater advantage and convenience by reference to weight or other measure of quantity, the Treasury may direct that the duty shall be charged by the latter method.

The Import Duties Advisory Committee submitted to the Treasury in April, 1932, their recommendations for additional duties on specified classes of goods, which recommendations are embodied in the Additional Import Duties (No. 1) Order, 1932.

	Additional duty. Per cent.	Additional plus ad val. duty. Per cent.
Electrical goods, including :— Insulated wires and cables. Telegraph, telephone and wireless apparatus. Electric carbons. Electric lighting appliances and fittings (other than glass bulbs for electric filament lamps). Batteries and accumulators. Electric bell apparatus. Electric cooking and heating apparatus. Electric meters. Parts of, and accessories to the above ...	10	20
Machinery other than agricultural machinery, ball or roller bearings or parts thereof	10	20
Ball or roller bearings and parts thereof	23½	33⅓
Manufactures (other than sheets, piping, tubing and rods and machinery belting) wholly or partly of rubber, balata or gutta percha, including vulcanite and ebonite ...	10	20
Articles manufactured wholly or partly of aluminium, copper, lead, nickel, tin, zinc and alloys, including these metals (excluding sheets, and strip, rods, plates, ingots, bars, slabs and discs, angles, shapes and sections, wire and tubes ; machinery, tools, scientific and medical instruments)	10	20
Steel springs and spring steel, screws, nails, tacks, studs, spikes, rivets, washers, bolts and nuts	10	20
Goods manufactured wholly or partly of asbestos	5	15
Locks, padlocks, keys, bolts, latches, hasps and hinges of metal... ...	10	20
Tools other than agricultural tools	10	20
Articles manufactured wholly or partly of wood	10	20
Dressed leather (other than patent, varnished, japanned and enamelled and glace kid)	5	15
Paints and colours, excluding printers' ink, varnishes, lacquers, enamels, and dyestuffs	10	20

GRAMOPHONE RECORDS

Makers' Trade Names and Prices

BELTONA.

MURDOCH TRADING CO., 59-61, Clerkenwell Road, London, E.C.1. Telephone—Clerkenwell 6144.

Standard 10 in.	2s. 6d.
Standard 12 in.	4s. 0d.
De Luxe 10 in.	3s. 0d.
De Luxe 12 in.	4s. 6d.

BROADCAST.

VOCALION GRAMOPHONE CO., LTD., 60-62, City Road, London, E.C.1. Telephone—Clerkenwell 2633.

Broadcast 9 in.	1s. 0d.
Broadcast Super Twelve ...	1s. 6d.
Broadcast Twelve (Blue)	2s. 0d.

BRUNSWICK.

WARNER-BRUNSWICK, LTD., 1–3, Brixton Road, London, S.W.9. Telephone—Reliance 3311.

Black Label, 10 in. ...	2s. 6d.
Red Label, 12 in.	4s. 0d.

COLUMBIA.

COLUMBIA GRAPHOPHONE CO., LTD., 98-108, Clerkenwell Road, London, E.C.1. Telephone—Clerkenwell 7620.

Dark Blue Label, 10 in. ...	2s. 6d.
Dark Blue Label, 12 in. ...	4s. 0d.
Light Blue Label, 10 in. ...	4s. 0d.
Light Blue Label, 12 in. ...	6s. 0d.
Purple Label, 10 in. ...	6s. 0d.
Purple Label, 12 in. ...	8s. 6d.

In addition there are a number of special ssues of a classical nature at higher prices.

DECCA.

DECCA RECORD CO., LTD., 1-3, Brixton Road, London, S.W.9. Telephone—Reliance 3311.

Blue Label, 10 in.	2s. 0d. (F Series)
Blue Label, 12 in	3s. 0d.
Magenta Label, 10 in.	3s. 0d.
Magenta Label, 12 in.	4s. 6d. (T Series)

DECCA-POLYDOR.

DECCA RECORD CO., LTD., 1–3, Brixton Road, London, S.W.9. Telephone—Reliance 3311.

Red Label, 10 in. ...	2s. 6d.
Red Label, 12 in. ...	3s. 6d.
Gold Label, 10 in. ...	2s. 6d.
Gold Label, 12 in. ...	4s. 0d.

Among Polydor discs there are a number of other issues at higher prices. They are mainly classical and special reproductions. Full details will be found in current catalogues.

ELECTRON.

EDISON BELL, LTD., Glengall Road, London, S.E.15. Telephone—Bermondsey 2211.

Dark Blue Label, 10 in. ...	1s. 6d.
Dark Blue Label, 12 in. ...	4s. 6d.

H.M.V.

THE GRAMOPHONE CO., LTD., 363 Oxford St., London, W.1. Telephone—Mayfair 1240.

Plum Label, 10 in. ...	2s. 6d.
Plum Label, 12 in. ...	4s. 0d.
Red Label, 10 in. ...	4s. 0d.
Red Label, 12 in. ...	6s. 0d.

No further Black Label records will be issued. Supplies of these discs pressed before September 1, 1931, will retail at 4s. for the 10 in. and 6s. for the 12 in. discs.

Apart from the above discs, H.M.V. list a number of Royal records, special and single-sided discs, full particulars of which are given in the current catalogues.

IMPERIAL.

CRYSTALATE MANUFACTURING CO., LTD., 60-62, City Road, London, E.C.1. Telephone—Clerkenwell 2633.

Red Label, 10 in. ...	1s. 3d.
Red Label, 12 in. ...	2s. 0d.

PANACHORD.

WARNER-BRUNSWICK, LTD. (see Brunswick).

Blue Label, 10 in.	1s. 6d.

PARLOPHONE.

THE PARLOPHONE CO., LTD., 98, Clerkenwell Road, London, E.C.1. Telephone—Clerkenwell 7620.

Red Label, 10 in. ...	2s. 6d.
Dark Blue Label, 10 in. ...	2s. 6d.
Dark Blue Label, 12 in. ...	4s. 0d.
Parlophone-Odeon, 10 in.	4s. 0d.
Parlophone-Odeon, 12 in.	6s. 0d.

RADIO.

EDISON BELL, LTD. (see Electron).

Dark Blue Label, 8 in. ...	1s. 0d.

REGAL.

COLUMBIA GRAPHOPHONE CO., LTD., (See Columbia).

Red Label, 10 in. ...	1s. 6d.

STERNO.

STERNO MANUFACTURING CO., LTD., 19, City Road, London, E.C.1. Telephone—National 5886.

Red Label, 10 in.	1s. 3d.
Plum Label, 12 in. ...	2s. 6d.

WINNER

EDISON BELL, LTD. (see Electron).

Red Label, 10 in.	1s. 6d.
Gold Label, 10 in. ...	2s. 0d.

ZONOPHONE.

BRITISH ZONOPHONE CO., LTD., 98, Clerkenwel Road, London E.C.1. Telephone—Clerkenwel 7620

Green Label, 10 in. ...	1s. 6d.

TRADE DISCOUNT

Amount.	Discount Rate %.																							
	2½			3⅓			3¾			5			7½			10			12½					
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.			
£100	2	10	0	3	6	8	3	15	0	5	0	0	7	10	0	10	0	0	12	10	0			
90	2	5	0	3	0	0	3	7	6	4	10	0	6	15	0	9	0	0	11	5	0			
80	2	0	0	2	13	4	3	0	0	4	0	0	6	0	0	8	0	0	10	0	0			
70	1	15	0	2	6	8	2	12	6	3	10	0	5	5	0	7	0	0	8	15	0			
60	1	10	0	2	0	0	2	5	0	3	0	0	4	10	0	6	0	0	7	10	0			
50	1	5	0	1	13	4	1	17	6	2	10	0	3	15	0	5	0	0	6	5	0			
40	1	0	0	1	6	8	1	10	0	2	0	0	3	0	0	4	0	0	5	0	0			
30		15	0	1	0	0	1	2	6	1	10	0	2	5	0	3	0	0	3	15	0			
20		10	0		13	4		15	0	1	0	0	1	10	0	2	0	0	2	10	0			
10		5	0		6	8		7	6		10	0		15	0	1	0	0	1	5	0			
9		4	6		6	0		6	9		9	0		13	6		18	0	1	2	6			
8		4	0		5	4		6	0		8	0		12	0		16	0	1	0	0			
7		3	6		4	8		5	3		7	0		10	6		14	0		17	6			
6		3	0		4	0		4	6		6	0		9	0		12	0		15	0			
5		2	6		3	4		3	9		5	0		7	6		10	0		12	6			
4		2	0		2	8		3	0		4	0		6	0		8	0		10	0			
3		1	6		2	0		2	3		3	0		4	6		6	0		7	6			
2		1	0		1	4		1	6		2	0		3	0		4	0		5	0			
1			6			8			9		1	0		1	6		2	0		2	6			
19/-			6			8			9			11		1	5		1	11		2	5			
18/-			5			7			8			11		1	4		1	10		2	3			
17/-			5			7			8			10		1	3		1	8		2	2			
16/-			5			6			7			10		1	3		1	7		2	0			
15/-			5			6			7			9		1	2		1	6		1	11			
14/-			4			6			6			8		1	1		1	5		1	9			
13/-			4			5			6			8		1	0		1	4		1	8			
12/-			4			5			5			7			11		1	2		1	6			
11/-			3			4			5			7			10		1	1		1	5			
10/-			3			4			5			6			9		1	0		1	3			
9/-			3			4			4			5			8			11		1	2			
8/-			2			3			4			5			7			10		1	0			
7/-			2			3			3			4			6			8			11			
6/-			2			2			3			4			5			7			9			
5/-			2			2			2			3			5			6			8			
4/-			1			2			2			2			4			5			6			
3/-			1			1			1			2			3			4			5			
2/-			1			1			1			1			2			2			3			
1/-	—			—			—					1			1			1			2			
11d.	—			—			—					1			1			1			1			
10d.	—			—			—					1			1			1			1			
9d.	—			—			—			—					1			1			1			
8d.	—			—			—			—					1			1			1			
7d.	—			—			—			—					1			1			1			
6d.	—			—			—			—			—					1			1			
5d.	—			—			—			—			—					1			1			
4d.	—			—			—			—			—			—					1			
3d.	—			—			—			—			—			—			—					
2d.	—			—			—			—			—			—			—					

READY RECKONER

Amount.	Discount Rate %.																	
	15			17½			20			25			27½			33⅓		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
£100	15	0	0	17	10	0	20	0	0	25	0	0	27	10	0	33	6	8
90	13	10	0	15	15	0	18	0	0	22	10	0	24	15	0	30	0	0
80	12	0	0	14	0	0	16	0	0	20	0	0	22	0	0	26	13	4
70	10	10	0	12	5	0	14	0	0	17	10	0	19	5	0	23	6	8
60	9	0	0	10	10	0	12	0	0	15	0	0	16	10	0	20	0	0
50	7	10	0	8	15	0	10	0	0	12	10	0	13	15	0	16	13	4
40	6	0	0	7	0	0	8	0	0	10	0	0	11	0	0	13	6	8
30	4	10	0	5	5	0	6	0	0	7	10	0	8	5	0	10	0	0
20	3	0	0	3	10	0	4	0	0	5	0	0	5	10	0	6	13	4
10	1	10	0	1	15	0	2	0	0	2	10	0	2	15	0	3	6	8
9	1	7	0	1	11	6	1	16	0	2	5	0	2	9	6	3	0	0
8	1	4	0	1	8	0	1	12	0	2	0	0	2	4	0	2	13	4
7	1	1	0	1	4	6	1	8	0	1	15	0	1	18	6	2	6	8
6		18	0	1	1	0	1	4	0	1	10	0	1	13	0	2	0	0
5		15	0		17	6	1	0	0	1	5	0	1	7	6	1	13	4
4		12	0		14	0		16	0	1	0	0	1	2	0	1	6	8
3		9	0		10	6		12	0		15	0		16	6	1	0	0
2		6	0		7	0		8	0		10	0		11	0		13	4
1		3	0		3	6		4	0		5	0		5	6		6	8
19/-		2	10		3	4		3	10		4	9		5	3		6	4
18/-		2	8		3	2		3	7		4	6		4	11		6	0
17/-		2	7		3	0		3	5		4	3		4	8		5	8
16/-		2	5		2	10		3	2		4	0		4	5		5	4
15/-		2	3		2	8		3	0		3	9		4	2		5	0
14/-		2	1		2	5		2	10		3	6		3	10		4	8
13/-		1	11		2	3		2	7		3	3		3	7		4	4
12/-		1	10		2	1		2	5		3	0		3	4		4	0
11/-		1	8		1	11		2	2		2	9		3	0		3	8
10/-		1	6		1	9		2	0		2	6		2	9		3	4
9/-		1	4		1	7		1	10		2	3		2	6		3	0
8/-		1	2		1	5		1	7		2	0		2	2		2	8
7/-		1	1		1	3		1	5		1	9		1	11		2	4
6/-			11		1	1		1	2		1	6		1	8		2	0
5/-			9			11		1	0		1	3		1	5		1	8
4/-			7			8			10		1	0		1	1		1	4
3/-			5			6			7			9			10		1	0
2/-			4			4			5			6			7			8
1/-			2			1			2			3			3			4
11d.			2			2			2			3			3			4
10d.			2			2			2			3			3			3
9d.			1			2			2			2			2			3
8d.			1			1			2			2			2			3
7d.			1			1			1			2			2			2
6d.			1			1			1			2			2			2
5d.			1			1			1			1			1			2
4d.			1			1			1			1			1			1
3d.		—				1			1			1			1			1
2d.		—			—			—				½			1			1

BANK AID FOR DEALERS

Tiding the temporarily depressed dealer over periods of cash shortage is the banker's almost daily performed task. He generally requires material indication that the money lent—which belongs, of course, to other depositors—will be duly repaid.

Many a borrowing request which cannot be regarded as a banking proposition can nevertheless be negotiated by the banker by means of introducing the would-be borrower to other customers desiring to invest capital in sound business.

This often creates a better position for the would-be borrower, making him a salaried managing director, with full discretion as to management, but sharing the financial responsibility with others well able to bear it.

Similarly, when times are difficult, it is the banker who helps the dealer to obtain extra credit which often has temporarily to replace cash.

When the better days come, the dealer often finds that necessary restocking is hampered by lack of cash resources. Again it is the banker who will not hesitate to help when convinced of the ability of the dealer to make good. He will lend, and further, uphold, the dealer's credit name.

Overdraft, outside capital, credit—none can be obtained unless the banker thinks well of the dealer as a money manager.

How the dealer conducts his banking account will act as an almost infallible guide to his general monetary sense. If he pays in regularly, settles all accounts by cheque, and does not take cash from the till haphazard, but replaces it by a cheque ; if he separates business and domestic moneys, and is known to sell at a fair margin of profit ; if he avoids bookmakers and moneylenders, and does not dodge his tax-paying, then the banker has fairly sound reasons for supposing that he knows his financial position at all times, is to be trusted with the employment of other people's money, and is willing and able to meet financial obligations.

Dealers giving the name of the banker as credit referee are wise to advise him of the firms to whom the bank's name is given, and the amount of credit required of each. This shows that the dealer is business-like.

Applying for an advance to tide over depression, copies of the last five balance-sheets should be produced for the banker's inspection, and the exact financial position and difficulties fully explained.

When extension of business premises or scope is the use to which the capital is to be put, it is well to map out roughly how the money, if advanced, will be disposed, to point out just where it will show a direct return, and how it will enable the business to meet interest appropriations.

Borrowing is *buying* money on deferred terms ; so buy your money in the best market and approach the seller with a knowledge of what he will expect of you.

Radio dealers should strain every nerve to get out of the banker's debt—the sooner they do so the less will their advance have cost them.

A specified limit of overdraft should never be exceeded without arrangement ; because the banker has stood by the dealer once is no reason why he should necessarily do so again.

When a repayment date has been fixed, some sort of preparation for the arrival of that day should be made. It might help many to open a "No. 2" account, and to make regular transfers to this, when loan repayment is to be out of profits. The banker would take a balance here into consideration when charging interest on the main account.

The banker should be kept in touch with the dealer's progress ; to send him annual or bi-annual balance sheets and profit and loss accounts is a good plan. Another sound plan is to visit the bank periodically and talk over finance with the manager.

LICENCES AND DEMONSTRATION SETS

According to a G.P.O. official, a licence is issued to cover the "erection of a receiving station . . ."

A dealer whose shop is part of his house has to take out a licence for his demonstration receiver, as well as the licence for his family receiver. The shop installation is a "separate receiving station."

Naturally, demonstration receivers in lock-up shops must be licensed just the same.

These dealers who derive a large amount of trade from sending receivers out on approval will, it seems, have to lay in a stock of licences.

If the prospective customer already has a licence, then the set sent on approbation needs no further licence.

On the other hand, should the set be taken to a prospect with no licence, then the dealer must provide a "portable" licence with the apparatus.

INCOME TAX ON H.P. PROFITS

Present methods of assessing hire-purchase profits for income-tax purposes make it essential that all such transactions should be treated in the trader's accounts as "hirings," and never as "sales."

He is now bound to pay tax only on that part of instalments actually received.

Every payment received is, of course, partly cost proportion and partly profit.

Take, for example, a wireless set of value, with finance charge, £20. It is to be sold on terms of £5 initial payment, and the balance by twelve monthly instalments of 25s.

The initial payment is made on October 1, and subsequent hire rents are received on November 1 and December 1. When the books are ruled on December 31, £7 10s. has been received on that set.

Assume that the total profit on the transaction will amount to £4—or 20 per cent. of the selling price. Tax assessment figures returned in respect of the financial year ended December 31 need not include the entire £4 of profit on this transaction.

They need include only 20 per cent. of the £7 10s. actually received in respect of the hiring—that is 30s.

The remaining 50s. of profit will, if duly received, be taxed, of course, in the returns of the next financial year.

Should any hire-purchase transaction not be completed the trader will, under this method, pay tax only on moneys actually received.

That the wireless retailer may have at hand correct figures of his hire-purchased transactions for tax purposes, he must treat all such business in his books as "hirings," not as "sales."

Then his books will be accepted by the tax authorities as evidence of the *bona-fides* of his profit and loss account figures.

The book-keeping method to employ is shown by this specimen page of a wireless dealer's hiring ledger.

Of paramount importance here is the first entry on the left-hand side—the amount of the cheque paid to the manufacturers for the wireless set.

In the ordinary credit ledger, where the transaction is treated as a "sale," the first entry would be the *sale* value of the goods concerned, and the customer would be shown as a debtor.

In the hiring ledger, the customer cannot be shown as a debtor—he owes nothing, since hire rents are paid in advance.

Entries are straightforward until the "To Profit Accrued" figure is reached. This is ascertained, in the present instance, by dividing the sum of payments received by five—since the rate of profits is 20 per cent.

The "By Balance of Set Value" figure is ascertained by subtracting the profit accrued from the sum of hire rents received, and taking the difference thus obtained from the cost value of the set.

Hirer's Name.....

Address.....

Description of Set.....

No. of Set ..... No. of Hiring Agreement.....

Date of Agreement ..... Terms : £5 down payment and 12 hire rents of 25s.

Date.		£	s.	d.	Date.		£	s.	d.
1931.					1931.				
Oct. 1	Cost of Set	16	0	0	Oct. 1	By Down Payment ..	5	0	0
Dec. 31	To profit accrued ..	1	10	0	Nov. 1	By Payment ..	1	5	0
					Dec. 1	Do. ..	1	5	0
					Dec. 31	By Balance of Set Value	10	0	0
		£17	10	0			£17	10	0
1932.					1932.				
Jan. 1	To Balance	10	0	0	Jan. 1	By Payment ..	1	5	0
	To Balance of Profit..	2	10	0	Feb. 1	Do. ..	1	5	0
						Etc., etc., etc.			
					Oct. 1	By Payment ..	1	5	0
		£12	10	0			£12	10	0

TAX ON H.P. PROFITS

This figure then represents the balance, *not of payments yet to come*, but of the *value of the set.*

For tax purposes, the profit accrued figure will be included in the retailer's gross profit. When hirings are comparatively few, it is simple to extract, from the Hiring Ledger, these figures.

The sum of them and the profit on transactions completed during the year will give the trader the total profit to date on hire-purchase transactions.

Wireless retailers doing a considerable hiring business may find it convenient to adopt the "bulk" valuation method of arriving at gross profits, which is allowed and encouraged by tax authorities.

The foundation of this method is to regard all goods out on hire terms as "stock." The "stock" value of any such article is ascertained by deducting from the unpaid balance of hire rents the proportion of profit which they contain.

The valuation is simply made in the manner of the following example :—

Year ended December 31, 1931.

Dr.	£
To "Stock" out under h.-p. agreements at January 1, 1931 ..	492
Cost price of sets sent out under h.-p. agreements during 1931	756
Gross profit carried to profit and loss account	145
	£1,393

Cr.	
By Cash received on h.-p. accounts during 1931	725
"Stock" out under h.-p. agreements at December 31, 1931	668
	£1,393

The first item here will have been carried forward from the previous year, and represents the balances of instalments outstanding at that time, less the appropriate profit proportion.

The second item is self-explanatory. The third is found by deducting the total of the first two from the credits total.

All the money which the wireless retailer has received on account of hire-purchase transactions is represented by the first item of credits.

Included in it is all the profit which has been netted for the year on completed portions of those transactions. So that the second figure of credits must not include any profit, or else the retailer will be paying tax as though the transactions were completed.

The second figure of credits, therefore, is ascertained by extracting from the hiring ledger all those final figures on the right-hand side thereof which represent "balances of set values."

We have already seen that, since the initial ledger entry is the cost price of the set, and not the sale price, these figures include no profit, but show the "stock" value of the sets at the end of the year.

MUSIC ROYALTY AND P.A.

The Performing Right Society, Ltd., of 13, George Street, Hanover Square, London, W.1, ('phone : Mayfair 1168), collects royalties for reproduction rights.

When music is supplied in a hall or for a body which often runs events, the royalty is usually covered by an annual licence.

If in doubt, the dealer should enquire whether the organisers of an event or the owners of the venue hold a licence. One of the three parties must pay. All are equally liable.

The Society usually looks to the promoter of the event to pay any royalty. The Society will always give further information.

COPYRIGHT NOTICE

All dealers and users of public address equipment should note the following statement issued by the British Broadcasting Coporation during 1932 :—

"No unauthorised outside use may be made of a broadcast programme. In particular the copyright of all broadcast commentaries, and of all news supplied by the News Agencies, is strictly reserved.

"These broadcasts are for the private use of owners of receiving sets only and may not be communicated to the public by loud-speaker, lantern slide, printed slip or other device."

ADVERTISING AND PRINTING DATA

PAPER SUB-DIVISIONS.

When a sheet of paper is cut the resulting sheets have special names according to the number of cuts.

Sheet Cut into	Name of resulting small sheets	Written as
2	Folio	fo.
4	Quarto	4to.
6	Sexto	6to.
8	Octavo.	8vo.
12	Duodecimo (or twelvemo)	12mo.
16	Sextodecimo (or sixteenmo)	16mo.

The size of a quarto sheet, naturally, depends on the size of the original sheet, which must be quoted if this way of describing a size, instead of inches, is used.

STANDARD SHEETS.

In fixing the dimensions of a piece of print, work to the sizes which cut economically out of standard sheets of card or paper, and which give the printer least trouble in machining.

OTHER SHEET SIZES

(in inches).

Elephant	23 × 28
Post	15½ × 19¼
Double Foolscap	17 × 27
Double Post	19½ × 31½
Double Large Post	21 × 33
Double Demy	22½ × 35

CARD SIZES.

(All measurements in inches).

Description.	Size.
Third Large	3 × 1½
Broad Thirds	3 × 1¾
Town	3 × 2
Reduced Small	3⅝ × 2⅛
Small	2⅜ × 3⅝
Carte de Visite	4⅛ × 2½
Large	4½ × 3
Correspondence	4½ × 3½
Post Cards, Official	5½ × 3½
Post Cards, Court	4½ × 3½
Large Court	4⅞ × 4
Double Small	4¾ × 3⅝
Double Large	6 × 4½
Cabinet	6½ × 4¼
Quad Small	7¼ × 4¾
Quad Large	9 × 6

PAPER SIZES (all measurements in inches).

Size of sheet.	Size of page (trimmed).				
	16mo.	8vo.	4to.	6mo.	12mo.
Foolscap, 13½ × 17	3⅜ × 4⅛	4⅛ × 6⅝	6⅜ × 8⅜	5⅜ × 6½	3⅛ × 5⅜
Crown, 15 × 20	3⅝ × 4⅞	4⅞ × 7⅜	7⅜ × 9⅞	6⅜ × 7⅜	3⅝ × 6⅜
Large Post, 16½ × 21	4 × 5⅛	5⅛ × 8⅛	8⅛ × 10⅜	6⅞ × 8⅛	4 × 6⅞
Demy, 17½ × 22½	4¼ × 5⅛	5½ × 8⅝	8⅜ × 11⅛	7⅜ × 8⅝	4¼ × 7⅜
Medium, 18 × 23	4⅜ × 5⅝	5⅜ × 8⅞	8⅞ × 11⅜	7½ × 8⅞	4⅜ × 7½
Royal, 20 × 25	4⅞ × 6⅛	6⅛ × 9⅞	9⅞ × 12⅜	8⅛ × 9⅞	4⅞ × 8⅛
Super Royal, 20½ × 27½	5 × 6¾	6¾ × 10⅛	10⅛ × 13⅝	9 × 10⅛	5 × 9
Imperial, 22 × 30	5⅜ × 7⅜	7⅜ × 10⅞	10⅞ × 10⅞	9⅞ × 10⅞	5⅜ × 9⅞
Double Crown, 20 × 30	4⅞ × 7⅜	7⅜ × 9⅞	9⅞ × 14⅞	9⅞ × 9⅞	4⅞ × 9⅞
Double Royal, 25 × 40	6⅛ × 9⅞	9⅞ × 12⅜	12⅜ × 19⅞	13⅛ × 12⅜	6⅛ × 13⅛

ADVERTISING DATA

LINE WIDTH FOR GREATEST READABILITY.

Length of line in conjunction with size of type has a marked bearing on readability. Long lines of very small types make it difficult to follow the line. Short lines of large type make word-spacing irregular and causes many broken words.

The minimum and maximum length of line measured in ($\frac{1}{6}$ of an inch) for the usual body-matter type sizes are as given below.

Size of Type.	Minimum.	Maximum.
6 pt.	6 ems	12 ems
8 pt.	8 ems	14 ems
10 pt.	12 ems	18 ems
12 pt.	14 ems	24 ems
14 pt.	16 ems	30 ems
18 pt.	18 ems	36 ems

NUMBER OF WORDS TO THE SQUARE INCH.

Type size.	Words. Solid.	Words. 1½-pt. Leaded
5½ pt.	54	45
6 pt.	47	34
8 pt.	32	23
10 pt.	21	16
12 pt.	14	11
14 pt.	11	7

CIRCULAR LETTER COSTS.

These figures are roughly what is charged by firms specialising in this kind of work. Prices are given per thousand.

Duplicating the letter	13s. 0d.
Matching in name and address	17s. 6d.
Printing facsimile signature ..	2s. 6d.
Addressing envelopes (by hand)	12s. 6d.
„ „ (Typewriter)	15s. 0d.
Folding, enclosing, posting— (per operation : there are 5 or 6 operations for the average letter)	1s. 0d.

STEREOS AND ELECTROS.

When two blocks exactly the same are required, an original block is made from the picture or diagram, and then a stereo or electro made from the original block.

On the majority of trade printing jobs electros will be unnecessary, as stereos are quite suitable.

Electros are used only on very long printing runs as their copper printing surface stands up to wear better than does the face of a stereo.

Tables below give the prices of both stereos and electros.

STEREOS.

	Minimum and First 8 in. of every Block.	Each inch in excess of 8 in. per sq. in.	Lots of six or more (however comprised) but not exceeding 7 sq. in.
Ordinary ..	1/8	1¾d.	1/6 each
Nickel-faced ..	2/-	2d.	1/9 „
Two or more colours—			
Line or Half-tone	Per colour. 2/2	2¾d.	

ELECTROS.

	Per square inch.	Minimum.	Lots of six or more (however comprised) but not exceeding 9 sq. in.
From Type, Woodcuts—			
Line Blocks, or Half-tones	3d.	2/6	2/3 each
Two or more colours—			
	Per colour.		
Half-tone Process	3¾d.	3/3 minimum	
Line Process	3¼d.	2/9 „	

BLOCK-MAKING CHARGES.

	Per sq. in.	Minimum.
Line blocks	6d.	7s.
Colour line blocks (two colours)	1s. 4d.	18s. 8d.
Per colour after ..	8d.	9s. 4d.
Half-tone (very coarse)—		
Squared-up	7d.	8s. 2d.
Circles or ovals ..	8d.	9s. 4d.
Vignette or cut-out ..	10d.	11s. 8d.
Half-tone (medium screen)—		
Squared up	8d.	9s. 4d.
Circles or ovals ..	9d.	10s. 6d.
Vignette or cut-out ..	11d.	12s. 10d.
Half-tone (fine)		
Squared up	11d.	12s. 10d.
Circles or ovals ..	1s. 1d.	15s. 2d.
Vignettes or cut-out	1s. 4d.	18s. 8d.
Colour half-tones—	Per sq. in. beyond minimum.	
Two colours	2s. 6d.	90s.
Three colours ..	4s. 0d.	165s.
Four colours	4s. 9d.	202s.6d.

Half tone blocks are those made from photographs, or drawings in graduated light and dark tones.

Line blocks can only be made with pictures or diagrams made up of lines of un varying intensity on a contrasting back ground.

Quality of reproduction in a half-tone depends upon the paper upon which it is printed. For newspaper work a coarse half-tone is necessary, while fine half-tones must be used on an art paper.

A vignetted half-tone block is one that shades off imperceptibly into the white of the paper.

When several pictures are to be reduced by the same proportion, the blocks can be made as one and then separated. They will then be charged at the overall measurement, plus a separating charge of 6d. each.

TYPE SIZES.

The following specimens will give some idea of the appearance of different body matter type sizes :—

These two lines of type are set in six point fourteen ems wide. You will notice that this

These two lines are set in eight point, in a fourteen-em column also.

This is nine point type—a very readable and much used size. It can be utilised

Slightly larger is this ten point type, also set fourteen ems wide.

This is one of the largest sizes you will use for body matter—twelve point. Set fourteen ems.

Few advertisers use anything bigger than this — fourteen point — except for headings

RULES.

The appearance of an advertisement can be made or marred by the rule employed in its border. Here are the rules every printer will be able to supply.

1½-pt. Thin Rule

1½-pt. Thick Rule.

1½-pt. Medium Rule

3-pt. Double Medium

3-pt.

6-pt.

12-pt.

3-pt. Milled

6-pt. milled

12-pt. Milled

TYPE COMBINATIONS.

Certain faces of type which will generally be found in the ordinary printer's stock can be used harmoniously in the same piece of print. Others naturally will not mix.

The table below gives convenient combinations :

BODY TYPE (the larger sizes of which may be used for display purposes).	DISPLAY TYPES (safe to use in combination with Bold Face Group).	OPEN GROUP.
Antique Old Style.	Neuland, Goudy Bold, Cooper Black.	——
Baskerville.	Bodoni, Bodoni Bold.	Goudy Open, Old Face Open.
Bodoni.	Bodoni Bold.	——
Caslon Old Face	Plantin, Verona Bold, Goudy Bold, Garamond Bold.	Goudy Open, Old Face Open.
Plantin (Monotype).	Neuland.	Caslon Shaded.
Verona.	Verona Bold, Goudy Bold.	Old Face Open, Goudy Open.
Garamond.	Garamond Bold.	Old Face Open, Goudy Open, Caslon Shaded.
Goudy Old Style.	Goudy Bold, Verona Bold.	Goudy Open.

REGISTRATION OF BUSINESS NAMES ACT, 1925

By the Legal Editor

This Act is designed to ensure that the true name and nationality of any person trading under a "Business Name" shall be officially registered, and that the Register shall be open to inspection by any interested party.

All firms or individuals, whether of British or alien nationality, having a place of business in the United Kingdom must register under the Act, (a) if in the case of a firm it trades under a name which does not consist of the true surnames of all the partners; or (b) if any member has at any time changed his name (except, in the case of a woman, on marriage); or (c) if, in the case of an individual, he does not trade under his true surname.

The Act does not in general apply to a business which is incorporated as a limited company; but certain of its provisions are now applicable under the Companies Act of 1929 to any company incorporated subsequently to the 22nd November, 1916.

A firm, individual, or corporation carrying on business in this country as the nominee, trustee, or on behalf of another person or firm, or acting as general agent for any foreign firm is bound to register under the Act.

In the case of death or retirement of one of the partners, the successor or survivor can carry on the business under its original name, without registering afresh, provided he adds his own name to the original trading name, together with the words "successor to" or "late."

Bonâ-fide philanthropic, charitable, religious, scientific, and similar institutions, not carried on with a view to profit, are excluded from the provisions of the Act.

Firms established abroad, but having places of business in this country, are included in the Act.

Section 18 of the Act lays down that every individual and firm required by the Act to register shall show, in legible characters, (a) the present surname and Christian names or initials, (b) and former Christian name or surname, and (c) the nationality, if not British (and also the nationality of origin if this is not the same as the present nationality) *on all trade catalogues, circulars, show cards, and business stationery.* In the case of firms, these particulars must be given for all the partners.

Registration must be made, within fourteen days of the commencement of business, at Princes House, Kingsway, London, W.C.2, when the business is situated in England or Wales, or at Exchequer Chambers, Parliament Square, Edinburgh, for businesses carried on in Scotland. The cost of registration is 5s.

Neglect to comply with the provisions of the Act renders each individual concerned liable on Summary Conviction to a fine not exceeding £5 for each offence. Proceedings under the Act can, however, only be instituted by or with the consent of the Board of Trade.

BRITISH "WIRELESS FOR THE BLIND" FUND

226, Great Portland Street, London, W.1.

Telephone: Museum 9701.

At Christmas 1931, the Committee of this Fund had distributed 17,000 wireless receivers to the blind in Great Britain and Northern Ireland, and during 1932 a further 4,000 sets have been installed, making a total of 21,000.

Thanks to the great assistance given by the public, and the Wireless Trade in particular, the main task has been completed, but additional funds are needed to maintain the service as each year new cases of blindness are brought to the notice of the Fund, who intend to continue the work of supplying all blind persons who are not in the possession of a wireless set.

Throughout its activities, the B.B.C. has rendered considerable assistance to the fund.

The president of the fund is H.R.H. The Prince of Wales, and its chairman Capt. Sir Beachcroft Towse, V.C. The hon. treasurer is the Rt. Hon. Reginald McKenna, and the secretary Mr. W. McG. Eagar. The offices of the fund are at 226, Great Portland Street, London, W.1, where the telephone number is Museum 9701.

P.M.G. LICENCE

Most people think that the yearly charge of 10s. made by the Post Office for a listener's "licence" is merely a convenient way of collecting the cost of the programmes provided each day by the B.B.C. To a certain extent this is perfectly true, but it is not the full story.

The use of the ether for the purpose of wireless telegraphy and telephony is part of the vast monopoly of postal communications (including the ordinary telegraph and telephone systems) vested by law in the Postmaster General. No one in fact is entitled to use the ether, either for the transmission or reception of wireless signals of any kind, without the formal permission or "licence" of the P.M.G. This was the case long before the introduction of the present Broadcasting service, and the position remains the same to-day.

Of course, in practice, by far the larger part of the revenue collected by the Post Office under this head goes to maintain the B.B.C. in active operation, but whatever surplus is diverted into the Treasury coffers goes there properly and legally as a rent or profit made by the P.M.G. out of his monopoly powers over the ether.

Conditions of the Licence.

The present P.M.G. licence covers the use of one or more broadcast receivers in the same household. It does not, however, cover the use of a separate receiver by a lodger or sub-tenant in the same house. Similarly the occupier of each flat in the same block of buildings must take out his own licence.

If the possessor of a wireless set supplies low frequency current over wires to a loud speaker in an adjacent house, the owner of the loud speaker must take out a separate licence. In the case of a local relay service which supplies a large number of subscribers by means of wires from a central receiving station, the owner of the service must take out a special licence, whilst each subscriber must pay 10s. a year for the P.M.G. licence over and above the cost of the service itself.

The P.M.G. licence covers the use of one portable set, in addition to a set permanently installed in the household. Such portable set must, however, be operated only by the licensee or by a member of his family residing in the same house, who must carry the licence with him for inspection if required.

The receiving set must not be used in such a manner as to cause "interference," *i.e.*, the valves must not be allowed to oscillate.

The licensee must not use his set to intercept messages other than those broadcast for general reception. If he does happen to overhear any private messages he must not reproduce or make any other use of them.

Every receiver is liable to inspection by a duly authorised official of the P.M.G., who must, however, produce an official card of identification if required.

The licence is not transferable. Any permanent change of address should be notified to the Postmaster of the new district. A temporary change of address need not be notified.

A notice is now inserted on each licence warning listeners who use mains-driven sets not to make any direct connection between the electric supply mains and the aerial.

It has also been agreed that a dealer may supply a set on approval for fourteen days without it being licenced, provided he keeps a record showing the name and address of the prospective purchaser, and the dates of delivery and completion of sale.

FACTORY AND WORKSHOPS ACTS

1901—1920

By the Legal Editor

The main structure of the law relating to Factories and Workshops in this country is contained in the Act of 1901, which is too lengthy to be reproduced in full. The main provisions are summarised below, attention being directed to points of particular interest. A copy of the Act should be in the possession of every manager of a workshop or factory, since those responsible are expected to make themselves conversant with their duties and obligations to employees. It should be remembered that in matters of law ignorance is no excuse.

It is difficult to draw any clear distinction between "Factory" and "Workshop." They are both places where any manufacturing process is carried on, with or without the use of mechanical power.

Broadly speaking the legislature only protects the adult male worker in those matters which directly affect his safety and health. For the rest he is expected to be able to fend for himself. It is very different as regards (a) women of 18 and upwards, (b) "young persons" (male and female), between the years of 14 and 18, and (c) children of both sexes under 14 years of age.

Health (*Sections* 1–9).

The factory or workshop must be kept clean and properly ventilated. Wet floors must be drained and a reasonable temperature maintained. There must be no overcrowding, (i.e. a minimum of 250 cubic feet of space must be allowed per person, and during periods of overtime, at least 400 cubic feet per person). Proper sanitary conveniences must be provided.

All the inside walls and ceilings of each room, whether plastered or not, if they have not been painted with oil or varnished once at least within seven years, must be limewashed at least every fourteen months; and if they have been painted or varnished, must be washed with hot water and soap every fourteen months.

Safety (*Sections* 10–18).

Certain kinds of machinery must be fenced; steam boilers maintained in proper condition and periodically overhauled; adequate means of escape provided in case of fire; the doors must be made to open from inside; the moving carriage of any automatic machine must not run out beyond the fixed frame of the machine to within a distance of eighteen inches from any fixed structure in any passage or space through which any person is liable to pass.

A child is not allowed to clean any part of any machinery, or any place under any machinery other than overhead mill gearing. A young person is not allowed to clean any dangerous part of any machinery while in motion. A woman or young person is not allowed to clean mill gearing while in motion.

The Courts are given power to make an Order prohibiting the use of any dangerous machinery or plant, or to close down a factory or workshop as unhealthy or dangerous.

Accidents (*Sections* 19–22).

These Sections are now supplemented by the Notice of Accidents Act, 1906, and the "Dangerous Occurrences Notification Order of 1928." dealt with below.

Any accident in a factory or workshop

(*a*) causing loss of life to a worker, or

(*b*) due to any power-driven machinery, or to molten lead or hot liquid, or to an explosion or escape of gas or steam, or to electricity, inflicting such injuries to a worker as to cause him to be absent from employment for at least one day, or

(*c*) any accident disabling a worker from employment for more than seven days,

must be notified in writing to the Factory Inspector and also to the certifying Surgeon for the district.

Hours of Employment, etc. (*Sections* 23–35).

These sections relate to hours of employment and provision for meal-times and holidays, particularly as affecting women, young persons, and children.

The manager must fix a notice in a prominent position in the factory or workshop setting out (a) the daily hours of employment, (b) the time allowed for meals. A copy must be sent to the Factory Inspector, who must also be notified of any subsequent changes.

The period of employment of women and young children in a non-textile factory or workshop shall, except on Saturday, and

with certain other exceptions, begin between 6 a.m. and 8 a.m., and end between 6 p.m. and 8 p.m., with meal intervals of not less than one hour and a half, of which at least one hour must be before 3 p.m. No woman or young person shall be employed continuously for more than five hours without an interval of at least half an hour for a meal.

All women and young persons must have their meals at the same times of day; they must not be employed or allowed to remain in any room in which work is in progress during these times.

The recognised Bank Holidays must be observed—or a full day, or its equivalent, allowed as a holiday in lieu.

If an employer of the Jewish faith keeps his factory or workshop closed on Saturday until sunset, he may employ women and young persons from after sunset on Saturday until 9 o'clock in the evening. If he closes down all day on Saturday, he may extend the permitted hours of work by one hour each day during the rest of the week, except on Sunday.

Miscellaneous Provisions.

The remaining sections of the Act may be briefly summarised as follows:—

Sections 36–48 set out special exceptions which may be made to the general rules previously laid down regarding hours and holidays.

Sections 49–60 regulate overtime and night-work, and deal with intermittent and special employment.

In non-textile factories and workshops the "hours of employment" for women on any day except Saturday may be extended for two hours overtime, provided that at least two hours are allowed during the day for meals, of which half an hour must be after 5 p.m., and also provided that a woman must not be so employed on overtime for more than three days in any one week, or for more than thirty days in twelve months.

Sections 61–67 forbid the employment of children under 12, and of women within four weeks of childbirth. Employers must have medical certificates of fitness in the case of young persons and children residing more than three miles from the factory.

Sections 68–72 relate to education, and make the employer share with the parent the obligation of seeing that each employed child shall attend a recognised school.

A child employed during the morning or afternoons must attend a recognised efficient school on each work-day for at least one attendance; or, when employed on the alternate day system, must on each other day make at least two attendances at the school, these attendances being between the hours of 8 a.m. and 6 p.m. ("Child" is defined to be a person under the age of 14 years and who has not—at the age of 13—obtained a certificate of proficiency or attendance at school.)

Sections 73–86 are concerned with certain industries specified as "Dangerous and Unhealthy."

Sections 87–106 set out certain modifications and extensions which are allowable in respect of the provisions made in the preceding sections.

Sections 107–115 are concerned chiefly with the conditions of employees who work at their own homes, particularly as regards the use of unwholesome premises or where there is infectious disease.

Sections 116–117 are designed to ensure that piece-workers in certain trades are fairly paid for the work they do.

In every factory, for the purpose of enabling each piece-time worker to calculate the amount of wages due to him, there must be a clear list of the rate of wages applicable to the work done, and also particulars of the work to which the rate is applicable. These must be given to the worker when the work is handed to him, or posted up in a conspicuous place in the workroom.

Sections 118–134 contain provisions regarding the general administration of the Act; the appointment, power, and duties of Factory Inspectors and Surgeons; and regulations as to special notices, registers, and returns, and how and when they are to be made.

Sections 135–148 relate to the various penalties incurred by any breach of the Act, and the legal procedure for enforcing them.

The last part of the Act (*Sections* 149–163) are of a supplementary nature, and do not call for further description.

Since the passing of the 1901 Act various supplementary measures have been passed.

"Notice of Accidents Act 1906."

This tightens up the provisions of the 1901 Act relating to accidents, and lays down that certain kinds of "dangerous occurrences" must be notified even though no bodily injury is caused.

Dangerous Occurrences Notification Order, 1928.

This is a further development of the preceding Act making notification to the Inspector compulsory in the following cases, whether personal disablement or injury is involved or not—

(*a*) bursting of a revolving vessel or wheel driven by mechanical power;

(*b*) breaking of a rope or chain or other appliance used for raising or lowering persons or goods by mechanical power;

FACTORY ACTS

(*c*) any explosion or fire due to (i) ignition of dust, vapour, or gas; (ii) ignition of celluloid or substances composed wholly or partly of celluloid; (iii) electrical short-circuit or failure of electrical apparatus, if the occurrence causes damage to the structure of any building in which persons are employed or to any machinery or plant therein, and results in the complete suspension of ordinary work, or stoppage of plant for not less than five hours;

(*d*) explosion or fire due to causes other than those set out under (*c*) above, and causing total suspension of ordinary work for not less than 24 hours.

Police, Factories, etc. (Miscellaneous Provisions) Act, 1916.

This act empowers the Secretary of State to make "Welfare Orders" compelling special precautions to be taken for the health and comfort of workers in certain industries.

Employment of Women, Young Persons, and Children Act, 1920.

This was passed to give effect to recommendations made by the International Labour Organisation of the League of Nations. It forbids the employment of children under fourteen years of age in any industrial undertaking, except domestic factories and workshops. It also restricts the employment of young persons of both sexes between the years of 14 and 18.

In this connection it may be pointed out that the Education Act of 1921 forbids the employment of children between 12 and 14 in any manner which prevents their attendance at school.

Regulations for Accumulator Manufacture and Repair.

Among the numerous Statutory Rules and Orders issued under the Factory and Workshops Acts, No. 28 of 1925, which repeals a previous Order of 1923, No. 1004, is of particular interest since it applies to the repair, as well as the manufacture, of any accumulator containing lead or any compound thereof. The principal provisions are:—

No person under 18 years of age shall be employed in any lead process, *i.e.*, in melting lead or any material containing lead, or in casting, pasting, lead-burning, or any operation involving trimming, abrading or cutting of pasted plates containing lead oxide.

No woman or young person under 18 shall be employed in any room in which the manipulation of raw oxide of lead, or pasting, is carried on.

In every room in which a lead process is carried on there must be a minimum of 500 cubic feet of air per person, any height over 12 feet not being taken into account.

Every person employed in a lead process shall be medically examined within seven days of his first employment, and monthly thereafter.

Other sections of the Order regulate the working conditions under which various processes are to be carried out, prescribe the protective clothing to be worn by the workers, and specify the sanitary and washing accommodation to be provided in each workshop or factory.

Regulations for the Use of Electrical Energy (Order No. 1312 of 1908).

The principal provisions are as follows:—

All apparatus and conductors shall be sufficient in size and power for the work they are called upon to do, and so constructed, installed, protected, worked and maintained as to prevent danger so far as is reasonably practicable.

All conductors shall either be covered with insulating material, and further efficiently protected where necessary to prevent danger, or they shall be so placed and safeguarded as to prevent danger so far as is reasonably practicable.

Every switch, switch fuse, circuit-breaker, and isolating link shall be: (*a*) so constructed, placed, or protected as to prevent danger; (*b*) so constructed and adjusted as accurately to make and to maintain good contact; (*c*) provided with an efficient handle or other means of working, insulated from the system, and so arranged that the hand cannot inadvertently touch live metal: (*d*) so constructed or arranged that it cannot accidentally fall or move into contact when left out of contact.

Every switch intended to be used for breaking a circuit and every circuit-breaker shall be so constructed that it cannot with proper care be left in partial contact, or so that an arc cannot accidentally be maintained.

Every fuse and every automatic circuit-breaker used instead thereof shall be so constructed and arranged as effectively to interrupt the current before it so exceeds the working rate as to involve danger.

Every electrical joint and connection shall be of proper construction as regards conductivity, insulation, mechanical strength and protection.

Efficient means, suitably located, shall be provided for cutting off all pressure from every part of a system, as may be necessary to prevent danger.

Every motor, convertor and transformer shall be protected by efficient means suitably placed and so connected that all pressure may thereby be cut off from the motor, convertor or transformer as the case may be, and from all apparatus in connection therewith: provided, however, that where one point of the system is connected to earth, there shall be no obligation to disconnect on that side of the system which is connected to earth.

Every flexible wire for portable apparatus, for alternating currents or for pressures above 150 volts direct current, shall be connected to the system either by efficient permanent joints or connections, or by a properly constructed connector.

In all cases where the person handling portable apparatus or pendant lamps with switches, for alternating current or pressures above 150 volts direct current, would be liable to get a shock through a conducting floor or conducting work or otherwise, if the metal work of the portable apparatus became charged, the metal work must be efficiently earthed.

The Truck Act, 1896.

The Truck Acts prohibit, in general, the payment of workers' wages in any form other than cash.

Fines and Deductions.

The 1896 Act, which amends former Acts, lays down that an employer shall not make any contract with a workman for any deduction from the stipulated rate of wages, or for any payment by way of fine, unless

(*a*) the terms of the contract are conspicuously displayed in the workshop, or are set out in writing and signed by the worker, and

(*b*) the contract sets out specifically the acts or omissions in respect of which fines may be levied, and

(*c*) the fine imposed by the contract is in respect of some act which causes or is likely to cause damage or loss to the employer, and

(*d*) the amount of the fine is fair and reasonable having regard to all the circumstances of the case.

These provisions apply equally to shop assistants as to other workers.

Payments for Damaged Goods.

Deductions or fines in respect of damage done by workmen to goods or materials supplied are also subject to the foregoing provisions. In addition :—

(*a*) Not only must the fine be "fair and reasonable," but it must not, in any circumstances, exceed the actual amount or loss suffered by the employer.

(*b*) The contract need not set out all particulars of deductions, since it is impossible to foresee these completely, though it must set out definitely that deductions are to be made in respect of damage done to materials by the workman.

Recovery of Fines.

Any sum taken by or paid to the employer by way of fine, contrary to this Act, can be recovered by the employee provided he applies to the Court within six months of the date of deduction or fine ; but if he has signed a contract agreeing to such fines or deductions, he can only recover whatever amount has been paid in excess of that which the Court may hold to be fair and reasonable.

BRITISH RADIO CABINET MANUFACTURERS' ASSOCIATION

30, Bouverie Street, London, E.C.4.
Telephone : Walthamstow 2833–4.

Chairman :
W. J. Salaman.

Vice-Chairman :
H. Holmes.

Hon Secretary :
A. E. Johnson.

Members :

Carrington Manufacturing Co., Ltd. ; Daventry & Co., Ltd. ; Edward Doherty & Sons ; John J. Dunster & Sons ; F. W. Edwards ; A. Ercolani & Sons, Ltd. ; Franchi Endura Co. ; Holmes Bros. (London), Ltd. ; J. B. Manufacturing Co. (Cabinets), Ltd. ; C. A. Osborn ; Western Joinery Works ; Smith's Cabinets, Ltd. ; T. Stanton.

The first meeting of this new Association was held in July 1932.

Its primary object is to promote mutual understanding and goodwill between those connected in the making of radio cabinets, thereby improving the standard of design and service to the radio manufacturers and to the whole of the Industry.

Every cabinet manufactured by a member of the B.R.C.M.A. is to be stamped with the Association symbol.

SHOP REGULATION ACTS

1919—1928

By the Legal Editor

The term "shop" as here used applies to any "premises where a retail trade or business is carried on," a definition which distinguishes the scope of the Shops Acts from that of the "Factory and Workshops Acts" dealt with separately on pages

The origin of the law relating to the employment of shop assistants may be traced back to the early Truck Acts, which first compelled employers to pay all wages entirely in cash or coin, and prohibited any part being paid "in kind," *i.e.*, in food clothing, or other commodities.

In his own interest the owner or manager of any shop, large or small, should study the main provisions of the Shops Acts. He is responsible for the proper observance of specified obligations towards his employees, and cannot evade the consequences of any infraction of the law under the plea of ignorance.

This Act consolidates the Shops Regulation Acts 1892-1911.

Conditions of Employment.

(*a*) On at least one weekday in each week a shop assistant shall not be employed after half-past one-o'clock in the afternoon.

This does not apply to the week preceding a Bank Holiday if the shop assistant is not employed on the Bank Holiday, and if on one weekday in the following week, in addition to the Bank Holiday, the employment of the shop assistant ceases not later than half-past one o'clock in the afternoon.

(*b*) The occupier of a shop shall set out in a notice displayed in the shop the day of the week on which his shop assistants are not employed after half-past one o'clock, and may fix different days for different shop assistants.

Meal Times.

Intervals for meals shall be allowed to each shop assistant and shall be arranged so as to secure that no person shall be employed for more than six hours without an interval of at least twenty minutes being allowed, provided that :—

(1) where the hours of employment include the hours from 11.30 a.m. to 2.30 p.m., an interval of not less than three quarters of an hour shall be allowed between those hours for dinner, which shall be increased to one hour in cases where that meal is not taken in the shop, or in a building of which the shop forms a part or to which the shop is attached :

(2) where the hours of employment include the hours from 4 p.m. to 7 p.m., an interval of not less than half an hour shall be allowed between those hours for tea.

This provision does not apply to a shop if the only persons employed as shop assistants are members of the family of the occupier of the shop, maintained by him and dwelling in his house.

The penalty for any breach of the foregoing regulations is, for the first offence, a fine not exceeding £1 ; for a second offence £5 ; and for a third or subsequent offence £10 ; but an exception is made in the case where an assistant stays on after 1.30 for the purpose of serving customers who were in the shop at that time.

Employment of "Young Persons."

(*a*) No "Young person" (*i.e.*, one under the age of eighteen years) shall be employed in or about a shop for a longer period than seventy-four hours, including meal times, in any one week.

(*b*) In every shop in which a young person is employed a notice shall be kept exhibited by the occupier of the shop in a conspicuous place stating the number of hours in the week during which a young person may lawfully be employed in or about the shop.

For any offence against the first regulation the occupier of the shop shall be liable to a fine not exceeding one pound, or, where more than one young person is so employed, one pound for each young person.

If the occupier of a shop fails to comply with the provisions regarding "notices," he is liable to a fine not exceeding forty shillings.

Seats for Female Assistants.

In all rooms of a shop where female shop-assistants are employed in the serving of customers, the occupier of the shop shall provide seats behind the counter, or in such other position as may be suitable for the purpose, and such seats shall be in the proportion of not less than one seat to every three female shop-assistants employed in each room.

Failure to comply with this provision entails a fine not exceeding three pounds for the first offence, and for a second or subsequent offence a fine not less than one pound and not exceeding five pounds.

Early Closing.

Every shop shall, save as otherwise provided, be closed for the serving of customers not later than one o'clock in the afternoon on one weekday in every week.

The local authority may, by order, fix the day on which a shop is to be so closed for "the weekly half-holiday," and any such order may either fix the same day for all shops, or may fix :—

(*a*) different days for different classes of shops ; or

(*b*) different days for different parts of the district ; or

(*c*) different days for different periods of the year.

Failing such an order, the weekly half-holiday shall be such day as the occupier may specify in a notice affixed in the shop, but it shall not be lawful for the occupier of the shop to change the day oftener than once in any period of three months.

Where the local authorities have reason to believe that a majority of the shopkeepers of any particular class in any area are in favour of being exempted from the provisions of this section either wholly or by fixing as the closing hour instead of one o'clock some other hour not later than two o'clock, the local authorities shall make an order exempting the shops of that class within the area from the provisions of this section of the Act, either wholly or to such extent as specified.

Failure to comply with any of the provisions of this section, entails a fine not exceeding :—

(*a*) in the case of a first offence, one pound ;

(*b*) in the case of a second offence, five pounds ; and

(*c*) in the case of a third or subsequent offence, ten pounds.

Special Exceptions.

In places frequented as "holiday resorts" during certain seasons of the year, the local authority may by order suspend, for such period or periods as may be specified in the order (not exceeding in the aggregate four months in any year), the obligation imposed by this Act to close shops on the weekly half-holiday.

Where the occupier of any shop in any place in which any such order of suspension is in force satisfies the local authority that it is the practice to allow all his shop assistants a holiday on full pay of not less than two weeks in every year, and keeps affixed in his shop a notice to that effect, the requirement that on one day in each week a shop assistant shall not be employed after half-past one o'clock shall not apply to the shop during such period or periods as aforesaid.

Definitions.

The expression "shop" includes any premises where any retail trade or business is carried on ;

The expression "shop assistant" means any person wholly or mainly employed in a shop in connection with the serving of customers or the receipt of orders or the despatch of goods ;

The expression "Bank Holiday" includes any public holiday or day of public rejoicing or mourning ;

The expression "week" means the period between midnight on Saturday night and midnight on the succeeding Saturday night.

The Shops (Hours of Closing) Act, 1928.

This enacts that every shop (with certain exceptions which do not include wireless retailers) shall be closed not later than nine o'clock in the evening on one day in the week (known as the late day) and not later than eight o'clock in the evening of all other weekdays. Generally speaking the "late" day is Saturday, but the local authorities have powers to fix an alternative day.

LOUD SPEAKER "LAW"

by the Legal Editor

The exact point at which the use of a loud-speaker becomes a public nuisance, and therefore an offence against the Common law, is not easily defined. Like most other "nuisances," it is a matter which depends to a large extent upon particular circumstances and localities.

In a residential district, for instance, the standard would be more severe than in a business locality where a certain amount of noise is inevitable.

The broad principle is that every person has the right to enjoy himself in his own house in a reasonable way. In other words, he is entitled to play the piano or violin, sing, or put on the loud-speaker practically as and when he likes. At the same time, he must not overlook the fact that his neighbour is equally entitled to spend his home-life in reasonable peace and quietness. The neighbour must not be too "cranky" in his likes or dislikes, but, on the other hand, the quiet enjoyment of his home cannot be unfairly trespassed upon with impunity.

In short, you must not make your neighbour's house or flat so uncomfortable that no *ordinary reasonable* person would like to live there. In interpreting this doctrine the Court lays particular emphasis on the words "ordinary" and "reasonable."

Business Aspects

Again, the wireless retailer as a business man is entitled to make reasonable use of a loud-speaker for business purposes. But he must also bear in mind that his neighbours are also entitled to protection against any undue intrusion of noise, especially if it can be shown to interfere with their own business. Apart from mere noise the persistent use of a loud-speaker may cause a crowd to gather in such a way as to impede the access of the public to another shopkeeper's premises. In both cases there would be grounds for applying to the Court for an injunction.

So far as business localities are concerned there is a simpler and more effective means of regulating the use of loud-speakers when employed for publicity purposes. Under the Municipal Corporations Act of 1882 a Town Council may make by-laws for the good rule and government of the Borough, and for the prevention of nuisances not already punishable under any existing Act.

Local Government Act

The Local Government Act of 1888 gives County Councils similar powers with regard to their County or any part of it other than a Borough, whilst the Local Government Act authorises the Ministry of Health to frame a number of Model Acts and Model Rules, which in certain cases must, and in other cases may, be adopted by the local Urban, District or County Authorities.

By-laws made under these various Acts of Parliament have the same force and effect as Statute law. They define various forms of "nuisance," including the creation of excessive noise, make them legal offences, and so give the local authorities power to deal with the matter directly through the police courts, and to impose specified penalties for any infringement.

A Case in Point

A number of prosecutions have already been taken against wireless dealers in different parts of the country, with somewhat varying results. In Stockport, for instance, a summons issued by the police against a local dealer, following complaints received from his neighbours, was dismissed on the ground that the magistrates were not fully satisfied that the alleged offence came within the wording of the borough by-law. The by-law in question prohibited the playing of "any musical or noisy instrument in any street or public place to the general annoyance of the inhabitants thereof."

The defending solicitor pointed out that the by-law was framed in 1903, when wireless was practically unknown, and that it was not fair to apply it now that broadcasting had become a national institution and the use of speakers almost universal. In agreeing with this contention the Bench expressed the view that the noise should be reduced to prevent it being a public nuisance.

A similar prosecution launched against a Blackpool dealer was dealt with by the local bench of magistrates in exactly the same way, whilst other prosecutions at Islington and Finsbury were withdrawn upon an undertaking being given by the defendants to moderate the noise and to pay the costs of the prosecution.

On the other hand, there are many cases on record where the prosecution has been upheld and fines have been levied upon the offenders.

On the whole, the authorities appear to be willing to allow a fair latitude to the retailer on this question, provided he limits himself to a reasonable use of loud-speaker publicity and acts on the principle of "Live and let live."

FORMING A LIMITED COMPANY

By the Legal Editor

All limited liability companies are now subject to the provisions of the Companies Act of 1929.

The first step in converting a private business into a limited company is to file the following documents at the office of the Registrar of Companies, Somerset House, Strand, W.C. :—

Memorandum of Association.
Articles of Association.
Statement of nominal capital.
Declaration that the requirements of the 1929 Act have been complied with.

The Memorandum of Association must set out :—

(a) The name of the Company.
(b) The address of the Registered Office.
(c) The objects of the Company.
(d) A statement that the liability of the members is limited.
(e) The amount of share capital and the manner in which it is divided into different shares.

The Articles of Association are usually based on the set of rules known as Table A and contained in the first schedule of the 1929 Act. In effect they are the formal bye-laws which govern the conduct of the company, and are strictly binding both on the company and the members thereof.

Both the Memorandum and Articles of Association must be signed by at least seven members, who must each subscribe for at least one share. In the case of a private company however two signatures are sufficient. The signatures must in both cases be attested by at least one witness.

The amount payable on the incorporation of a company consists in part of an *ad valorem* duty on the amount of the nominal capital and in part of a graduated stamp fee on the Memorandum of Association. The following table shows how the total fees increase as the capital value rises.

Nominal share value. £	Total fees payable. £ s. d.
100	5 0 0
250	7 0 0
500	9 0 0
1,000	14 0 0
2,000	24 0 0
5,000	57 0 0
10,000	108 5 0
50,000	518 5 0

Difference between Public and Private Companies.

The main distinction between a Public and Private Company is that the latter :—

(a) restricts the right to transfer its shares,
(b) limits the number of its members (exclusive of persons in the employment of the company) to fifty, and
(c) makes no appeal to the public to subscribe for any shares.

In the case of a small business, conversion into a Private limited liability company is the more usual course. It offers the same safeguards against personal liability for business losses as a Public Company. Although it has fewer restrictions as compared with the latter, it enjoys certain definite advantages. For instance : no "Statement in lieu of Prospectus" need be filed ; no Statutory meeting need be held ; an annual balance sheet is not required to be filed with the Registrar ; whilst any member requiring a balance sheet must pay for it.

On the other hand, as previously stated, there must be no question of inviting the public to subscribe for shares, or even debentures in a Private Company.

If at any future time it should be desired either to increase the shareholders to more than fifty, or to invite the public to subscribe for shares or debentures, a Private Company can convert itself into a Public Company by passing a Special Resolution to that effect, amending the Articles of Association accordingly, and filing with the Registrar of Companies a Prospectus (or Statement in Lieu of Prospectus) in the proper form.

Some Advantages of a Private Company.

The principal advantage is, of course, that the liability of each member or shareholder is limited to the shares he holds. Another is that on the death of one member the survivors are not prejudiced financially, i.e., no capital is withdrawn, as would probably be the case with a partnership.

In general, the appointment or removal of directors can be effected in a simple manner ; facilities are afforded for obtaining additional capital, or for borrowing money on joint security, and for negotiating with other companies ; and finally the disposal of whole or part of the business is simplified.

PATENTS, DESIGNS AND TRADE MARKS

By "The Broadcaster" Patent Expert

The term "Intellectual Property" is applied to the legal rights which protect an inventor from unauthorised imitation or piracy. In its broadest sense invention is any original process of the mind, including artistic and literary creations, but the particular kind of invention which is concerned with industrial matters is dealt with by the law relating to Patents, Designs, and Trade Marks.

It is clear that the inventor must be prepared to take special precautions to safeguard his position. Ideas are intangible things—unlike land or money or any other ordinary form of property. Once set free from the mind, they become common property unless some definite legal steps are taken to save them from this fate. Broadly speaking, the essential procedure, in the case of industrial invention is formal Registration at the Patent Office.

Patents.

Letters patent are granted by the State to the inventor of any new apparatus, device, machine, or process of manufacture. The grant is in the form of a monopoly giving the holder the sole right to manufacture or use the invention for a term of sixteen years. It is the policy of the State to encourage inventors because it is a valuable factor in the development of industry.

During the monopoly period of sixteen years, the inventor has power to control the market, within certain wide limits, so that, provided a demand exists for his invention, he is able to reap a financial reward for his ingenuity. At the end of the period the patent lapses, and the benefit of the invention passes to the State, or, in other words, to the community in general.

It must be understood that the grant of Letters Patent is the nature of a bargain or contract made between the inventor on the one hand and the State on the other. The monopoly grant is only given to the inventor on condition that he carries out his side of the contract fairly and conscientiously. Should he fail to do so, he runs the risk of having his patent declared invalid by the High Courts, even after it has been issued by the Patent Office.

The fundamental conditions to be observed are briefly as follows.

What May be Patented.

In the first place the invention must be for a "manner of manufacture." That is to say, it must have some commercial application and be beneficial to trade.

The discovery of a new scientific principle, such as Einstein's theory of relativity, is not patentable unless it is embodied in some practical application. The same objection applies to any abstract notion or bare philosophic idea.

Inventions for which a patent can be obtained usually fall into one or other of the following classes :—

(1) New articles of commerce made by mechanical or chemical operations.

(2) New machinery and apparatus.

(3) New processes of manufacture in which a series of operations are performed in sequence.

Essentials of a Patent.

Obviously the invention must be new and original. The degree of novelty may be slight, but it must be present. In other words, the inventive step must be something more than an improvement such as would naturally be carried out by an intelligent artisan or skilled workman engaged in the trade to which the invention relates.

The invention must also be useful. There is no advantage either to the State or the inventor, in granting a patent for something which is obviously futile.

To secure a patent, the inventor must file a written specification setting out clearly and fairly (a) the nature of his invention, and (b) the way in which it is to be carried into effect. An inventor is sometimes tempted to give as little information as possible. This is dangerous because it may have the effect of rendering the patent invalid. The criterion is that the description must be sufficient to enable a skilled workman to carry out the invention and to secure the correct results from the information given in the Patent specification. Anything less than this, or any deliberate misstatement of facts, will be sufficient to invalidate the patent, should it ever be brought into Court.

Procedure on Application.

Generally speaking, it is advisable to employ professional assistance in applying for a patent. The requirements of the Patent Office are not always fully appreciated by the layman, and where important interests are at stake it is the wisest policy in the long run to get the best advice available.

To assist inventors who may desire to proceed in person, a useful official pamphlet entitled "Instructions to Applicants for Patents" may be obtained free on application to the Comptroller-General of Patents, 25, Southampton Buildings, London, W.C.2. This sets out in detail the formalities to be observed in preparing the written specification and accompanying drawings.

Provisional Application.

The application for a patent may be made either in two stages or in one. In the former case the first step is to file a Provisional specification, and then at any time within nine months to follow this up by filing a Complete specification.

In the Provisional specification the inventor is only called upon to give a brief description of the nature of his invention. He then has a period of nine months in which to work out the idea fully before filing the Complete specification.

Should he meanwhile decide to abandon the application, he can do so without incurring any further expense.

It should, however, be clearly understood that the filing of a Provisional application gives the inventor no patent rights whatever. These do not come into existence until a Complete specification has been filed, accepted, and sealed.

Complete Specification.

The Complete specification should contain a full and detailed description of the invention and the way in which it is to be carried into effect. Usually it must be illustrated by formal drawings.

The specification may be deposited at the Patent Office in the first instance. Or it may be submitted nine months after the preliminary filing of a Provisional application for the same invention, as previously explained.

The Cost of a Patent.

(Official Stamp Fees only)

Provisional specification only..	£1	0	0
On filing Complete specification thereafter	3	0	0
Total ..	£4	0	0
Complete specification filed in the first instance	£4	0	0
Sealing fee (after acceptance)..	1	0	0
Total ..	£5	0	0

There are no further charges for the first four years, but £5 must be paid before the end of the fourth year to keep the patent alive during its fifth year, £6 for the sixth year, £7 for the seventh year, and so on, up to the sixteenth and last year of the monopoly period. There are various other fees and "fines" which may be incurred by not filing documents within the proper times. These are set out in the Patent Acts and Rules.

Trade Marks.

The register of trade marks is divided into Part A and Part B. As the fullest protection in law is obtained by marks entered in Part A, it is desirable, if possible, to qualify for entry in this part of the register.

Part A Registration.

For registration in Part A, a trade mark must contain or consist of at least one of the following essential particulars :—

Group 1 :—The name of a company, individual, or firm represented in a special and distinctive manner, such as by particular lettering, which must, however, be really distinctive and not ordinary typographical printing. Fictitious names should not be used under this heading, nor names in the possessive sense.

Group 2 :—The signature of the applicant for registration, or some predecessor in his business.

Group 3 :—An invented word or words, such as "Kodak," "Mazawattee," "Magnavox," "Gecophone."

Group 4 :—A word or words having no direct reference to the quality or character of the goods and not being, according to its ordinary significance, a geographical name or a surname. Obviously such words as "best," or "loudest," could not in fairness be monopolised by any one maker of, say, loud-speakers. Equally it would be unfair to allow the geographical name "Sheffield" as a trade mark to any particular make of cutlery.

Group 5 :—This includes such marks as pictorial, ornamental and geometrical devices, letters, numerals, and monograms, which fulfil the sole condition of being distinctive.

Formerly the rules excluding references to quality were rigidly enforced, but nowadays skilful and covert allusions to quality, so long as they are not evident or obvious, are frequently accepted.

Part B Registration.

Part B of the register is mainly intended to take trade marks that have been in use for over two years without having previously been registered; but marks which do not possess any of the essential particulars requisite for Part A may, in certain cases, qualify for Part B, so long as such marks

PATENTS DESIGNS, ETC.

are capable of distinguishing the trader's goods.

What Cannot be Registered.

A mark which is not new as applied to the particular goods for which it is proposed to use it, cannot be registered.

Representations of the Royal Arms or Crests, or of the Red Cross or Geneva Cross, are not allowed; nor are such words or phrases as "Patent," "Registered," or "Entered at Stationers Hall."

How to Register a Trade Mark.

Application for registration may be made direct or in writing to the Registrar, Trade Marks Branch, Patent Office, Southampton Buildings, Chancery Lane, W.C.2, who will forward full particulars.

If desired, an official search will be made in connection with any proposed mark, if an application to this effect is made in Form No. 28, stamped £1.

Designs.

A registrable design is defined by Act of Parliament to be "the features of shape, configuration, pattern or ornament applied to any article by any industrial process or means, whether manual, mechanical, or chemical, separate or combined, which in the finished article appeal to and are judged solely by the eye; but does not include any mode or principle of construction or the operation of a mechanical device."

This definition brings out the true distinction between a design and a patent, a point which is frequently confused. Contrivances or devices which essentially involve processes or methods of manufacture, or some mechanical principle, can only be protected by means of Letters Patent and not by registration under the Designs Act.

Registration.

To register a design, it is first necessary to obtain Form Designs No. 2, which costs 10s., and can be obtained on personal application at the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C.2,

The Register is divided into a number of different classes, and it is necessary to specify on the form the particular class in which registration is required. If the applicant is uncertain on this point, he can apply by letter to the Patent Office.

Rights Given by Registration.

Registration of a design gives the proprietor the exclusive right to use the design. By Act of Parliament, any *manufacturer* who infringes or imitates a registered design, whether or not he does so knowingly, may be proceeded against in the Courts.

Marking Articles.

Before delivery on sale of any article to which a Registered Design has been applied, the proprietor of the design must mark the article "Registered" or "Regd." even if such articles are only intended for export. Failure to do this may cause the proprietor to lose his right to get damages for infringement.

Patents and Designs Act, 1932.

This new Act of Parliament comes into force as and from November 1, 1932, and introduces various changes of a far-reaching nature. The most important relates to the investigation which is made by the Patent Office into the novelty of an invention before a patent is issued.

In common law the invention must obviously be new. If it has previously been used, or even described, in any open publication, a patent—even if granted—is not valid in the Courts.

So far the Official search has been limited to previous British patents over a period of fifty years. This, of course, is not sufficient to guarantee the full legal requirement of novelty, because the alleged "invention" may previously have been published in some technical paper—or it may have been patented abroad, and thus published, since all foreign patent specifications reach this country in course of time.

In neither of these cases would the official search disclose the fact, because it only covers existing British Patents. A patent might therefore be granted only to be declared void subsequently by the Courts on the ground that it lacked novelty.

The new Act is designed to lessen this risk. Instead of being restricted to prior British patents, the official search is now extended to cover Foreign patents as well as British, and also to embrace, as far as possible, all other technical and scientific papers and publications.

To cover the extra cost, the stamp fee payable when filling a Complete Specification is increased from £3 to £4.

To give time for the search the interval between filing a Provisional Specification and the corresponding Complete Specification is increased from nine months to a year, whilst the normal time for acceptance is extended from 18 to 21 months.

The Act also lays down that, amongst other grounds, a patent may now be revoked if it can be proved that the invention is not useful, or if it does not involve any true inventive step, or if the specification does not disclose the best method known to the inventor of carrying out the invention.

Finally there is set up a special "Appeal Tribunal" consisting of a High Court Judge specially appointed by the Lord Chancellor to hear and decide disputes that may arise between the inventor and the Patent Office.

BRITISH "POOL" LICENCE

Although certain of the "master" patents controlling the manufacture of Broadcast receivers are no longer in force, *e.g.*, certain of those covering the use of "reaction" H.F. amplification, and grid-leak rectification, whilst others are due to expire within the next year or so as will be seen from the "schedule" which follows, there are sufficient patents still in force to affect the manufacture of practically every receiver of modern design.

The present position is that the Marconi Wireless Telegraph Co., Ltd., the Gramophone Co., Ltd., and the Standard Telephones and Cables, Ltd., have "pooled" their respective patents, so far as they relate to broadcast reception, and now issue a joint licence to recognised manufacturers.

Taking the agreement seriatim, it should be noted that the licence only covers broadcast receivers intended for private or domestic use. It does not apply to receiving sets installed in places of public entertainment or in licensed premises.

Clause 1 makes the agreement retrospective as and from August 28, 1928, and gives the licensees the use of any future broadcast patents that may be acquired by the grantors. The agreement normally holds good until August 28, 1933. It is restricted to sound broadcasting, evidently in order to exclude any future developments in television receivers.

Clause 2 excludes the manufacture either of valves or loudspeakers from the terms of the licence. It also specifically excludes broadcast receivers used for revenue-earning purposes, or in connection with licensed premises.

Imports and Exports.

Clause 3 prohibits the licensee from exporting (without the grantors' written consent), or from importing, apparatus falling within the scope of the scheduled patents. It also defines the wording of the licence plate to be attached by manufacturers to all sets made under the patents.

Provision is made for any extra royalty that may be payable to third parties by the grantors, for instance, under the terms of any existing contracts between the grantors and the third parties in question.

Kits and Component Parts.

All sets or "kits" of component parts pay royalty at the rate of 5s. per valve if designed to utilise any patent which was in force on or after November 14, 1929. (See schedule.)

Mains Units.—Battery eliminators pay at the rate of 10 per cent. of the net selling price when sold as a separate unit, or at the rate of 5s. when forming part of the complete receiver.

What is excluded.—Clause 4 excludes from the scope of the licence sets designed for combined radio and gramophone reproduction. It also excludes multi-stage valves. The use of pentodes and screened grid valves is, however, definitely permitted under the licence.

A special appendix to the agreement excludes from the terms of the agreement certain (unspecified) patents owned by the British Thomson-Houston Co., Ltd., *i.e.*, apart from those included in the schedule.

Miscellaneous.—The definition of a place of public entertainment is made to depend upon the payment of entertainment tax.

Clause 8 refers to the reciprocal rights of the grantors in respect of any patents owned by the licensees.

If these patents relate to improvements upon any of the scheduled patents for broadcast reception owned by the "pool" of patentees, the latter pay no royalties. But as regards their use of any other patent rights owned by a licensee the "pool" agree to pay royalty at a rate not exceeding 10 per cent. of the net selling price.

SUMMARY OF LICENSING AGREEMENT.

Clause 1.—The Grantors grant to the Licensees subject to certain terms and conditions, licence to use and exercise all or any of the inventions the subject of the patents set out in the first schedule and (subject to Clause 2 (a) hereof) all other patents applicable to broadcast receiving apparatus which were on August 28, 1928, or are now or may hereafter during the subsistence of this licence be owned or controlled by the grantors or in respect of which the grantors now have or may during the subsistence of the licence have power to grant licences or sub-licences for the purpose of manufacturing using and (subject to Clause 2 (b)) selling and letting on hire within Great Britain, Northern Ireland, the Channel Islands and the Isle of Man, broadcast receiving apparatus for the reception of sound broadcast. The licence is only for private or domestic use or for the purpose of lectures or demonstrations in any institution of a charitable educational philanthropic or religious character (such lectures or demonstrations not being open to the public generally and not being held for payment). The licence shall be deemed to have commenced on August 28, 1928, and shall continue until August 28, 1933, unless previously revoked as provided.

Clause 2.—(a) The licensee is not authorised to manufacture thermionic valves or loudspeakers of any kind.

(b) The licence granted for selling or letting on hire shall extend only to apparatus in respect of which provision has been made under Clause 3 (f) (i.) (ii.) or (iii.).

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(c) The licence shall not authorise the use of any of the patent for any purpose other than the purposes specifically set forth, and in particular shall not authorise the use for any revenue-earning purposes or in relation to the service of any place of public entertainment or of any place in which any business requiring any licence is conducted.

Clause 3.—The licensees agree as follows :—

(a) Not without the previous written consent of the Grantors to export or sell for export or knowingly permit to be exported any apparatus subject to this royalty.

(b) Not to import any apparatus constructed or intended to be constructed in accordance with any of the patents still subsisting.

(c) On the request of the Grantors to furnish diagrams or samples of all broadcast receiving apparatus.

(d) To attach to all broadcast receiving apparatus upon which royalty is payable (or in the case of sets of component parts of apparatus upon which royalty is payable to supply for attachment by the constructor) the usual licence plate.

(e) So far as is reasonably practicable to make the conditions of the licence a condition of every sale or hire binding upon and observable by every purchaser or hirer of any broadcast receiving apparatus or set of component parts.

(f) To pay to the Grantors by way of royalty :—

(i.) In respect of all broadcast receiving apparatus (other than battery eliminators) employing or designed to employ a valve the sum of five shillings in respect of each valve employed, whether or not such apparatus embodies or utilises any invention the subject of any of the patents.

(ii.) In respect of all sets of component parts (other than battery eliminators) which include a valve or are intended when they are assembled to employ a valve, the sum of five shillings in respect of each valve, but only if such sets embody or utilise any invention the subject of any of the patents subsisting on or after November 14, 1929.

(iii.) In respect of each battery eliminator embodying any invention the subject of any of the patents and each set of component parts (whatever type of rectifier be employed) 10 per cent. of the net selling price when sold as or for assembly into a separate unit and the sum of five shillings when not so sold, in addition to any royalty payable under sub-clause (i.) or (ii.) of this clause.

Then follows a proviso that in respect of apparatus which employs any patent under which the Grantors may be liable to pay a royalty to a third party the licensees shall pay an additional royalty of such amount as may be required to satisfy the terms of the licence or agreement under which royalty is payable by the Grantors. The Grantors shall upon request of the licensees examine free of charge diagrams or samples of receiving apparatus and advise whether such apparatus embodies any invention in respect of which such additional royalty may be payable.

(g) To keep proper and accurate and separate accounts to ensure an accurate return to be made each quarter.

(h) To permit the Grantors' auditors, if desired, to inspect the books and accounts.

(i) If so requested to deposit the sum of £50.

(j) Not to dispute or assist others to dispute the validity of any of the patents.

(k) To manufacture only in Great Britain, Northern Ireland, the Channel Islands or the Isle of Man all apparatus in respect of which the licence is granted.

(l) Not to assign transfer mortgage grant sub-licences.

(m) Not to sell any valves other than valves manufactured by the M.O. Valve Company, Limited or by companies licensed by the Grantors or companies set out in the second schedule so long as the licensees obtain supplies in sufficient quantities to meet their reasonable requirements.

Clause 4.—It is mutually agreed as follows :—

(a) The expression "broadcast receiving apparatus" shall include battery eliminators but shall exclude (i) combined gramophone and wireless receiving apparatus and (ii.) apparatus employing or intended to employ a valve designed to give a multiple stage effect. A screened grid or pentode valve shall not be deemed to be a valve designed to give a multiple stage effect.

(b) The expression "place of public entertainment" shall mean a place of public entertainment at which entertainment tax is payable or would be payable but for any statutory exemption granted since 1922.

Clause 5.—(a) The Grantors will keep the licensees fully indemnified from all actions by any third party who establishes his right to restrain the user and exercise by the licensees of any of the patents.

(b) The Grantors may assume at their own cost the defence of any such proceedings as are referred to in sub-clause (a). If the Grantors fail within seven days of a request in writing by the licensees to assume such defence the licensees shall be entitled to defend or to compromise or submit to judgment. In any such case the Grantors shall hold the licensees fully indemnified.

Clause 6 provides for the settlement of royalties if the licence is terminated.

Clause 7.—The Grantors may revoke the licence upon the happening of any of the following events :—

(a) If any royalty return or any royalty shown to be due is not rendered or is not paid ;

(b) If there be any breach of any other of the agreements on the part of the licensees which are not remedied made good or desisted from within seven days ;

(c) If the licensees shall become bankrupt or go into liquidation (except for the purposes of reconstruction) ;

and such revocation shall be without prejudice to all claims of the Grantors.

Clause 8.—(a) The licensees agree to grant to the Grantors upon request free non-exclusive non-transferable licences (but with the right to sub-license associated companies) to make use exercise and vend all or any of the inventions applicable to receiving apparatus other than valves and loudspeakers in respect of which the licensees shall have power to grant a licence for the purpose of manufacturing using and subject to sub-clause (b) of this clause selling and letting on hire within Great Britain. Northern Ireland and the Channel Islands and the Isle of Man broadcast apparatus for the reception of sound broadcast for the public by wireless for private or domestic use or for the purpose of lectures or demonstrations in any institution of a charitable, educational, philanthropic or religious character (such lectures or demonstrations not being open to the public generally and not being held for payment).

(b) Any such licence granted by the licensees shall so far as selling or letting on hire is concerned extend only to receiving apparatus employing or designed to employ a valve, sets of component parts which include or are intended to employ a valve, and battery eliminators.

(c) If any invention in respect of which any such licence is granted by the licensees is not an improvement or development of the patents in respect of which this licence is granted then the Grantors shall pay a royalty at a rate not exceeding the lowest rate paid by any licensee in respect of the same invention, or if there is no other licensee then at a rate not exceeding ten per cent. of the net selling price of the article manufactured.

(d) Any such licence shall continue until August 28, 1933.

Clause 9.—The existing licence granted by the said Marconi's Wireless Telegraph Co., Ltd., to the licensees is cancelled as from August 27, 1928.

The second schedule contains the names of The British Thomson-Houston Company, Limited: A. C. Cossor, Ltd.; Edison Swan Electric Company, Ltd.; Electron Company, Ltd.; M.O. Valve Company, Ltd. (Osram and Marconi Valves); Mullard Radio Valve Company, Ltd.

A note is added to this effect:—

1. This licence includes rights under certain letters patent granted or to be granted to the British Thomson-Houston Co., Ltd., but does not authorise the licensees to manufacture under all letters patent granted or to be granted to that company, and before using any such letters patent other than those set out in the first schedule to this licence the licensees should communicate with the Grantors.

A supplementary agreement between the Marconi Wireless Telegraph Co., Ltd., and the Gramophone Co., Ltd., on the one part, and Standard Telephones and Cables Ltd., on the other makes the Standard Co. a party to the licensing agreement set out above, as and from the 1st April, 1930, and states that the name of that Company shall be included on all licence plates supplied under Clause 3 (d) of the original agreement.

In this connection the following announcement has been issued by the Marconi Company on behalf of the pool:

"The Gramophone Co., Ltd., Marconi's Wireless Telegraph Co., Ltd., and Standard Telephones and Cables, Ltd., have pleasure in announcing that they have made arrangements which they think will be of benefit to the Trade in general whereby patents owned or controlled by any or all of the three companies, including those resulting from the extensive research facilities at their disposal, will be available for use by licensees through a single organisation.

"Applications for a joint licence by the three companies are invited from interested manufacturers of broadcast receiving apparatus. Such applications should be addressed to Marconi's Wireless Telegraph Co., Ltd., Marconi House, Strand, London, W.C.2. In approved cases a licence will be granted which will be generally similar as regards conditions and field of use to the licence hitherto issued by the Gramophone and Marconi Companies jointly and known as Type 'A3.'

"All present holders of the usual 'A3' licence will be able to obtain the benefit of patents owned or controlled by Standard Telephones and Cables, Ltd., without any increase in the rates of royalty, and they will receive a communication upon the subject in the course of a few days.

"In conclusion, the above-mentioned three companies wish to give special notice of their combined intention to take such action as they may deem necessary to protect their own and their licensees' interests in regard to the patents in question."

As we go to press, the schedule of Standard Telephone patents to be included in the new agreement has not been issued. It includes the superheterodyne and push-pull circuits, amongst others, but not radio-gramophone or speaker patents.

SCHEDULE OF PATENTS.

No.	Grantee.	Normal date of expiry.	Relating to.
		MARCONI COMPANY.	
127013	Brillouin &	27th Mar., 1932	Resistance capacity coupled amplifiers (high
127014	Beauvais	7th Nov., 1932	and low frequency).
131054	Brillouin	8th Oct., 1933	Resistance couplings.
131055	Do.	Do.	Do.
135177	Siemens & Halske	18th June, 1934	Circuit for supersonic reception.
209184	Willans	4th Oct., 1938	Obtaining grid bias from resistance in plate circuit.
216589	Do.	2nd Mar., 1939	Balancing plate—grid capacity.
245839	Do.	14th Oct., 1940	Use of reaction to prevent transformer-coupling distortion.
258315	Smith	18th May, 1941	Using separate grid bias for each valve, derived from intervalve resistances.
260036	Round	20th July, 1941	Balancing plate-grid capacity.
260321	Wright & Smith	29th June, 1941	Balancing plate-grid capacity.
261110	Wright	15th Aug., 1941	Stabilising mains-fed amplifiers.
		RADIO CORPORATION OF AMERICA.	
266749	Marconi Co.	26th Feb., 1942	Automatic grid bias derived from condenser inserted between grid and filament.
279808	Do.	26th Oct., 1942	Improvements in supersonic reception.
		BRITISH THOMSON-HOUSTON CO.	
119365	B.T.H.	2nd Jan., 1934	Balancing or neutralising plate-grid capacity.
148129	Do.	22nd Dec., 1931	Obtaining constant voltage current from A.C. or D.C. mains (the "eliminator" patent).
151346	Do.	20th June, 1935	Resistance-coupled amplifier incorporating tuned-grid circuit.
		GRAMOPHONE CO.	
281740	Gramophone Co.	6th July, 1942	Balancing plate-grid capacity.
299089	Gramophone Co. & Mittell	21st July, 1943	Stabilising mains-fed amplifiers.

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REVISED CONDITIONS: NEW PATENT "POOL"

The old A3 agreement authorised manufacturers to use certain "key" patents for broadcast receivers only. The new RG2 agreement is a more comprehensive document, covering a long list of patents relating to radiograms as well as wireless receivers. A radiogram is defined as a set designed not only to receive broadcast programmes, but also to reproduce and amplify gramophone records.

The group of patentees issuing the RG2 licence has been enlarged and now includes the British Thomson-Houston Co., Ltd., Columbia Gramophone Co., Ltd., Electrical Research Products, Incorporated, the Gramophone Co., Ltd., Marconi's Wireless Telegraph Co., Ltd., and Standard Telephones and Cables, Ltd.

The "operating company" for the Pool is the Marconi Wireless Telegraph Co., Ltd.

Licensees under the new agreement will enjoy the benefit of 65 patents, including amongst others the push-pull amplifier, the super-heterodyne circuit, the Rice-Kellogg speaker, and the Craft patent covering the first combination of a pick-up and wireless receiver. A full list of the scheduled patents is given below.

The agreement holds good from July 1, 1930, to June 30, 1934. It has been made retrospective, to give protection to firms who may have manufactured radiogram sets prior to the actual date of signing. The Pool also agrees to take into consideration royalties which may previously have been paid by licensees to individual members of the Pool.

With royalty charges an interesting distinction is drawn between (a) sets employing five valves or less, and (b) those using more than five valves. The latter pay at the rate of 10s. for every valve in the set, whilst the former pay an overall rate of 5s. per valve, plus an extra 5s. for each valve which is in active use when the set is reproducing from a gramophone record.

Thus a five-valve receiver with a pick-up feeding into the first of two L.F. stages will pay a royalty of 35s., viz., 5s. on each of the first three valves and 10s. each for the last two. Special provision is made for the case where the last stage is push-pull. If there are only four preceding valves, the set is rated at the cheaper rate and pays 45s., viz., 5s. each for the first three valves and 10s. each for the last three, the push-pull stage counting as two.

Royalties are chargeable on all completed sets, whether the set embodies any patented feature or not. In the case of "kits," or sets of parts sold unassembled, the royalty is payable only if the set, when assembled, actually embodies one or more patented features.

The original "eliminator" patent. No. 148129, expired in December, 1931, and an application for prolongation was refused by the High Court. It was, however, in force for part of the period covered by the RG2 agreement, whilst other patents still in force and relating to improved methods of eliminating "hum" are contained in the schedule.

The following is a summary of the more important clauses in the new agreement:—

General Conditions.

The agreement does not license the licensees to manufacture or sell thermionic or other valves of any kind (including multiple valves), nor to manufacture or sell any speaker, pick-up, or other component part of a radio-gramophone other than in and forming part of a radio-gramophone or in a set of parts as hereinafter defined.

The licence does not authorise the use of any of the Letters Patent for any revenue-earning purposes, or for receiving broadcasting or reproducing sound from records in any place of public entertainment or in any place in which any business requiring any licence is conducted (excepting public houses, hotels, cafés and small dance halls not attached to or forming part of a theatre or cinema), or for use with a microphone, or for any other purpose than that specifically provided for herein.

Scale of Royalties.

For every radio-gramophone which does not employ and is not intended to employ more than five valves, the royalty is five shillings in respect of each and every valve employed or intended to be employed therein, together with a further sum of five shillings in respect of each and every valve utilised or intended to be utilised when such radio-gramophone is used for the reproduction of sound from records, whether or not such radio-gramophone embodies or utilises any of the said Letters Patent.

For every radio-gramophone which employs or is intended to employ more than five valves the royalty is ten shillings in respect of each valve, whether or not such radio-gramophone embodies or utilises any of the said Letters Patent.

Kits.

For every set of parts manufactured or sold by the Licensees and which does not include and is not intended to employ more than five valves, the royalty is five shillings for every valve, together with a further sum of five shillings for every valve used for the reproduction of sound from records, but only if such set of parts embodies or utilises any of the said Letters Patent.

For every set of parts manufactured or sold by the licensees employing more than five valves, the royalty is ten shillings for every valve included or intended to be employed therewith, if such set of parts embodies or utilises any of the said Letters Patent.

Multiple Stage Valves.

In the case of multiple valves the sum of ten shillings is payable in respect of each and every stage of amplification or detection.

Eliminators.

For each battery eliminator incorporated in a radio-gramophone or in a set of parts manufactured or sold by the Licensees and utilising any of the said Letters Patent (whatever type of rectifier be employed therein) the sum of ten shillings in addition to any royalty payable above.

Valves employed for rectifying current from the electricity supply mains do not pay any

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royalty apart from that charged for the battery eliminator. Valves which are employed in parallel with their respective anodes and grids directly connected shall be deemed to be one valve for the purpose of calculating the royalty.

Push-pull Circuits.

Two valves which are employed or intended to be employed in "push-pull" circuit shall be deemed to be two valves for the purpose of calculating royalty, except that a radio-gramophone fitted with a "push-pull" circuit and using not more than six valves in all only pays at the ten shilling rate in respect of those valves actively used for gramophone reproduction.

Definitions.

A radio-gramophone is defined as a unitary instrument designed for use with valves (whether or not equipped with the valves themselves) for producing sound through an electrically-operated speaker alternatively from (a) apparatus designed for the reception and translation of signals transmitted by modulated electrical oscillations, and (b) apparatus (such as a turntable and a pick-up) for the translation of vibrations recorded on a sound record.

A set of parts shall mean a number of component parts which, if assembled into one container (which need not form one of the parts), would constitute substantially a radio-gramophone.

The expression "multiple valve" wherever used herein shall mean a valve designed to give a multiple stage effect. A valve shall not be deemed to be a multiple valve simply because it is a screened grid or pentode valve.

Schedule of Patents.

In the schedule to the agreement the patents are set out in chronological order, and under titles which in most cases are so broadly framed as to give no very clear indication of the subject matter covered.

In the following list the patents have been rearranged so as to fall as far as possible into related groups.

"Key" patents appear at the beginning of the list.

In the case of the older patents, the date on which these would expire, in the normal course of events, has been indicated, though it is always possible that a further extension of time may be given by the High Court. Where a patent has already been so "extended," this fact is mentioned. In the ordinary way the maximum life of a patent is sixteen years.

Push-Pull Amplifier.

275/15 (Western Electric). Dated January 7, 1915. Due to expire January 7, 1931, but recently extended for four years. Covers push-pull amplification.

Centre-tapping for Raw A.C. Valves.

15448/15 (B.T.-H.). Dated November 2, 1915. Due to expire November 2, 1931, but recently extended for three years. Covers the use of a centre-tapping to the filament of a valve energised by raw A.C. current taken direct from the mains.

Neutralising Valve Capacity.

119365 (B.T.-H.). Dated January 2, 1918. Due to expire January 2, 1934. Covers the so-called "Rice" circuit, designed to neutralise the effect of inter-electrode capacity in valve amplifiers.

Resistance Coupling.

127013 (Brillouin and Beauvais). Dated March 27, 1916. Due to expire March 27, 1932. Covers the use of resistance as an inter-valve coupling.

127014 (Brillouin and Beauvais). Dated November 7, 1916. Due to expire November 7, 1932. Relates to modified forms of resistance coupling between valves.

Hartley Oscillator.

141046 (Western Electric). Dated June 1, 1915. Due to expire June 1, 1931, but extended for a further 3½ years from that date. Covers the well-known Hartley oscillator circuit.

Screened-grid Valve Circuits.

145421 (Siemens Halske). Dated May 31, 1916. Due to expire May 31, 1932. Covers screened-grid valve circuits—i.e., in which a second grid is interposed between the control grid and plate, the extra grid being biased at a constant voltage lower than that of the plate.

The "Craft" Patent.

195589 (Western Electric). Dated March 30, 1922. Due to expire March 30, 1938. Covers the combination of a radio receiving set with a gramophone pick-up, both feeding the same loudspeaker.

Superhet Sets.

135177 (Siemens and Halske). Dated June 18, 1918. Due to expire June 18, 1934. Covers the superheterodyne circuit with intermediate amplification between the first and second detectors.

143583 (Levy). Dated August 4, 1917. Due to expire August 4, 1933. Relates to the "superhet" or double-modulation principle, particularly as applied to transmission, but also to reception.

151021 (B.T.-H.). Dated October 27, 1916. Due to expire October 27, 1932. The use of a heterodyne local oscillator to reduce static disturbances. Related to the superhet circuit.

243371 (Marconi). Dated November 20, 1924. Covers the use of ganged tuning in a superhet receiver with a band-pass input.

279808 (Marconi). Dated October 26, 1926. Superhet receiver where two local oscillators are used in order to minimise the reception of the same programme at different settings of the tuning dial.

331969 (Gramophone Co. and C. E. G. Bailey). Dated May 1, 1929. Receiver adapted to operate as a "straight-circuit" set on one band of wavelengths, and as a superhet receiver on another band of wavelengths. The change-over is effected by ganged switches.

"Free" Grid Bias.

209184 (Willans). Dated October 4, 1922. "Free" grid bias derived from a resistance inserted in the anode circuit between the H.T. supply and the valve filament.

216114 (Western Electric). Dated May 16, 1923. "Free" grid bias for amplifiers where the filaments are connected in series.

294250 (B.T.-H.). Dated July 22, 1927. "Free" grid bias derived from one of the smoothing chokes in the eliminator circuit.

248731 (B.T.-H.). Dated March 3, 1925. Mains-driven amplifier in which the field coil of the moving-coil speaker also acts as a smoothing choke in the eliminator circuit, and in which an automatically varying "free" grid bias is applied to the amplifiers.

Tone-compensating Circuits.

233417 (P. W. Willans). Dated February 6, 1924. Covers the use of a tone-compensating circuit following the detector valve to offset any loss of the higher notes due to the sharp selectivity of the H.F. stages.

245839 (P. W. Willans). Dated October 14, 1924. Covers the use of reaction between the input and output circuits of thermionic amplifiers in order to compensate for distortion caused by a low-frequency coupling transformer.

Speakers.

231420 (B.T.-H.). Dated March 27, 1924. Covers the Rice-Kellogg type of loud-speaker, in which the diaphragm is arranged to vibrate as a whole, without breaking up into harmonics, and in which the natural frequency is below that of the lowest dominant voice frequency.

231421 (B.T.-H.). Dated March 27, 1924. Also relates to the Rice-Kellogg speaker, and covers the use of a non-resonant baffle-plate having an effective size of at least a quarter

of the wavelength of the longest dominant sound wave.

245796 (B.T.-H.). Dated January 9, 1925. Construction and mounting of rigid conical diaphragm in Rice-Kellogg speaker.

246771 (Western Electric). Dated September 1, 1924. Construction of the magnetic movement of a loudspeaker having a constant impedance over a wide range of frequencies.

248412 (Western Electric). Dated September 9, 1924. Loudspeaker movement in which the steady magnetic pull on the armature is balanced in all positions.

250931 (B.T.-H.). Dated April 20, 1925. Moving-coil speaker in which rings of copper are embedded in one or both of the pole pieces in order to reduce the impedance of the actuating coil.

283286 (M. E. Newland). Dated October 8, 1926. Seamless diaphragm for a loud-speaker.

290239 (Electric Research Products). Dated May 11, 1927. Loudspeaker diaphragm of rectangular form and tensioned in the direction of its greater length to such a degree that the velocity of transverse sound-waves is greater than one-fourth the velocity of sound in air.

294285 (H. J. Round and N. M. Rust). Dated April 22, 1927. Moving-coil speaker, in which a conical diaphragm is supported by spider members located between the apex and the open end.

308776 (Electrical Research Products). Dated March 31, 1928. Moving-coil speaker with elliptical centring springs, arranged tangentially to the moving coil.

Gramophone Motors.

303105 (Electrical Research Products). Dated December 28, 1927. Worm gearing to ensure a uniform drive in gramophone motors.

324169 (Gramophone Co., E. M. Payne and A. H. Johnson). Dated November 24, 1928. Induction type of gramophone motor with provision for ensuring a constant driving torque.

Pick-ups.

260148 (B.T.H.). Dated December 10, 1925. Construction of pick-ups.

260537 (B.T.H.). Dated October 28, 1925. Volume control for a pick-up consisting of a variable shunt resistance, coupled to the input of an amplifying valve.

290264 (Electrical Research Products). Dated May 13, 1927.

290558 (Electrical Research Products). Dated May 14, 1927.

290559 (Electrical Research Products). Dated May 14, 1927.

293847 (Electrical Research Products). Dated July 14, 1927.

312468 (C. H. Johnson). Dated May 4, 1928.

These five patents cover various constructional forms of pick-up.

Eliminating Mains "Hum," etc.

150415 (B.T.-H.). Dated May 29, 1919. Covers the use of filters in the output circuits of valve amplifiers to minimise low-frequencey disturbances.

240851 (Jonasson and Ericsson). Dated October 2, 1924. All-mains set with means for neutralising "hum," due to variation in the supply voltage, by tapping off out-of-phase voltages from a potentiometer shunted across the mains. The valve filaments are in series across the mains.

246897 (Western Electric). Dated October 30, 1924. All-mains set with a two-branch eliminator circuit, the valve filaments being centre-tapped and energised by raw A.C. "Free" grid bias is provided.

247213 (Marconi). Dated February 6, 1925. Full-wave rectifier and special smoothing circuit for supplying plate voltage.

"305944 (Marconi). Dated February 11, 1928. All-mains set in which the grid and plate of an amplifier are connected to variable tappings on the supply potentiometer, the tapping points being so selected that any "hum" voltage present in the supply is automatically cancelled out

Miscellaneous Features.

141033 (Western Electric). Dated March 28, 1919. An amplifier in which the ratio of amplification is varied without altering the effective input impedance.

142115 (Western Electric). Dated July 15, 1915. Due to expire July 15, 1931, but extended for a further 3½ years from that date. Covers the Campbell type of filter circuit.

151346 (British Thomson-Houston). Dated June 20, 1919. Valve amplifier with combined resistance and tuned-circuit coupling.

200254 (Western Electric). Dated April 25, 1922. Covers the use in a valve amplifier of an input transformer, the inductance of the "leakage" flux being matched with the internal capacity of the valve, so as to be resonant to a given frequency, thereby giving a flat "gain" characteristic over the range of frequencies to be amplified.

216246 (Sterling Telephone and T. D. Ward-Miller). Dated March 10, 1923. Construction of receiver cabinet in which the tuning components are mounted on a common metal chassis or plate.

216589 (Willans). Dated March 2, 1923. Covers the use of a balancing circuit for preventing the receiving aerial from being energised by oscillations produced in the receiving set.

230150 (Western Electric). Dated November 29, 1923. Covers the use of a centre-tapped frame aerial, particularly for a superhet set.

230876 (Western Electric Co.). Dated October 8, 1923. Public address system with various impedance-matching arrangements.

252657 (Western Electric). Dated May 29, 1925. Gramophone soundbox constructed of corrugated aluminium alloy.

254496 (Western Electric). Dated June 18, 1925. Constant-frequency generator and modulator system.

303758 (B.T.-H.). Dated July 7, 1927. Cutter for "hill-and-dale" type of sound record.

314660 (B.T.-H., A. P. Young and J. H. Butcher). Dated June 11, 1928. Sectional cabinet for radiogram, the necessary electrical connections being made automatically as the different sections are assembled in position.

321682 (Standard Telephones and A. H. Reeves). Dated August 15, 1928. System of low-frequency amplification, in which the speech currents are first modulated on a higher-frequency wave and then rectified and amplified. For use principally with a condenser microphone or pick-up.

325023 (Gramophone Co. and C. O. Browne). Dated November 17, 1928. Low-frequency amplifier comprising a screened-grid valve coupled to a pentode output.

331007 (Gramophone Co. and A. Whitaker). Dated April 8, 1929. Use of anode resistance to ensure constant sensitivity, for a given setting of reaction, over the whole tuning range.

334996 (Gramophone Co. and C. E. G. Bailey). Dated July 13, 1929. Split end-plates in ganged condenser to allow for independent adjustment on different wavelengths.

340389 (Gramophone Co. and W. J. Brown). Dated December 2, 1929. All-mains set in which the supply mains are also used as an aerial.

344076 (Standard Telephones). Dated January 2, 1929. Screened-grid amplifier with input and output circuits so arranged that there is substantially no coupling between them, entirely separate paths being provided for the charging currents for the screening grid and anode.

349576 (Gramophone Co. and A. H. Cooper). Dated February 26, 1930. Quick-action switching system for wave-changing, etc., in a wireless receiver.

353419 (C. S. Agate and J. E. Rhys-Jones). Dated April 16, 1930. Volume control by differential condenser to compensate for aerial capacity as coupling is altered.

353658 (Gramophone Co., H. C. Atkins, and H. C. Huxter). Dated July 2, 1930. Pentode output, with provision for L.F. reaction to ensure constant amplification over a wide range of frequencies.

THE INDUSTRY AT LAW

Summary of Last Year's Legal Actions

Patents; Trade Marks; "Passing-Off"; and Price Cutting.

Extension for " Eliminator " Patent Refused.

On April 25, 1931, the British Thomson-Houston Company, Ltd., and Marconi's Wireless Telegraph Co., Ltd., applied to the High Court for an extension of Patents Nos. 15448 of 1915 and 148129.

Patent 15448 was granted to the British Thomson-Houston Company from November 2, 1915, and related to a valve directly heated by raw A.C. current from the mains. Patent No. 148129 was granted to the British Thomson-Houston Company Ltd., on December 22, 1915, and related to a smoothing circuit or " eliminator " for obtaining a steady D.C. current from the mains.

The application was opposed by the Hazeltine Corporation, of New Jersey, U.S.A., and Aktiengesellschaft Brown Boveri et Cie, of Switzerland, on the following grounds: (1) The Patentees had not suffered any loss or damage; (2) They failed to deal in or develop the inventions until 1925; (3) The inventions only became of importance after 1925, as and when other improvements with which the patented inventions could be used were developed; (4) Prior to 1925 the Patentees failed or refused to grant licences in respect of the said inventions save for purposes for which the demand was negligible.

Further, it was alleged that the opening for any wide application of the said invention did not present itself until wireless and in particular broadcasting had reached a certain stage of development, and such stage was not reached until about the year 1928.

Owing to the war, development of the " radio " art, especially as to thermionic valves, was hastened, and the advent of broadcasting accelerated, with the result that a field for the application of the inventions both to wireless receiving and valve operated amplifiers for electric gramophones was made available earlier than would otherwise have been the case.

Sir Arthur Colefax, K.C., for Brown Boveri et Cie: I am only concerned with the opposition to Letters Patent No. 148129. The documents now disclosed show that the Applicants' evidence is unreliable. It is now clear that it was decided in 1916 not to apply for a Patent and the application was abandoned until 1920. There was therefore during the war no loss of opportunity by the Patentee as such.

Mr. Cripps, K.C., for the Hazeltine Corporation: It appears that the statements made by the Applicants in evidence with regard to Patent No. 148129 are untrue. Under these circumstances can the Applicants have any relief upon either Patent? If they can, it puts a premium on carelessness. If an extension is to be granted, there must be some connection between the war and the history of the Patent.

The Marconi Company had no interest in the Patents until 1924 and therefore need not be considered. The evidence shows that the British Thomson-Houston Co. have never been in the radio field either before, during, or after the war except for a short time under licence from the Marconi Company.

There is no evidence of any attempt to exploit the Patent until 1926. There is nothing to connect the activities of the British Thomson-Houston Co. during the war with any loss of opportunity, for it was not until at least five years after the war that any use for the invention was found.

Mr. Justice Luxmoore: The first Patent, No. 15448, was granted to the British Thomson-Houston Company on a communication from the General Electric Company of Schenectady in the State of New York in the United States of America. The communication was received here on September 27, 1915; and the application for a Patent in this country was made in October, 1915, The Convention date is November 2, 1915, the date of the Grant in the United States of America.

The British Letters Patent which were granted consequently expired on November 1, 1931. On April 7, 1931, the British Patent was assigned to the Marconi Company, that Company having become entitled to it.

The second Patent, No. 148129, was granted to the British Thomson-Houston Company as the assignees of one Albert Wallace Hull, an American citizen in the employ of the General Electric Company to which I have already referred. It is a communicated Patent, the Convention date is December 22, 1915, and consequently the Patent is still in force.

The communication to this country was made on February 2, 1916, but no application for a British Patent was made until July 9, 1920, when it was decided to apply under the provisions of the Peace Treaty. The Patent is now legally vested in the British Thomson-Houston Company and the Marconi Company as tenants in common.

The Applicants ask for extension of both the Patents on the ground that part of the life of each Patent has been cut out of the monopoly term by reason of the war, and the activities thereby imposed on the British Thomson-Houston Company, and that there has consequently been loss of opportunity of exploitation and development.

The British Thomson-Houston Company was placed under Government control on July 12, 1915, and continued to be a controlled establishment until November. 1919. The Marconi Company had no interest in either Patent until a much later date.

The conclusion to which I have come is that the Application for Patent No. 148129 was not made in 1916 because, after a careful consideration of the facts, it was decided not to proceed with it, and that precisely the same decision would have been made if the war had not, in fact, existed.

It follows that in my judgment it cannot fairly be said that any loss or damage or loss of opportunity has arisen owing to the war. Apart from this, however, I am satisfied that I must decline to consider the Application for prolongation in respect of Patent No. 148129.

As regards Patent No. 15448 the Applicants have made out a case for extension. In my judgment the requirements of the case will be met by an extension of this Patent for a period of three years. The Patent expired on November 1, 1931, and I therefore direct a re-grant for a period of three years from that date.

Baird Television v. The Gramophone Company.

On January 9, 1931, the Baird Television Co. commenced an action against the Gramophone Co. for infringement of Patent No. 253957 relating to scanning devices for television.

The usual preliminary steps were taken in due course, and the Plaintiffs then delayed taking any further action for approximately eight months. The Defendants thereupon applied to the Court to dismiss the action for want of prosecution. The application came before Mr. Justice Clauson on March 15, 1932.

Mr. Drewe, for the Defendants, pointed out that no rule specifically provided for dismissal for want of prosecution in this case. (The Judge : The Court has an inherent jurisdiction in the matter.) The action would be a very heavy one, and the expense of research and experiment would be great even in the preliminary stages.

For the Plaintiffs Mr. Shelley said the issues were difficult and it might even be necessary to apply to amend the Specification of the Patent.

The Judge : There has been undue delay, and the application by the Defendant is quite proper. Unless the Plaintiffs apply by notice for directions as to the mode of trial, the action will stand dismissed with costs.

Mullard v. Tungsram.

On June 5, 1930, the Mullard Radio Valve Co., Ltd., commenced an action for infringement of their Patents against Tungsram Electric Lamp Works (Great Britain), Ltd.

In their Statement of Claim the Plaintiffs alleged that the Defendants had imported into this country certain valves manufactured in Hungary in accordance with a process which in this country would infringe the Patents. The Defendants had at all material times been acquainted with this process or possessed the necessary means of acquiring such knowledge.

More particularly they alleged that prior to the issue of the writ and subsequent to the respective dates of the Patents the Defendants had imported into, sold, and offered for sale, in this country, wireless valves manufactured in Hungary and had thereby infringed certain specified Claims of the Patents.

Mr. Whitehead, K.C., and Mr. Shelley appeared for the Defendants, Mr. R. Moritz, K.C., and Mr. L. F. Heald for the Plaintiffs.

Mr. Whitehead said it was impossible for the Defendants to meet the case against them without further particulars. The Plaintiffs alleged that the valves of which they complain were made in accordance with all or some of a large number of specified processes and that they possess all or some of certain specified characteristics. The Defendants were entitled to know whether the Plaintiffs were relying upon all, or merely some, and if so, which, of the processes and characteristics.

Mr. Moritz in reply said, the Defendants are not placed in any unfair position : they know how their valves are manufactured, whereas the Plaintiffs do not, and cannot know, since in spite of our applications, the Defendants have consistently refused to allow us inspection of their process or give any description of it.

Mr. Whitehead : The Defendants do not manufacture but merely import. They have always been willing to arrange with the foreign manufacturers to give inspection, if the Plaintiffs would undertake to cease starting proceedings against the Defendants' customers.

Judgment was reserved and was delivered on February 24, 1932.

Mr. Justice Eve : The Plaintiffs in this action, instituted on June 5, 1930, seek to restrain the Defendants from infringing four Letters Patent relating to improved Cathodes or Oxide Cathodes.

On December 5, 1930, the Plaintiffs' solicitors wrote to the Defendants' solicitors a letter, wherein they say : "It will be obvious to you, as it is to us, that the scope of the proceedings could be very much curtailed if our clients and their advisers were in possession of precise information as to the processes employed by your clients in the manufacture of the valves in respect of which infringement is alleged. We therefore suggest to you that your clients should allow two experts, to be approved by you, to inspect on behalf of our clients at your clients' factory the processes by which each of the valves in question was manufactured and to see the plant in actual operation, with liberty to make sketches or photographs and to take samples of the filaments at various stages of manufacture, and materials employed.

"The question of the proof of the matters disclosed could be discussed subsequently. The result of this procedure, if adopted, may well be to save lengthy and expensive interlocutory proceedings which our clients would be compelled to take for the purpose of obtaining discovery."

To this the Defendants' advisers replied that their clients' representative would confer with their suppliers in Budapest on the subject of the letter. The letter proceeded : "We should like to point out that these Defendants are not the actual manufacturers of the valves in question, and whilst of course they are quite willing to assist in every way in saving unnecessary expense, the course adopted by your clients of issuing threats on a large scale, and of suing retailers and in some cases obtaining consent judgments, and generally disturbing the trade, will have to be considered."

On January 28, 1931, they wrote further : "As you are aware, our clients are not manufacturers themselves and have no factory to inspect and cannot compel the giving of any inspection. Whilst not admitting, however, any right on the part of your clients to any inspection, they were prepared to interview and did interview the manufacturers with a view to getting permission for your clients to inspect. They now find that in spite of our letter of 22nd ultimo, your clients have continued their policy of generally disturbing the trade by threats, and have in fact issued further writs against customers and have inserted further advertisements of consent judgments without making clear to the trade the true nature of such judgments, and particularly that there has been no trial upon the merits. In these circumstances our clients are no longer willing to do anything to assist your clients to prove their case."

The Defendants thereupon on December 16 last issued this summons for further and better particulars of the alleged infringment.

Their requirements would appear to be of an unreasonable and oppressive nature, because the relative positions of the Plaintiffs and the Defendants must not be lost sight of : the former has no certain knowledge of the process or processes employed by the alleged infringer, whilst the latter has full knowledge of the patented processes and of those in use for the production of the alleged infringement.

At the moment the Plaintiffs cannot commit themselves to more than this, that the alleged infringements are produced in accordance with a process or processes the application of some or all of which in this country would infringe each of their Patents. In this state of things they can only specify the Patents and Claims alleged to be infringed.

That this was their attitude was made clear to the Defendants in the letter of April 17, and until discovery shall have been made and inspection had, I do not think the Defendants are entitled to the further particulars asked for. I am prepared to let the summons stand over generally, but if the Defendants wish to take the matter further, I will now dispose of the matter by making no other order on the summons than that the costs of the same be the Plaintiffs'

Mr. Shelley : Will your Lordship allow the summons to stand over generally ?

The Judge : Yes, very well. But, of course, it is an Order against which you cannot appeal.

Mr. Shelley : That is so, my Lord, but if it stands over generally there will be liberty to apply to restore ?

The Judge : Yes.

THE INDUSTRY AT LAW

"Ever Ready" and Price-Cutting.

Before Mr. Justice Farwell in the Chancery Division on Friday, June 10, 1932, the Ever Ready Co. (Great Britain), Ltd., of Holloway, claimed an injunction to restrain C.P. Wireless Ltd., of Bedford Row, London, from infringing their letters patent by selling batteries below authorised prices.

Mr. Lloyd Jacobs, for the Ever Ready Co., explained that his clients were the owners of four letters patent dealing with the construction of wireless high tension batteries, and they alleged that C.P. Wireless, Ltd., had infringed each of the patents.

After hearing evidence, Mr. Justice Farwell granted the Ever Ready Co. an injunction as claimed, an inquiry as to damages, costs of the action, and a certificate of the patents' validity.

"Blue Spot": Alleged "Passing-Off."

Mr. Justice Clauson, in the Chancery Division, on Thursday, November 5, 1931, heard an action brought by the British Blue Spot Co., Ltd., against the North Western Electric Light Co., Ltd. of Kilburn Bridge, Kilburn High Road, London, for an injunction to restrain defendants from passing off as and for the plaintiffs' chassis for speakers, chassis not of their manufacture.

Mr. T. E. Davis, for the North Western Electric Light Co., denied the alleged passing off.

For Blue Spot, Mr. K. E. Shelly said it was alleged that the defendants, in response to a verbal order for a Blue Spot chassis by Mr. Richard Page Taylor, had sold a chassis not of plaintiffs' manufacture. The article sold did not bear the words Blue Spot. It was further alleged that when he took the article complained of back because he was dissatisfied, he was assured it was a Blue Spot chassis.

When he asked why it was not marked, he was told that not all Blue Spot products were marked. The next day he took the article to plaintiffs, who told him it was not of their manufacture. They then brought these proceedings.

For the defence, Mr. Harry Usick said he had no knowledge that any assistant had passed off a chassis as a Blue Spot chassis. The staff were warned against anything like that. The firm would get more profit by selling a Blue Spot product.

After a salesman in the firm had given corroborative evidence, His Lordship said there was not a fragment of paper in support of the plaintiffs' case. It would be wholly unsafe to rely on the evidence given, although he was not suggesting that Mr. Page Taylor had not been fair to the court.

His Lordship could not, on such evidence, hold the defendants guilty of fraudulent trading, and the action would be dismissed with costs.

"Blue Spot": Limited Licence.

Before Mr. Justice Farwell, in the Chancery Division, on Wednesday, November 11, 1931, a settlement was announced of an action by British Blue Spot Co., Ltd., against Jacques. Mr. R. E. Shelley, for the British Blue Spot Co., stated that the parties had come to an agreement and the defendant would consent to an order.

The action was brought to restrain the infringement of plaintiffs' patent by selling a patented article at less than the approved price under a limited licence. By consent he asked for an order for an injunction to that effect. An arrangement had been come to as to costs.

Defendant was an infant with, so far as plaintiffs knew, no assets, and sooner than incur the expense of bringing witnesses to Court, plaintiffs were prepared to make an arrangement as to costs which had been carried into effect. Counsel asked that there should be no mention of that arrangement in the order, which otherwise would be perfectly useless. The whole point of those actions was to inform the trade that they could not sell in breach of the limited licence, and they desired to show the order to anyone who attacked their rights in future.

Mr. Tookey, for the defendant, asked that the arrangement as to costs should be recited in the order. Defendant saw no objection to giving an injunction restraining him from doing something he never intended to do, plaintiffs paying a very substantial sum towards his costs.

His Lordship said that the proper order would be, by consent, to grant the injunction with no order as to costs. Mr. Tookey assented and his Lordship made an order in that form.

Another Action Against Derby Firm.

In the Chancery Division, on Friday, November 20, 1931, British Blue Spot Co., Ltd., were successful in an action against Eunice Radio and Gramo Co., Green Lane, Derby, claiming an injunction to restrain the defendants from selling Blue Spot 66P speaker units at a less price than that authorised, and an injunction to restrain defendants from infringing letters patent.

It was stated that the plaintiffs sold their units under a limited licence to retailers, and an express term was that they should not be resold to the public for less than 27s. 6d.

A Mr. R. Taylor, employed by Currys at East Street, Derby, who was sent to the shop, saw the manager, who said he could not sell a Blue Spot unit at less than ordinary price. Later Mr. Taylor saw Mr. Abraham, the owner, who, after some hesitation, said he would risk it and sold a unit for 22s. 11d.

The defence was a denial.

Giving judgment, Mr. Justice Luxmoore said he was satisfied Mr. Taylor had not concocted his story, as he must have done if defendant's evidence was true, in order to ruin a new Trade rival. Plaintiffs had established that a sale was made in breach of their licence, and were entitled to the injunctions they asked for with costs of the action.

"Columbia" Secures Injunction.

In the Chancery Division on April 29, 1932, the Columbia Graphophone Co., Ltd., secured an injunction restraining the alleged passing off of receivers not of their manufacture as and for their goods by the use of the word "Columbia."

The defendants, who denied the allegation, were Mr. H. Martin and the London Radio Co., of Chelmsford; the London Radio Supply Co., Victoria Arcade, Southend-on-Sea, and the Acme Wholesale Wireless and Electrical Co., Goresbrook Road, Dagenham.

Giving evidence for the defence, Mr. H. Martin said he carried on business as the London Radio Co. at Moulsham Street, Chelmsford. He purchased the wireless set in question from a Mr. Scott, of Boscombe Road, Southend, who told him he understood it was a "Columbia" and all he said to the purchaser was that he had purchased it as a "Columbia."

Mr. Cyril Martin said he knew nothing about the other sales mentioned, as they occurred prior to his purchasing the Southend and Dagenham businesses.

Mr. Justice Maugham, giving judgment, held that there was nothing to connect Mr. Cyril Martin with the Southend or Dagenham businesses at the time the wireless sets were passed off, and that the action as against him failed and must be dismissed with costs. He found that the case against Mr. Harry Martin had been established and granted an injunction against him with costs. The plaintiff company waived their right to an inquiry as to damages against Mr. Harry Martin.

Exide Batteries: Price Cutting.

A settlement was announced to Mr. Justice Bennett in the Chancery Division on Wednesday, January 13, 1932, of an action brought by the Chloride Electrical Storage Co., Ltd., against the National Radio Co., of East India Dock Road, London, E., which was down for trial before him.

Mr. Tookey, for the plaintiffs, said it was a patent action, the infringement alleged being the selling of a patented article below authorised price. The defendants were willing to submit to an injunction, and if his Lordship was prepared to grant this the plaintiffs would ask for no further order.

Mr. Justice Bennett: You may take an order by consent.

"Dominion" Trade Name.

A motion by the Brownie Wireless Co., Ltd., for an interim injunction pending the trial of the action restraining the Dominion Radio, Ltd., from carrying on business in the name or under any style of which the word "Dominion" formed part, was heard by Mr. Justice Maugham in the Chancery Division on Tuesday, July 19, 1932.

The injunction was granted until the trial or further order restraining the defendants from carrying on business in wireless sets or components thereof under the name Dominion Radio, Ltd.

Mr. J. Mould, for the plaintiff company, said it was formed in 1925 to carry on business as manufacturers of wireless apparatus, and in particular of wireless receiving sets. During the last four years it had adopted as a trade mark (unregistered) the word "Dominion." A large and increasing business had been built up, and in that period, in addition to a large number of Brownie sets, they had sold £175,000 worth of sets under the name "Dominion," and had spent very large sums in advertising that name.

The defendant company was incorporated on March 11 last, and an advertisement announcing its existence appeared in the trade papers on April 9. The plaintiffs at once communicated with the defendants, asking them to change their name before they had commenced business on the ground that otherwise confusion would arise to the detriment of the plaintiffs.

Mr. Gerald Upjohn, for the defendants, said that they carried on a wholly different business, and did not in any way compete with the plaintiffs.

Mr. Justice Maugham, giving judgment, said that in his opinion there ought to be an injunction in this case until the trial of the action. The costs were ordered to be costs in the action.

Radiovisor Companies Dispute.

An action was brought by Radiovisor (Foreign and Colonial), Ltd., against Radiovisor Parent, Ltd., claiming £200,000 damages and the return or cancellation of 120,000 £1 fully paid shares on the ground of misrepresentation in the sale by the defendants to them of the foreign patent rights in a selenium bridge. The defendants denied misrepresentation and that the plaintiffs had suffered damage.

Sir William Jowitt, K.C., for the plaintiff company, said it was formed with a capital of £450,000 in £1 shares, of which 380,000 were fully paid. Its possible uses for broadcasting and making gramophone records were pointed out in the defendants' prospectus. It was suggested that the time had arrived for mass production at low price, but the plaintiffs said the joint factory and research of the two companies had not established this.

Counsel said the selenium bridge had been fitted to some of the street lamps at Barnes and elsewhere, but experiments seemed to show that temperature and other factors disturbed its constancy.

Mr. Hugh Terrell, vice-chairman and managing director of the plaintiff company, said he did not see a report of December 6, 1928, till after the action was brought. The company could not have been formed by anyone if that report had been known.

He explained that the A.E.G. Co. and Siemens in Germany wanted to use the bridge for acoustic purposes, and directed experiments to that end. This led to investigations into the question of the effects of temperature and, later, other factors. The company was to have supplied bridges at 8s. 6d. to Siemens, and he calculated they had lost a possible £50,000 in that direction, though Siemens made no claim.

Cross-examined, Mr. Hugh Terrell said he became vice-chairman and managing director of the plaintiff company, and promoted his company in part-reliance on the demonstrations he saw and on the defendant company's prospectus. He relied also on what he was told at the demonstrations. He knew that every talking-picture house in the country had a light-sensitive bridge. The prospectus said this bridge could be linked across normal supply voltages. In answer to the suggestion that earlier bridges would be ruined by these voltages he would point out that talking films were out before that, and that every talking-picture house had one.

Evidence for the Foreign and Colonial company was given by the Duke of Atholl, Mr. Hugh Terrell, vice-chairman and managing director of the plaintiff company, and Mr. Abraham Cotton, managing director of the plaintiff company. Mr. Cotton said that when experiments were made in Berlin considerable trouble was experienced as to the effect of temperature on the bridges. Two shareholders of the plaintiff company, Mr. S. C. Josephs and Mr. Oscar Deutsch, said they were informed the bridge was a perfect article ready for the market. This induced them to invest.

Mr. P. A. Bax, solicitor, who with his partner invested £12,000 in the company, said he was informed at demonstrations that the bridge could be produced for half-a-crown.

Dr. William Henry Eccles, a past-president of the I.E.E., said he had tested eleven hundred selenium light bridges during the past six or seven months, and had found that they changed in appearance, which could be observed by merely looking at them.

When Mr. Justice Lawrence resumed on Friday, June 24, for the 34th day, the hearing of the Radiovisor action, the case was adjourned until a date in October.

Hire Purchase

Foreign or British.

An unusual point in H.P. law was mentioned at Shoreditch County Court on Friday, November 20, 1931, when A. Granville, Ltd., of Stoke Newington Road, N.E., dealers, sued Arthur and Christian Smith, both of Neville Road, N.E., to recover £12, being the balance alleged to be due on a £13 receiver. A deposit of £1 had been paid.

The defence was that the set would not work satisfactorily, and that on investigating they discovered it was not English. They told plaintiffs they did not want it, and during their absence it was changed. They were just as dissatisfied, told them they did not want it, and would not pay for it.

For the plaintiffs, it was stated that the set was made in England. There was no one present who could definitely say anything about the changing of the set.

Judge Dumas said this was an important point because if the receiver had been changed there was no H.P. agreement in existence with reference to the substituted set.

The case was then adjourned for plaintiffs to produce evidence that this was the original set they were suing for, but at the next hearing no one for the plaintiffs was present, and defendants said they had received intimation that they were withdrawing from the action.

Judgment was then given for the defendants with costs. The defendants also asked for the £1 which they counter-claimed, and judgment was given them for that with costs.

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THE INDUSTRY AT LAW

[*Continued from page* 201.]

A Question of Discount.

In the Southwark County Court, London on Thursday, November 26, 1931, Selecta Gramophones, Ltd., of 81, Southwark Street, Southwark, S.E., sued Phonograms, Ltd., of 19, Gillingham Street, Westminster, S.W., to recover £10 7s. 1d., for Pye radio sets supplied.

It was stated for the plaintiffs that the claim was on two dishonoured cheques, both on the same date. The Pye Company allowed a 10 per cent. discount to retailers who dealt direct with them, but there was no agreement between the plaintiffs and Pye.

The defendants telephoned an order for Pye receivers, and then said they were recognised Pye dealers, and wanted the 10 per cent. Plaintiffs told defendants that in those circumstances they would not supply them, whereupon defendants said they would have to have them, and asked them to be sent along C.O.D. The two cheques for £9 7s. 1d. and £1 were handed to the carman, and the defendants apparently immediately stopped the cheques. They had paid £9 6s. 5d. into Court, leaving the balance of £1 0s. 8d., the discount, in dispute.

A director of the defendant company said that when the goods were ordered there was no question of discount at all. The next day he rang up the plaintiffs, and they told him they had more orders than they could do with in these sets, and they were sorry they could not allow the 10 per cent.

Later, he spoke by telephone to Mr. Harry Bryan, of the plaintiff company, who said he would allow the 10 per cent. He said he would give instructions to his bank to pay the cheques, and the plaintiffs would credit him with £1 0s. 8d.

Judge Moore considered the plaintiffs had supplied the goods on their usual terms, and that no special arrangement was made at the time of the order. Defendants had given the cheques, and at that time they knew they were not to receive a discount.

Defendants had to prove a definite agreement, which they had failed to do, and there would have to be judgment for the plaintiffs for the amount claimed, and costs.

To Purchase or Hire?

An agreement, believed by one of the parties to be an agreement to hire, has been interpreted by the Courts as an agreement to purchase.

The terms of the written contract appeared simple. The defendant required certain machinery for his business. Its total cost was £400. He signed a document "agreeing to hire," which provided: Payment of £50 down; instalments of £50 on each of seven following quarter days. If the defendant wished to buy outright he might do so by paying up whatever part of "the purchase price of £400" was outstanding.

The quarter-day payments were irregular, and the plaintiff issued a writ, claiming (1) delivery up to him of the property, as being "wrongly detained"; (2) £250, the sum at that date unpaid; (3) "damages for detention" of the property. Defendant admitted only that he had not yet paid in full.

Mr. Justice MacKinnon found that he could not pass the agreement as one for hiring. He held that the contract was actually for a price to be paid in instalments. As soon as it was entered into there was an absolute obligation on both parties; thus the defendant, after paying his initial £50, could not have insisted on returning the property. The measure of damages was the loss of interest on the instalments.

There was by law no right to give damages in the shape of interest, except in a certain limited class of case. This transaction was one such. Judgment was given for the plaintiff for the unpaid balance, with interest at 5 per cent. on the various instalments reckoned from the date when they ought to have been paid.

Fictitious Hire Purchases.

A London chef was at Newcastle City Police Court on Tuesday, December 29, 1931, sentenced to six months' imprisonment on each of three charges of stealing receivers, the sentences to run concurrently.

It was stated the man obtained employment as a salesman with Herdman and Co., retailers, of Newcastle, and handed in H.P. agreements bearing fictitious signatures and addresses. He was said to have been led away by a gang of crooks, who sold the receivers in various parts of the country.

Later the same day the chef appeared at the Moot Hall Police Court, Newcastle, where he was charged with stealing six receivers, worth £68 7s. 6d., from Prior and Crake, retailers, of 225, High Street, Gosforth, by similar methods. There were three charges in this case, and sentences of six months' imprisonment on each were imposed, the sentences to run concurrently with the others.

At the same court, a Newcastle marine store dealer was fined £25 for receiving stolen receivers from the chef.

Selling H.P. Sets.

"Apparently he has been going about to wireless dealers, doing this kind of thing," remarked a detective at the North London Police Court, on Wednesday, January 13, 1932, regarding Thomas William Smith, 44, general labourer, of Islington.

Smith was said to have secured radio goods on H.P. by giving false information.

He pleaded guilty to stealing as bailee a receiver and speaker worth £14, the property of Lionel Shenstone, dealer, of Dalston Lane, E. He also admitted a further charge of attempting to obtain an 11-guinea wireless set by false pretences from Parkers.

Prisoner was sentenced to two months' hard labour on each of the two charges, the sentences to be consecutive. It was stated that in the first case, Smith had entered false statements on an H.P. agreement and, having obtained a receiver, re-sold it for £3 5s.

Ordered to Repay Dealer.

A Southend man and his wife appeared at the local Police Court on Tuesday, January 19, 1932, charged with stealing as bailees a 10-guinea receiver, the property of Enoch Davies, Alexandra Street, Southend.

The man, George James German, was bound over for twelve months' and ordered to repay Mr. Davies, while the woman was sentenced to two months' hard labour. It was stated the receiver was obtained on H.P., the man German paying 1-guinea deposit and agreeing to pay the balance of £10 8s. in monthly instalments. Evidence that the receiver had been sold by the woman was denied by the defendants.

H.P. in Scotland.

Following an outcry in Scotland that more than 200 people had been imprisoned in the course of a year for having failed to return goods bought on hire-purchase when ordered to do so by the Courts, a Commission was set up by the Secretary of State for Scotland to inquire into the workings of the hire-purchase system.

In its report, the Commission states that many hirers do not understand the agreements signed by them, and are induced to enter into contracts which they cannot perform. It is recommended that these agreements be expressed much more simply.

"Nearly all the companies which carry on hire-purchase have their headquarters in Glasgow," adds the report. "In many contracts a clause is inserted binding the hirer to appear, if necessary, in the court of the district in which the firm has its headquarters instead of in the district in which the hirer resides."

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THE INDUSTRY AT LAW

[*Continued from page* 203.]

"With regard to what is known as the 'penalty,' 'depreciation,' or 'liquidate damages' clause by the aid of which a firm can recover a certain sum for depreciation if a hirer decides to terminate a contract, the Commission recommends that there should be a statutory provision limiting the sum payable for depreciation."

"On the question of imprisonment for failure to produce goods the return of which has been ordered by the Court, the Commission recommends that the law be altered."

The findings of the Commission are merely recommendations, of course, and will require the approval of Parliament before there is any alteration necessary in present hire-purchase procedure.

A Cool Transaction.

How a man enticed a prospective customer from a dealer's shop and then sold a receiver and speaker worth £14 he had secured on hire-purchase from another dealer, was told at the North London Police Court on Friday, January 8, 1932.

The man, Thos. Wm. Smith, labourer, of Islington, who pleaded guilty to a charge of selling the property while being bailee, was remanded for a week.

It was stated Smith secured the receiver and speaker from Lionel Shenstone, of Dalston Lane, London, E., and paid £1 deposit.

Becoming suspicious, Mr. Shenstone had police inquiries made, when it was discovered the receiver was not at Smith's mother's house as had been stated, while a false reference had also been given.

Another Forgery.

An unusual form of forgery was revealed at Merthyr Tydfil Police Court, when a Dowlais man was sent to prison for two months for obtaining a gramophone and records worth £5 16s. 6d. from a Birmingham dealer by means of a forged document.

It was stated that the accused, who was unemployed, sent 2s. 6d. to the Birmingham firm as an H.P. deposit. He also sent a letter of guarantee, purporting to come from another Dowlais man. A confirmation of this was also secured.

When the accused fell into arrears with his payments, the man given as guarantor denied all knowledge of the matter.

Father's Signature Forged.

At Old Street Police Court, London, on Friday, May 6, 1932, John Kemp, commercial traveller, of Shoreditch, James Martin McNamara, french polisher, of Shoreditch, and George Wm. Westbrook, a soldier, were charged on remand with being concerned together with stealing on different dates two portables, worth £16, from Wirewell Radio, at Well Street, Hackney.

Kemp was further charged on remand with receiving a £4 12s. gramophone, and Westbrook had pleaded guilty to a charge that, being bailee of the gramophone, he had stolen it by converting the instrument to his own use.

Kemp was fined £10 and Westbrook and McNamara were bound over.

Sale of Goods

Breach of Contract.

Mr. Justice Swift, in the King's Bench Division on Wednesday, June 22, 1932, heard an action brought by British Ideal Patents, Ltd., of Green Street, Brimsdown, Middlesex, against Electrocolour Products, Ltd., of New Broad Street, London, E.C., claiming damages for alleged breach of contract to accept and pay for goods.

Defendants were not represented in Court.

Mr. H. G. Garland, for British Ideal Patents, Ltd., said by an agreement of March 2, 1931, Electrocolour Products, Ltd., agreed to buy from plaintiffs 5,000 10-inch covers for gramophone records. Subsequently they agreed to buy 5,000 Mivoice Speakeasie attachments, including T-pieces, sound-box, and tracking-arm, at 3s. 2d. a set. By another agreement they agreed to buy 5,000 small adaptors at 1½d. each.

Mr. Garland said the defendant company accepted and paid for 1,500 covers, 500 of the attachments, 1,014 of the T-pieces, and 1,050 small adaptors. They had, he alleged, failed to accept or pay for the balance of the ordered goods. These goods were valueless, because they were manufactured specially for defendants. Their scrap value was only £12.

His lordship gave judgment for plaintiffs for £327 7s. 9d., with costs.

Sale of Battery Cords.

The Perfecta Radio and Cycle Co., Ltd., 223, Shoreditch High Street, London, E., were again the defendants in an action in the Shoreditch County Court, on Thursday, December 17, 1931, Flexible Cords, Ltd., of Queensway, Ponders End, N., being the plaintiffs.

The action entered in the High Court, and remitted to the County Court, was for 1,000 7-way battery cords, amounting to £40 12s. 6d.

There was a defence and counter-claim entered by the defendants, in which they said that the plaintiffs agreed to sell 2,000 7-way battery cords at 9s. 9d. a doz., the whole to be delivered from stock, packed in attractive boxes. Only 1,000 cords were delivered, and these were not boxed.

Judge Cluer: You are entitled to judgment on your claim and the counter-claim will be dismissed. I will grant High Court costs.

A Question of Warranty.

A dispute over the sale of a receiver was settled in the Worthing County Court on Monday, January 25, 1932, when Miss Harriet Lavinia Mowels, Brighton Road, Worthing, sued Mr. Frank Clifton Hay, the Mello-Tone Wireless Service, Hove and Worthing, claiming the rescission of a contract and the return of £23 purchase money. Alternately, she claimed £24 for breach of a contract, or alternately £24 on a consideration which had failed. In addition, she claimed £10 general damages.

Plaintiff said she bought a set from defendant and gave a cheque for £29. He allowed her £1 on her old set. On the following day the set would not work, and after attention it gave more trouble. She finally decided to send it back and ask for the return of her money.

Defendant contended that he emphasised the receiver was one he had continually demonstrated and gave the option of having it, or a new one.

Judge Austin Jones held that plaintiff bought the set in the belief that it was a new one, and gave judgment for plaintiff for £18.

Disputing a Judgment Debt.

When Eros Distributors, Ltd., factors, of 12a, Finsbury Square, London, E.C., sued Richard Burle Cockburn, dealer, of Old Kent Road, London, S.E., in the Shoreditch County Court, on Tuesday, December 1, 1931, to recover £32 4s. 1d., under a judgment debt, Cockburn said it was not his debt.

Judge Cluer: That does not matter, until you get the judgment set aside.

endant: Does that mean that I have to pay somebody else's debt?

Judge Cluer: Yes. I will make an order for payment at £1 a month, and if you really consider you do not owe this, go into the office and fill in a form to have the judgment set aside.

THE INDUSTRY AT LAW

Sale of Composite Parcels.

In the King's Bench Division, on Thursday, October 29, 1931, Mr. Justice Rowlatt entered judgment in favour of the Electric Lamp Service Company, Ltd., of Parker Street, Kingsway, in dealing with a counter-claim brought to the action by V. Zeitlin and Sons, Ltd., of Theobald's Road, London, W.C.

It was stated that both parties dealt in radio accessories supplied by the Radio Clearance Co., of Manchester.

In August, 1930, V. Zeitlin and Sons, Ltd., supplied, on loan, certain types of valves to the Electric Lamp Service Co., Ltd., which were contained in a composite parcel. The arrangement between the parties was that the valves of a certain type in the parcel should be replaced later by Electric Lamp Service Co., Ltd., but when they intimated that they could not replace the articles it was agreed, according to V. Zeitlin and Sons, Ltd., that they should take the whole of the parcel.

V. Zeitlin and Sons, Ltd., now complained that the Electric Lamp Service Co., Ltd., had taken the "cream" of the parcel and had wrongfully declined to pay for the balance, amounting to £100.

In giving judgment, Mr. Justice Rowlatt said he was unable to decide that Zeitlin and Sons, Ltd., had made out their case. He was absolutely perplexed by the conflicting evidence given, and in the circumstances he had to give the judgment on the counter-claim for the Electric Lamp Service Co., Ltd., with costs.

Maltreated Set.

In the Shoreditch County Court on Friday, January 29, 1932, Sidney Joseph, 142, Osbaldeston Road, London, N., sued Williams Lighting Co., Kingsland Road, N., to recover £12, the value of a portable wireless set with eliminator, now in possession of the defendant. The defendant counter-claimed for £1 14s. for repairs.

The plaintiff said that he purchased the receiver under a guarantee that it would go for 12 months if reasonably used, and that if anything went wrong it would be repaired. The set never went right.

The defendant denied the guarantee, but admitted he would always put right any defect.

Judge Dumas was convinced the set had not be reasonably treated, and gave judgment for the defendant on the claim, and judgment for the defendant on the counter-claim, and costs.

Set that was "Lost."

A North Essex firm of Traders won an unusual action at the Dunmow County Court on Friday, May 6, 1932, when Nicholls Bros., wireless traders, High Street, Braintree, sued Frederick Goodey, of Braintree, for 6s. 9d., for receiver repairs, and also for the return of a new receiver sent on approval, or alternatively, its value, £5 3s. 9d.

Percy Joseph Nicholls, a partner in the firm, said that following the execution of the repairs, it was discovered the set had been delivered in error to another customer. This was explained to Goodey, who was offered a new set for £5 3s. 9d. and the old instrument in part exchange.

Goodey took the new set on approval, and later, when asked to pay, said: "You've lost my set and I'm going to keep yours." They then delivered the old receiver, but the new instrument had not been returned to them.

Judgment was entered for the plaintiffs for the repairs and for the return of the new set, or, failing its return, its value, and costs. His Honour added that there was no claim for damages in respect of depreciation of plaintiffs' set.

Disputed Order.

A successful claim for £22 10s. in respect of the installation of a receiver was made on Monday, January 22, 1932, at Bridgend County Court by Robert D. John, Maesteg, dealer, against John Redmond, also of Maesteg.

For the plaintiff it was stated that by arrangement several receivers were left from time to time at Redmond's house. Later one of his daughters called at the shop and declared they had decided to buy one of them.

Defendant denied an order had been placed, but judgment was entered for plaintiff with costs.

Miscellaneous Cases

Liability for Rent after Fire.

A recent High Court case in which a landlord sued his tenant for substantial arrears of rent calls for notice. The sum involved was £137—two quarters' rent of a shop and basement held on lease.

There had been a fire at the place, so serious that business was brought to a standstill during the following six months. The lessee had suffered heavy loss and could not pay.

The judge said there was no question but that defendant was liable for the whole sum, and he found for plaintiff, with costs. This action, and others similar to it in the Courts of late, suggests that it is far from being generally realised that, in the absence of a special agreement, a lessee continues to be liable for rent even though premises have been totally destroyed by fire, the only exception being when the outbreak is due to "Act of God"—such as lightning or earthquake—but even here it is perhaps needless to say, the landlord is under no compulsion to rebuild.

The moral to be drawn is that every lessee should be careful either to have the fire liability expressly excluded from his lease, or, if the landlord will not agree to this, to lose no time in taking out a premises fire insurance.

Salesman Must Have P.M.G. Licence.

The law as affecting wireless demonstrators was explained at Romford Police Court on Thursday, November 5, 1931, when Arthur R. Copeman, of Romford, was summoned for working a wireless set without a licence.

A Post Office official said that Copeman had a five-valve portable set at his home, and it was alleged that he had used it on many occasions.

Copeman: Well, you can take it from me that demonstrators do not need to have a licence.

Eventually, the chairman announced that the Bench was of opinion that Copeman needed a licence. Copeman protested that it was contrary to the practice which existed in the Trade. He was fined 20s.

So Must Constructors.

"This case is more serious than usual," said a barrister who appeared for the prosecution at the North London Police Court on Thursday, October 29, 1931, when Joseph Selig, of West Hackney, was summoned for working a receiver without a licence between May 1 and October 10.

"The defendant has been making sets for the past six years and selling them," counsel explained.

The defendant admitted the offence, and it was stated that he had not been summoned before. A fine of 40s. and a guinea costs was imposed.

Overhanging Signboard.

An unusual summons, under the London Building Act, against J. and M. Stone, 40, High Street, Deptford, for fixing a sign along the face of a shop at that address, which overhung the public footway, contrary to an L.C.C. by-law, was heard at Tower Bridge Court on Wednesday,

January 20, 1932. Proceedings were taken at the instance of the Deptford Borough Council.

It was stated that the sign, 15 ft. long, overhung the footway by some 6 in. The Council's surveyor said the sign was only nailed to battens on the wall and weighed about 2 cwt.

The magistrate said there had been a breach of the by-law, but as this was the first prosecution of the kind for some time he would only fine defendants £4 and order payment of five guineas costs.

A Private Car used for Business.

Some months ago the question was raised in *The Broadcaster* whether a private motor-car, licensed only as such (that is, on the horse-power, not on the by-weight commercial vehicle basis) might be used for any business purpose.

The view was expressed that the answer was in the negative—that if such a car was so used, the owner became liable to pay tax on the by-weight scale, usually a higher one.

This view has since often been queried, and quite recently even the Automobile Association itself declared:—"It is permissible to use a private car for any business purpose, *including the conveyance of goods and samples, so long as there is no adaptation or alteration in construction*" of the car.

The above case was taken to Appeal in the King's Bench Division, on April 22, from the Magistrate's decision that a trader who used his car, *without adaptation*, for conveying some goods, was liable to pay at the higher rate.

By a majority judgment the magistrate's ruling was upheld.

The Finance Act of 1922 states:—"Where a licence has been taken out . . . and the vehicle is used in an altered condition *or in any manner or for a purpose* which brings it within . . . a class or description of vehicle to which a higher rate of duty is applicable . . . duty at such higher rate shall become chargeable."

The Government has since notified the insertion of a clause in the current Finance Bill to provide that "duty at the higher rate shall not become chargeable unless the vehicle satisfies all the conditions" which relate to the taxing of commercial vehicles.

The final position is that one is not liable to pay the higher duty unless one's private car has obviously been converted partly or wholly for goods conveyance.

Proof of Claim on Liquidation.

Mr. Justice Eve in the Chancery Division on Tuesday, June 14, 1932, heard an application by Universal Cabinets, Ltd. (in liquidation), for an order reversing the decision of the liquidation of Aeonic Radio, Ltd., who rejected the company's proof in the liquidation for £2,176, the value of cabinets supplied for wireless sets.

Mr. Reed, for the liquidator of Universal Cabinets, Ltd., said that in June, 1929, Aeonic Radio, Ltd., gave Universal Cabinets, Ltd., an order for 5,000 two-valve oak cabinets at 11s. 6d. each, subsequently increased to 12s. Of this number 1,373 were delivered before June, 1930, when Aeonic Radio, Ltd., went into liquidation. The remainder of the cabinets were delivered, in part, at the works at Horley, Surrey, but it was now contended for the liquidator of Aeonic Radio, Ltd., that another company, Electrical and Radio Products, Ltd., had taken over and was in possession of the works when the deliveries took place, and that the deliveries constituted a release of the original contract, being a fresh sale.

His lordship said that the proof ought to be admitted by the liquidator of Aeonic Radio, Ltd., the debt being theirs and continuing to be so to the end. He made an order to that effect.

Conversion by Traveller.

The position of a radio traveller who used a motor-car with a private licence for the purposes of business was argued before the Cardiff Stipendiary Magistrate, when William Herbert Thomas, of Rumney, near Cardiff, was summoned for using a privately licensed car for the conveyance of trade goods.

It was stated that he had paid a licence of £3 6s. for the quarter, whereas the commercial licence was £4 2s. 6d.

Thomas said he had offered to pay the higher fee, but had been told by the authorities this would not be necessary unless alterations were made to the car.

Infraction of "Shops Act."

The Western Lighting Co., Ltd., 77, Mitcham Road, Tooting, who opened a branch at 25, North Street, Guildford, were summoned for not having in their shop a notice showing when their assistants had their weekly half-holiday, and also for not showing a notice stating at what hour their assistant, Edward Arthur Cobbett, could be employed in or about the shop.

Defendants pleaded that the error had occurred because they had had several different managers. The notices were now in position. A fine of £1 in each case was imposed.

Claim to Holidays.

At Dunoon Sheriff Court judgment was given in an action raised against James M'Gregor, dealer, Ferry Brae, Dunoon, by Arthur Cordiner, a former employee, who claimed £4 10s., being two weeks' wages in lieu of half-holidays which he did not receive during his employment with defendant.

The Sheriff held that pursuer had failed to prove that he was wholly or mainly employed by the defender as shop assistant. He repelled the pursuer's claim and granted defender £2 8s. expenses.

Holiday Claim Allowed.

That a commercial traveller was entitled by law to a fortnight's holiday was decided in the Southwark County Court, on Thursday, August 4, 1932, when a traveller sued his employers to recover £25 as damages for wrongful dismissal.

For the plaintiff it was stated he had a salary of £5 a week, and expenses. He was dismissed without proper notice, and claimed he was in all entitled to £10 in lieu of a fortnight's holiday, in addition to a month's notice.

Giving judgment, Judge Moore said in consequence of plaintiff's evidence he was entitled to a fortnight's notice only, and a fortnight's holiday money. In the absence of a special contract, he would say that commercial travellers were entitled to a month's notice at least.

Illegal Wage Deductions.

How 5s. 6d. had been deducted from a cabinet maker's wages because some of his work was unsatisfactory was mentioned in the Shoreditch County Court on Monday.

Judge Cluer said this was illegal.

"What does the Statute of 1906 say?" he said. "Is there a copy of the Statute posted up in the factory? There is a £10 penalty for such a thing as this.

"No one may deduct anything from wages.

Misleading Advertisements.

A warning as to the terms in which firms advertise was afforded by a case at Clerkenwell County Court on Friday, February 5, 1932, when Miss Edith Picton-Turbeville, of Westminster, sued J. Dennis and Co., Ltd., manufacturers of Bath Street, London, E.C., for the return of £4 18s. 6d. paid for a five-valve portable.

Her case was that the set did not comply with the terms of the firm's advertisement in a Sunday newspaper that the set gave foreign stations at full speaker strength.

The firm's defence was that any trouble experienced was due to the set having been left switched on inadvertently, so that the high tension battery and the accumulator ran down. This, however, was denied.

Judgment was given for the plaintiff for the amount claimed. Miss Picton-Turbeville was also allowed 10s. witness expenses and costs on the summons.

NEW COMPANIES REGISTERED DURING THE YEAR

A. B. Electric Co., Ltd.—Private co. Capital £5,000. Manufacturers, importers and exporters of, agents for and dealers in wireless. Directors: H. Boyne, Mrs. Margaret L. Boyne, and H. Kelly. Solicitor: G. F. Bolam, 12, West Street, Gateshead.

Aberdare Relay Service, Ltd.—Private co. Capital £5,000. Proprietors of a wireless relay service and dealer in wireless. Directors: J. D. Williams, G. T. David, and D. S. Evans.

Agripta Mfg. Co., Ltd.—Private co. Capital £1,500. Manufacturers of and dealers in wireless. Directors: T. E. Hall, W. C. Gillman. Registered office: 6/7, Queen Street, Cheapside, E.C.4.

Alliance Radio, Ltd.—Private co. Capital £1,000. Manufacturers of, agents for and dealers in wireless. Directors: Lt. A. H. Jenkinson, R.N. (Ret.), and P. Kader.

Alkum Storage Batteries, Ltd.—Private co. Capital £7,000. Manufacturers of batteries. Directors: G. Normanton, J. Robinson, and W. Emmott. Solicitor: Lewis I. Dey, 13, Harrison Road, Halifax. Registered office: Waterside, Halifax.

Allied Trading House, Ltd.—Private co. Capital £15,000. Hire-purchase financiers, guarantee, finance and indemnity company, etc. The directors are: M. Brooks, C. B. Lowe, and E. Eyre. Solicitors: H. E. Ward and Co., Chesterfield.

Amplion (1932), Ltd.—Private co. Capital £600. Manufacturers of and dealers in wireless. Subscribers: A. T. Winfield and A. Kings. Solicitors: Philip Conway, Thomas and Co., 80, Rochester Row, S.W.1. The registered office is at Sentinal House, Southampton Row, W.C.1.

Anglo Radio Co., Ltd.—Private co. Capital £2,500. Wireless mfrs. Subscribers: G. J. B. Porter and N. K. F. Porter. Solicitors: Farrar, Porter & Co., 2, Wardrobe Place, Doctors' Commons, E.C.4.

Associated Radio Productions, Ltd.—Private co. Capital £1,000. Wireless mfrs, etc. Directors: J. S. Clark and A. W. Moir. Solicitor: W. H. Sanders, 7, Bloomsbury Square, W.C.1.

H. Bailey and Co., Ltd.—Private co. Capital £2,000. Wireless engineer. Directors: H. Bailey and Mrs. N. Bailey.

Barium Metal Works, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in valves. Directors: J. S. Lowden and Catherine Stevens. Solicitor: A. W. J. Cloos, 107, Fleet Street, E.C.4. Registered office: Lancaster Road, Southall, Middlesex.

Barnes and Spicer, Ltd.—Private co. Capital £1,000. Wireless mfrs. Directors: C. A. Barnes and A. G. Spicer. Solicitors: Marsh and Herriman, Worthing. Registered office: 4, Connaught Buildings, Chapel Road, Worthing.

Barrow Radio, Ltd.—Private co. Capital £3,000. To relay radio programmes, radio engineers and manufacturers. Directors: J. Sutcliffe and G. H. Morris. Solicitors: Thompson and Angel, Barrow-in-Furness. Registered office: 217, Dalton Road, Barrow-in-Furness.

C. B. Barton, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless and television apparatus, gramophones and records. Directors: C. B. Barton and Mrs. B. G. Barton.

Basingstoke Wire Broadcasting Service, Ltd.—Private co. Capital £4,000. Broadcasting by wire and dealing in wireless apparatus. Subscribers: A. H. S. MacCallum and A. W. L. MacCallum. Solicitor: W. How Davey, 266, Earl's Court Road, S.W.5.

Bawtree Williams, Ltd.—Private co. Capital £2,000. Manufacturers of and dealers in wireless. Directors: H. G. Bawtree-Williams and C. V. Bunce. Registered office: Regent Buildings, 53a, London Road, Portsmouth.

Beacon Radio Manufacturing Co., Ltd.—Private co. Capital £2,000. Manufacturers of and dealers in electric wires, cables and flexible cords. Directors: G. I. Rawling and G. E. Rawling. Solicitor: L. I. Dey, 13, Harrison Road, Halifax. Registered office: 8, St. James' Road, Halifax.

Baedekers, Ltd.—Private co. Capital £20,000. Importers and exporters, manufacturers of wireless goods. Directors: Eugen Baedeker, A. E. Baedeker, and Enno. Becker. Solicitors: S. J. Grey and Willcox, 22, Church Street, Birmingham. Registered office: 109–111, Northwood Street, Birmingham.

T. A. Beavon and Co., Ltd.—Private co. Capital £1,500. Manufacturers of and dealers in wireless apparatus. Directors: T. A. Beavon and S. F. Hathaway. Registered office: Radio House, Chester Road, Wrexham.

Blandford Radio, Ltd.—Private co. Capital £2,000. Wireless engineers. Directors: G. A. E. Blandford and L. E. L. Smith. Solicitors: G. R. Smart, Walton-on-Thames.

Bognor Regis Rediffusion Service, Ltd.—Private co. Capital £5,000. To relay wireless programmes. Subscribers: L. E. B. Everett and C. Whitcroft. Solicitors: Farrar, Porter and Co., 2, Wardrobe Place, E.C.4.

C. H. Booth, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless apparatus. Directors: C. H. Booth and J. S. Myatt. Solicitor: H. Roberts, 109, Colmore Row, Birmingham. Registered office: 19, Staniforth Street, Corporation Street, Birmingham.

Bowyer-Lowe and A.E.D., Ltd.—Private co. Capital £5,000. Manufacturers of radio. Directors: A. E. Bowyer-Lowe and C. Hastings. Solicitors: Fredk. H. Nye, 15, Prince Albert Street, Brighton. Registered office: Diamond Works, Coombe Road, Brighton.

Boyce Brothers, Ltd.—Private co. Capital £2,100. Radio manufacturers. Directors: J. B. Parlour and J. B. Quinn. Solicitors: J. Howard Smith & Skelt, 16, City Road, E.C. Registered office: 52, High Street, Highgate.

J. Boyce, Ltd.—Private co. Capital £1,000. Wireless engineers. Directors: J. Boyce and Mrs. Hannah E. Boyce. Registered office: 39, St. Peter's Avenue, Cleethorpes, Lincs.

Bridge's Radio, Ltd.—Private co. Capital £1,500. Wireless manufacturers. Directors: J. Bridge and L. V. Bridge. Solicitors: H. R. Thomas, 22, Milton Road, Southend-on-Sea. Registered office: 31, Warrior Square West, Southend-on-Sea.

Brighton and Preston Relay Station, Ltd.—Private co. Capital £3,000. To relay wireless programmes. Directors: R. C. Moore, J. H. Gilkes and W. L. Trower. Solicitors: Colbourne, Bush and Bartlett, 62, Old Steine, Brighton.

British G. W. Z. Battery Co., Ltd.—Private co. Capital £10,000. To carry on the business of manufacturers of and dealers in gramophones, accumulators, dry cell and other batteries, wireless sets, etc. Subscribers: F. C. Winter and J. Lovett. Solicitors: Buckeridge and Braune, 3-4, Clement's Inn, W.C.2.

British N.S.F. Co., Ltd.—Private co. Capital £12,500. Manufacturers, factors of and dealers in wireless, etc. Subscribers: C. T. Mellin, F. E. Thurland. Directors: C. R. D. Pritchett, J. Saemann and Hans J. Saemann. Solicitors: Guscotte, Wadham, Tickell and Co., 19, Essex Street, Strand, W.C.2. Registered office: Room 721, Bush House, Aldwych, W.C.2.

British Clarion Co., Ltd.—Private co. Capital £2,000. Manufacturers of wireless instruments, gramophones and cabinets. Directors: Mark Bolsom, Morris Bolsom and W. H. Smedley.

British Goldring Products, Ltd.—Private co. Capital £5,000. Radio engineers. Directors: G. D. Smith, E. E. Smith, H. Scharf, J. Scharf, S. H. Smith, H. S. Lawrence, F. Scharf and J. Lecker are the respective alternate directors to the above life directors. Solicitors: Landons, 53, New Broad Street, E.C.2. Registered office: 119, Finsbury Pavement, E.C.2.

British Ipso Battery Co., Ltd.—Private co. Capital £6,000. Manufacturers, exporters, importers and distributors of all kinds of batteries. Subscribers: F. C. Winter and J. Lovett. Solicitors: Buckeridge and Braune, 3-4, Clement's Inn, Strand, W.C.2.

British Permel Enamelled Wire.—Private co. Capital £10,000. Wire manufacturers. Directors: G. L. Wates, A. P. Pyne, L. Hubert and J. Hubay. Solicitors: J. D. Langton and Passmore, 71, Powis Street, Woolwich, S.E. The registered office is at Columbia House, Aldwych, W.C.2.

British Pix Co., Ltd.—Private co. Capital £100. Manufacturers of the "Pix" selector, and wireless sets, etc. Directors: W. E. Debrunner, H. Slavid and J. E. Sherwin. Solicitors: Ernest W. Long and Co., 27, Lincoln's Inn Fields, W.C. Registered office: 14, Newgate Street, E.C.1.

British Radio Relay Service, Ltd.—Private co. Capital £8,000. To relay wireless programmes. Directors: T. W. G. Cottam and D. W. Heightman. Registered office: 844, Salisbury House, London Wall, E.C.2.

British Talkatome, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless apparatus, gramophones and records. Directors: H. Andrewes and J. A. Woodhams. Solicitors: Bartlett and Gluckstein, 199, Piccadilly, W.1. Registered office: Wells Street, Jermyn Street, S.W.

British Talkiescope, Ltd.—Private co. Capital £18,000. To acquire (a) certain letters patent granted to J. H. T. Roberts for an invention relating to synchronising apparatus; (b) the registered trade mark "Talkiescope," No. 526697 in Class 8, and (c) a further invention adapting a freewheel device to gramophone turntables for use with talking picture apparatus, and manufacturers of and dealers in recording and reproducing instruments. Directors: J. H. T. Roberts, D.Sc., F.Inst.P.; V. P. B. Stewart. Solicitors: Scott, Duckers and Co., 120, Chancery Lane, W.C. Registered office: River Plate House, Finsbury Circus, E.C.2.

Broadcast Listeners' Service, Ltd.—Private co. Capital £1,000. To establish and maintain wireless signal and other stations for the reception of wireless or radio signals or waves, etc. Directors: D. W. Heightman and E. H. Stonehouse. Registered office: 344, Salisbury House, London Wall, E.C.2.

Brookes Mfg. Co., Ltd.—Private co. Capital £10,000. Manufacturers of wireless. Directors: H. B. Yates, J. U. Willis, F. S. Brookes and H. Tatlow. Solicitors: Pinsent and Co., 6, Bennetts Hill, Birmingham.

Bush Radio, Ltd.—Private co. Capital £2,500. To acquire and turn to account interests in any invention relating to the science of sound, etc. Subscribers: H. S. White and C. H. Brown. Solicitors: Lawrence, Messer and Co., 16, Coleman Street, E.C.

J. Burns (London, 1932), Ltd.—Private co. Capital £2,000. Wireless Dealers. Directors: Mrs. Rachael Bernstock and H. Bernstock. Registered office: 103, Holloway Road, Highbury, N.

A. B. Butt, Ltd.—Private co. Capital £3,000. Wireless dealers. Directors: A. B. Butt and Miss M. Butt. Solicitors: Harding and Barnett, 14, New Street, Leicester. Registered office: Queen Street, Leicester.

Butterfield Bros., Ltd.—Private co. Capital £4,000. Wireless and gramophone dealers. Directors: A. W. Butterfield and S. Butterfield.

Cambridge Metal Stamping Co. (1931), Ltd.—Private co. Capital £2,000. Manufacturers, importers and exporters of, agents for gramophones and wireless apparatus. Directors: F. C. Hall and A. F. Hall. Registered office: 152-6, Sturton Street, Cambridge.

Carfon, Ltd.—Private co. Capital £2,000. Manufacturers of and dealers in wireless. Directors: C. Fonteyn and R. Fonteyn. Registered office: 2, Blandford Mews, Baker Street, W.1.

F. J. Cartwright, Ltd.—Private co. Capital £1,000. Manufacturers of wireless. Subscribers: J. A. Palmese and H. M. Melton. Solicitors: Maltz Mitchell and Co., 104, High Holborn, W.C.1.

Carwin Electric Co., Ltd.—Private co. Capital £2,000. Manufacturers of and dealers in wireless apparatus. Directors: J. W. Carwin, F. N. Carwin, Sidney Carwin and Stanley Carwin, 5, Northcliff Street, Preston.

Cavendish Gramophone Co., Ltd.—Private co. Capital £1,000. Wireless manufacturers. Directors: S. Phillips and W. Blades. Registered office: 8, Watling Street, Shudehill, Manchester.

Chatterton and Keen, Ltd.—Private co. Capital £1,000. Manufacturers of radio and television. Directors: P. V. Chatterton and C. Higgs. Solicitors: Culross and Co., 13, Old Cavendish Street, W.1. Registered office: 11, 12 and 13, Chandos House, Palmer Street, Westminster.

Celebrity Gramophones (1932), Ltd.—Public co. Capital £1,000. Manufacturers of and dealers in wireless, etc. Subscribers: J. Thomson, C. W. Freeman, W. Roebuck and four others. Solicitors: T. H. O'Connor and Co., 48, Dover Street, W.1. The registered office is Premier House, 48, Dover Street, W.1.

Cifel Products, Ltd.—Private co. Capital £2,500. Wireless manufacturers. Directors: C. Fonteyn and R. Fonteyn. Registered office: 2, Blandford Mews, Baker Street, W.1.

K. G. Clark, Ltd.—Private Co. Capital £1,500. Dealers in gramophones and wireless sets. Directors: K. G. Clark and L. H. Clark. Solicitors: Messrs. Prestons, 87, The Grove, Stratford, E.15. Registered office: 86, Cranbrook Road, Ilford, Essex.

Colonial Radio Programmes, Ltd.—Private co. Capital £1,200. To carry on the business of advertising agents, and of syndicating recorded wireless programmes, and to adopt an agreement with M. A. Frost for the benefit of certain agreements in connection with broadcasting programmes in the colonies and dependencies of the British Empire and in foreign countries. Subscribers: F. W. Martin and F. Frankis. Solicitors: H. F. Johnson and Son, 18, Theobalds Road, W.C.1. Registered office: 19, Adam Street, Adelphi, W.C.2.

Condenser Electric Co., Ltd.—Private co. Capital £2,800. Manufacturer of condensers. Directors: R. E. Miles, N. Blades and Winifred R. Miles.

Corecton Radio, Ltd.—Private co. Capital £4,000. Manufacturers, importers and exporters of wireless. Directors: H. W. B. Hansford and J. W. Underwood. Solicitors: Heald, Johnson and Co., 129, Wardour Street, W.1.

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NEW COMPANIES

[*Continued from page* 209.]

Corey, Parsons and Co., Ltd.—Private co. Capital £1,500. To carry on the business of manufacturers of wireless, etc. Directors: E. Parsons, R. E. Parsons, A. W. Corey and D. W. Sayer. Solicitors: Corner and Co., 113, Long Acre, W.C.2. Registered office: Winchester Works, 303, Sumner Road, Peckham, S.E.15.

County Down Rediffusion Service, Ltd.—Private co .Capital £2,000. To relay wireless programmes. Subscribers: K. Van Baerle and F. Medlicott. Directors: W. W. Wakefield and C. Whitcroft. Registered office: 21, Main Street, Bangor, Co. Down.

Cussins and Light, Ltd.—Private co. Capital £4,000. Wireless manufacturers. Directors: R. Cussins and J. P. Light.

Davis Brothers Illuminating Engineers, Ltd.—Private co. Capital £3,000. Wireless dealers. Directors: T. Davis and F. R. Davis.

Dawkins Trading Co., Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless, etc. Subscribers: P. E. Bousfield and H. W. Dawkins.

F. Deeling, Ltd.—Private co. Capital £2,000. Radio engineer. Directors; K. J. Clear, W. M. Clear, and Mrs. C. Clear. Solicitors: Stock and Slater, 35, Queen Victoria Street, E.C. Registered office: 913, Brighton Road, Purley, Surrey.

Distavox, Ltd.—Private co. Capital £1,000. Manufacturers of wireless. Directors: G. W. E. Doughty, C. G. Ireland, and H. E. Knight.

Distilled Water and Acid Carriers, Ltd.—Private co. Capital £4,000. Manufacturers of and dealers in wireless apparatus. Subscribers: J. C. Lindsay and F. C. Rossiter. Registered office: Cross Keys House, 56, Moorgate, E.C.2.

Dixon Bros. and Wood, Ltd.—Private co. Capital £1,000. To acquire the business of manufacturers heretofore carried on at 92, Harrow Road, Leytonstone, E.11, by Dixon Bros., and to carry on the business of wireless.

W. Drew, Ltd.—Private co. Capital £10,000. Manufacturers of and dealers in wireless instruments. Directors: W. A. Bartlett, H. Rothbarth, and C. H. Baker. Solicitors: Richard Furber and Son, 8, Gray's Inn Square, W.C.1. Registered office: 25a, Mount Pleasant Road, Tunbridge Wells.

J. J. Dunster and Son, Ltd.—Private co. Capital, £2,000. Radio manufacturers. Directors: J. J. Dunster and J. R. H. Dunster. Registered office: Atherden Works, Atherden Road, Clapton, E.5.

H. Duree, Ltd.—Private co. Capital £1,000. Manufacturers, importers and exporters of, agents for and dealers in radio. Directors: Mrs. Winifred H. Woolfe and Mrs. Emilie P. Batten. Registered office: 14, East Castle Street, W.1.

Elco Clocks, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in gramophones, radio sets, and batteries. Directors: M. Landau and A. Margulies. Solicitors: Alfred Kerstein and Co., 3 and 4, Clements Inn, W.C.2. Registered office: 68, High Street, Camden Town, N.W.1.

Electrical and General Distributors, Ltd.—Private co. Capital £1,000. Radio dealers. Directors: G. Mellor and C. Dunn. Solicitors: Norman Hart and Mitchell, 21, Panton Street, S.W.1. Registered office: 154, King's Cross Road, W.C.1.

Electrical and Radio Distributors, Ltd.—Private co. Capital £1,000. Wireless manufacturers. Directors: L. Sobel and Mrs. Esther Sobel. Solicitors: B. A. Woolf and Co., 31, Lombard Street, E.C.3. Registered office: 32-4, Red Lion Street, Holborn, W.C.

Engineering and Mining Supplies, Ltd.—Private co. Capital £3,000. Radio engineers. Subscribers: S. J. Weaver, W. J. Baxter, and G. H. Russell. Solicitor: S. J. Weaver, 18, High Street, Watford.

Envoy Electrical Storage, Ltd.—Private co. Capital, £1,000. Manufacturers of accumulators. Directors: R. W. Mallaby and G. Fisher. Solicitors: Armitage, Speight and Ashworth, Leeds.

Erdington Electrical Co., Ltd.—Private co. Capital £2,000. Electrical and mechanical engineers. Directors: G. A. Lewis, S. T. Lovewell, and A. D. Butler.

F. W. Evans, Ltd.—Private co. Capital £2,000. Plastic metal manufacturers. Directors: F. W. Evans and E. W. Welsley. Solicitors: W. H. Eggington, 56, Newhall Street, Birmingham. Registered office: Plastic Works, Long Acre, Nechells, Birmingham.

The Ever Ready Electric Carbon Co., Ltd.—Private co. Capital £50,000. Manufacturers of and dealers in all electrical carbon manufactured articles, etc. Directors: M. Goodfellow and A. H. Sheppard. Solicitors: Bentleys, 32, Bishopsgate, E.C.2. The registered office is at Hercules Place, Holloway, N.7.

The Ever Ready Electric Bulb Co., Ltd.—Private co. Capital £10,000. Manufacturers of and dealers in all kinds of incandescent electric bulbs and lamps, dynamos, motors, instruments. The directors and other particulars are similar to those of Ever Ready Electric Carbon Co., Ltd.

J. Fabian, Ltd.—Private co. Capital £1,000. To make, buy and sell wireless sets and component parts. Subscribers: J. Fabian and Mrs. E. Fabian. Registered office: 25, Cowper Street E.C.2.

Faraday House Wireless Co., Ltd.—Private co. Capital £5,250. Wireless manufacturers. Directors: A. Mitchell, J. S. P. Colquhoun, and L. H. Gilbert. Solicitors: Rees and Harris, 430, Strand, W.C.2. Registered office: 430, Strand, W.C.2.

J. Farrar and Son, Ltd.—Private co. Capital £6,000. Manufacturers of and dealers in gramophones and wireless. Directors: T. H. Farrar and A. D. Farrar. Solicitors: Moore, Shepherd and Whitley, Barum House, Halifax.

Fenriss (1932), Ltd.—Private co. Capital £10,000. Wireless manufacturers. Directors: S. Jeker, E. Glauser, R. Boichat, and E. Frewer. Solicitors: Birkbeck and Co., 49, Moorgate, E.C.2. Registered office: 42, Hatton Garden, E.C.1.

Folkestone Radio Relays, Ltd.—Private co. Capital £3,000. To relay radio programmes. Directors: T. C. Gilbert, G. H. Morris and H. H. Browne. Solicitors: Atkinson and Stainer, 8, Cheriton Place, Folkestone.

Fox Industrial, Ltd.—Private co. Capital £3,000. Manufacturers of and dealers in radio. Subscribers: M. E. Fox and J. E. Fraser. Solicitors: Wetherfield, Baines and Baines, 6, New Burlington Street, W.1.

Fraser Radio, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless. Directors: R. E. Fraser, F. H. Young, J. W. Miller, and A. J. Young. Registered office: 38, Crawley Road, Wood Green, N.22.

Fullotone, Ltd.—Public co. Capital £60,000. Importers and manufacturers of, agents for and dealers in wireless, etc. Directors: C. McDougall A. C. McDougall and C. T. Gillespie. Solicitor: F. R. Allen, 3-4, Clements Inn, Strand, W.C.2. The Registered office is at 22, Queen Street, E.C.4.

Garfield Cycle Co., Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in radio. Subscribers: L. H. Farmiloe and J. L. Poole. Solicitor: C. Lewin Poole, 11a, New Street, Birmingham. Registered office: 2, High Street, Erdington, Birmingham.

Globe Cabinets, Ltd.—Private co. Capital £2,000. Wireless and gramophone cabinet makers. Directors: M. Smorodinsky and M. Rosenwein. Registered office: 22, Aldgate, E.C.3.

Glossop Rediffusion Services, Ltd.—Private co. Capital £1,000. To relay wireless programmes. Directors: W. W. Wakefield and C. Whitcroft. Solicitors: Medicott and Co., 1, New Square, Lincoln's Inn, W.C. Registered office: Bush House, Aldwych, W.C.2.

NEW COMPANIES

F. E. Godfrey (Radio), Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless, radio, television apparatus, gramophones and records. Subscribers: H. D. Williams and J. E. Barrier. Solicitors: Mayo, Elder and Rutherfords, 10, Drapers Gardens, E.C.2.

Graham (Isle of Wight), Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in gramophones and wireless. Directors: H. G. Swaffield and Mrs. Dorothy Swaffield. Solicitors: M. C. Pyke, 15, Duke Street, Adelphi, W.C.2. Registered office: 9, Pier Street, Ventnor, I.W.

Grampian Reproducers, Ltd.—Private co. Capital £3,000. Manufacturers of wireless. Solicitors: Churchill Clapham and Co., 1, Broad Street Place, E.C.2. Registered office: Station Avenue, Kew Gardens, Surrey.

Grams, Ltd.—Private co. Capital £3,000. Manufacturers, exporters and importers of and dealers in gramophones and wireless apparatus. Directors: C. B. Payne, F. W. Kirby and R. S. Kirby. Solicitors: Turberville, Smith and Co., 1, Belmont Chambers, Belmont Road, Uxbridge. Registered office: 2, Belmont Chambers, Belmont Road, Uxbridge, Middlesex.

V. Grant, Ltd.—Private co. Capital £5,000. Gramophone and radio merchants. Directors: V. Grant, C. Goedecks and G. E. Beskerville. Solicitors: Grover, Smith and Moss, Manchester. Registered office: 69, Deansgate, Manchester.

Gravesend Radio Central Exchange, Ltd.—Capital £5,000. To relay wireless programmes. Directors: A. B. Winch and W. T. Whalley. Solicitors: Routh, Stacey and Castle, 14, Southampton Street, Bloomsbury, W.C.1. Registered office: 37, Walbrook, E.C.4.

Gray, Dallen and Co., Ltd.—Private co. Capital £1,000. Wireless engineers. Directors: F. L. Gray, C. H. Gray, J. R. Dallen, W. Hurley and E. J. Nobes.

Greening Wire Company, Ltd.—Private co. Capital £5,000. Wire manufacturers. Directors: W. Yorke, Rear-Admiral A. L. Picton, M. W. A. Peel and J. C. Kerr. Solicitors: Nicholson, Freeland and Shepherd, 46, Queen Anne's Gate, Westminster, S.W.1. Registered office: Britannia Works, Warrington, Lancs.

G. H. Gregory, Sons and Partners, Ltd.—Private co. Capital £5,000. Moulders. Directors: E. C. Powell and H. N. Pickford. Registered office: 59, Gracechurch Street, E.C.3.

H. and P. (Furniture), Ltd.—Private co. Capital £1,000. Manufacturers, importers, exporters of gramophone and wireless cabinets. Directors: F. Samuel, H. C. Brasted, R. P. Brasted, A. G. Brasted, W. S. Samuel, C. M. Samuel and E. D. Basden. Solicitors: Hyman Isaacs Lewis and Mills, 7-8, Thavies Inn, Holborn Circus, E.C.

Halford Radio, Ltd.—Private co. Capital £6,000. Manufacturers, importers and exporters of, agents for and dealers in wireless. Subscribers: Sir L. S. Johnson, Kt., and D. H. Johnson, Directors: J. Halford, R. Annan, J. L. Collier, C. Duncan and J. S. Hoskings. Solicitors: Stanley Johnson and Allen, 426, Salisbury House, E.C.2.

A. W. Hambling, Ltd.—Private co. Capital £100. Manufacturers, importers and exporters of wireless. Subscribers: A. W. Hambling and W. A. Hunt. Solicitors: Blundell Baker and Co., 16, Serjeants Inn, E.C.4.

Harken Electrical Co., Ltd.—Private co. Capital £2,500. Manufacturers of and dealers in radio. Directors: E. Harper and F. E. Kennard. Solicitors: Jordan and Lavington, 78, Queen Victoria Street, E.C.4. Registered office: 227a, Walworth Road, S.E.17.

Harlie, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless. Directors: C. Watson and H. J. Camp. Solicitors: Frere Cholmeley and Co., 28, Lincoln's Inn Fields, W.C.2. Registered office: Cambridge Arterial Roa Enfield.

Harmston and Fickling, Ltd.—Private co. Capital £4,000. Manufacturers of and dealers in wireless. Directors: E. J. Harmston and H. T. Fickling.

Hastings Factors, Ltd.—Private co. Capital £1,000. Manufacturers of, agents for and dealers in radio. Subscribers: J. Hollingsworth and L. J. Hollingsworth.

Heath Manufacturing Co., Ltd.—Private co. Capital £1,500. Manufacturers of wireless. Directors: J. Robson and W. L. Donaldson. Registered office: 34, King Street, Dumfries.

Hedley Price, Ltd.—Private co. Capital £2,000. Wireless dealer. Directors: C. H. Price, Miss Rosa M. Price and C. H. G. Price. Solicitors: Geo. T. Cooke, Son, and Painter, 22, Broad Street, Bristol.

E. J. Heraud, Ltd.—Private co. Capital £5,000. Gramophone and wireless dealer. Directors: E. J. Heraud and M. J. Heraud.

Hereford Radio Relays, Ltd.—Private co. Capital £1,000. To relay radio programmes. The permanent managers are: A. W. Marriott, F. T. Ladmore and A. A. Wallis.

Herne Bay Relay Services, Ltd.—Private co. Capital £4,000. To relay wireless programmes. Directors: J. E. Ball and Mrs. C. L. Ball. Solicitors: L. A. Blackbourn and Sons, 3, Staple Inn, W.C.1. Registered office: Brooklyn, Canterbury Road, Herne Bay.

A. J. Hewitt, Ltd.—Private co. Capital £1,000. Wireless manufacturers, etc. Directors: A. J. Hewitt and Dorothy M. Hewitt. Registered office: 21, South Street, Greenwich, S.E.10.

Hill and Co. (Radio), Ltd.—Private co. Capital £1,200. Manufacturers of and dealers in wireless. Subscribers: A. Hill and Mrs. E. Hill.

T. Horton and Son, Ltd.—Private co. Capital £1,250. Manufacturers of, agents for and dealers in radio. Directors: T. Horton and W. J. Steele.

F. O. and H. S. Hughes, Ltd.—Private co. Capital £1,000. Manufacturers, importers and exporters of and dealers in wireless. Directors: F. O. Hughes and H. S. Hughes. Solicitor: A. H. Headley, Tudor Chambers, Millstone Lane, Leicester. Registered office: 1, Equity Road, Leicester.

Hunnisett and Son (St. Leonards), Ltd.—Private co. Capital £500. Wireless dealers. Directors: R. J. Hunnisett, R. C. Hunnisett, Mrs. Mary A. Hunnisett and Alice Hunnisett. Registered office: 20, King's Road, St. Leonards-on-Sea.

Ilco, Ltd.—Private co. Capital £2,000. Manufacturers of and dealers in wireless batteries and radio instruments. Directors: H. J. Butterfield and H. S. Critchley. Solicitors: Linnell and Murphy, Tower House, Carfax, Oxford. Registered office: 22, George Street, Oxford.

Ipswich Wireless Company, Ltd.—Private co. Capital £1,000. Manufacturers, importers and exporters of wireless apparatus. Directors: C. D. Hazell and A. Adcock. Solicitors: Gotelee and Goldsmith, 11, Arcade Street, Ipswich. Registered office: 46, Westgate Street, Ipswich.

L. J. Ive, Ltd.—Private co. Capital £1,000. Radio dealer. Directors: L. J. Ive (chairman) and Mrs. Olive A. Ive, 15, Albert Road, Watford. Solicitors: Sedgwick, Turner, Sworder and Wilson, Watford Place, Watford.

James Bros. (Wiltshire), Ltd.—Private co. Capital £6,000. Wireless engineers. Directors: A. H. James, C. J. Moore and B. W. James. Solicitor: W. N. Roberts, 39, Park Square, Leeds.

James and Williams (Battersea), Ltd.—Private Co. Capital £2,000. Radio engineers. Directors: J. Callaghan and W. F. Pope. Solicitors: Alfred C. Warwick and Co., 14, Queen Victoria Street, E.C.4. Registered office: 31, Queen's Road, Battersea, S.W.8.

Johnson's Radio and Television, Ltd.—Private co. Capital £2,000. Radio dealer. Directors: H. R. Johnson and Mrs. A. Johnson. Solicitors: Wallace, Robinson and Morgan, 52, Newhall Street, Birmingham. Registered office: 352a, Ladypool Road, Birmingham.

Jones and Coopey, Ltd.—Private co. Capital £1,000. Manufacturers of wireless. Directors: G. H. Jones and F. H. Coopey. Registered office: Station Works, Station Road, Chadwell Heath, Essex.

K. and B. Radio Services, Ltd.—Private co. Capital £1,000. Wireless manufacturers. Subscribers: R. Armstrong and Gladys E. Gane. Directors: E. C. R. Brambleby, A. R. Kidd and L. Hudson. Solicitor: M. Lemon, Barclays Bank Chambers, Finsbury Park, N.4. Registered office: 81, Sydenham Road, Sydenham, S.E.

K. L. M. Radio Relays, Ltd.—Private co. Capital £5,000. To relay wireless programmes. Directors: W. S. Lee and E. N. Haines. Solicitors: Arnold, Greenwood and Son, Kendal. Registered office: 12, King Street, Lancaster.

Kenneth Brooks (Radio and Television), Ltd.—Private co. Capital £20,000. Manufacturers of wireless apparatus. Directors: D. Kriger and M. Sobel. Solicitors: V. Morley Lawson, 25, Old Buildings, Lincoln's Inn, W.C.2.

W. and A. G. Lambert, Ltd.—Private co. Capital £1,000. Radio engineers. Directors: W. Lambert and A. G. Lambert Solicitors: Bonser and Dawes, Oldbury, near Birmingham.

W. Lambert, Ltd.—Private co. Capital £1,000. Manufacturers, importers and exporters of wireless. Directors: K. R. Lambert and W. Lambert.

A. Landau and Co., Ltd.—Private co. Capital £1,500. Dealer in gramophones, wireless goods, etc. Subscribers: L. Hutchinson and E. M. Raves, Directors: M. Landau and R. J. Raphael. Solicitor: M. A. Jacobs, LL.B., 73-4, Jermyn Street, St. James's S.W.1.

W. Lawson, Ltd.—Private co. Capital £1,000. Manufacturers and retailers of radio. Directors: W. C. H. E. Lawson and Mrs. E. E. Lawson. Registered office: High Street, Beckenham.

J. H. Lee, Ltd.—Private co. Capital £3,000. Manufacturers of wireless. Directors: J. H. Lee and A. M. Lee.

M. Lichtenberg, Ltd.—Private co. Capital £1,000. Manufacturers, importers and exporters of wireless apparatus. Subscribers: M. Lichtenberg and Mrs. P. Lichtenberg, 19, Heathfield Gardens, N.W.11. Solicitors: Woolfe and Woolfe, 13a, Old Burlington Street, W.1.

Light Controlled Installations, Ltd.—Public co. Capital £1,000. To adopt an agreement with Saxon Securities (Amalgamated), Ltd., Universal and General Securities, Ltd., and Trinidad Oil Lands, Ltd., and to carry on the business of manufacturers of and dealers in plant, machinery and installations operated or controlled by light sensitive cells for industrial, commercial or other purposes, wireless television and radio apparatus, valves, cells, batteries and amplifiers, etc. Subscribers: P. H. Brashier, H. E. Skan and five others. Solicitors: Romer, Skan and Brashier, 4, Copthall Chambers, E.C.

Lincoln Radio Relay Service, Ltd.—Private co. Capital £6,000. To relay wireless programmes. Directors: L. C. Darbyshire, T. W. G. Cottam and H. G. Wells. Solicitors: Gosschalk and Austin, Hull. Registered office: Spring Hill, Lincoln.

Linealux, Ltd.—Private co. Capital £1,000 Manufacturers of electric batteries, etc. Subscribers: W. L. Turpie and Mrs. W. C. Turpie. Solicitors: Vyvyan Wells, Church End, Finchley, N.3. Registered office: 119-123, Cloudesley Road, Islington, N.1.

Llanelly Electrical Engineering Co. (1932), Ltd.—Private co. Capital £2,000. Radio retailers. Subscribers: J. Jones and D. M. Thomas. Registered office: Compton House, Vaughan Street, Llanelly.

Loudspeaker Engineering Co., Ltd.—Private co. Capital £13,200. Manufacturers of loudspeakers, wireless sets and gramophones. Subscribers: R. Tronton and W. R. Darwin. Solicitors: Markby, Stewart and Wadesons, 5, Bishopsgate, E.C.2.

Macks Auto-Electric Co., Ltd.—Private co. Capital £2,000. Manufacturers of, agents for and dealers in wireless apparatus. Subscribers: Jo Mack and W. S. Adams.

Maidstone Airport, Ltd.—Private co. Capital £1,000. Radio engineers. Directors: Count Johnston-Noad and J. Amery. Solicitors: Johnston-Noad and Co., 126, Long Acre, W.C.2. Registered office: 126, Long Acre, W.C.2.

Maidstone Radio Central Exchange, Ltd.—Public co. Capital £5,000. To relay broadcast programmes. Directors: A. B. Winch and W. T. Whalley. Solicitors: Routh, Stacey and Castle, 14, Southampton Street, Bloomsbury, W.C.1. Registered office: 37, Walbrook, E.C.4.

Mains and Allied Radio Supplies, Ltd.—Private co. Capital £5,000. Manufacturers of and dealers in wireless. Subscribers: B. L. Diddams and H. Handley. Solicitors: de Buriatte and Bowen, 7, Ely Place, E.C.1.

Majestic Electric Co. (I.F.S.), Ltd.—Private co. Capital £500. To manufacture wireless apparatus. Subscribers: F. A. Marks and W. C. Langford.

F. S. Mann, Ltd.—Private co. Capital, £1,000. Manufacturers of and dealers in wireless. Directors: S. H. Hester, J. S. C. Hester and F. S. Mann. Registered office: 27, Bangalore Street, Putney, S.W.15.

Sir Herbert Marshall and Sons, Ltd.—Private co. Capital £10,000. Gramophone and wireless dealers. Directors: M. Kemble, M. V. Jacobs and E. J. Marshall. Solicitors: Mills, Curry and Gaskell, Balfour House, Finsbury Pavement, E.C. Registered office: Regent House, Regent Street, W.1.

Maxim Lamps, Ltd.—Private co. Capital £2,000. Manufacturers of and dealers in radio valves. Subscribers: W. J. Chivers and Doris Evans. Solicitors: Messrs. Peter Thomas, 20, Kingsway, W.C.2.

J. F. May and Co., Ltd.—Private co. Capital £1,000. Dealers in wireless. Directors: J. F. May and W. D. Bank. Registered office: 33, Central Avenue, Bangor, Co. Down.

W. G. Melodies, Ltd.—Private co. Capital £1,000. Wireless engineers. Directors: C. R. Belling and J. H. Coupe.

Metropolitan Rediffusion Services, Ltd.—Private co. Capital £1,000. To relay wireless programmes. Directors: C. Whitcroft, B. H. Lyon, H. L. Mossley, and W. W. Wakefield. Solicitors: Medlicott and Co., 1, New Square, W.C.2. Registered office: Bush House, Aldwych, W.C.2.

Middleton and District Radio Relay Service, Ltd.—Public co. Capital £3,000. To relay wireless programmes. Directors: G. B. Winch, W. T. Whalley, and N. Lowe. Solicitors: Routh, Stacey and Castle, 14, Southampton Street, Bloomsbury, W.C.1. Registered office: 37, Walbrook, E.C.4.

Midgley Leighton, Ltd.—Private co. Capital £2,000. Wireless manufacturers. Directors: E. Leighton, A. H. Midgley, R. Leighton, and H. Leighton. Solicitors: Romain and Romain, 52, Baker Street, W.1.

Midland Rediffusion Service, Ltd.—Private co. Capital £10,000. To relay wireless programmes. Directors: C. Sharp and B. H. Lyon. Solicitors: Adler and Perowne, 46-7, London Wall, E.C. Registered office: 46-7, London Wall, E.C.2.

Miltrim Garage, Ltd.—Private co. Capital £1,000. Wireless dealers. Directors: A. Miller and H. Miller. Registered office: 34, Somers Street, Leeds.

W. Monks and Co., Ltd.—Private co. Capital £1,500. Manufacturers of and dealers in gramophones and radio. Directors: W. Monks and J. F. Young. Solicitor: C. B. Hudson, Church Lane, Rochdale.

Morris Relay Services, Ltd.—Private co. Capital £1,000. To relay broadcast programmes. Subscribers: F. J. Morris and F. G. Morris. Solicitors: Edwin Boxall and Kempe, 63, Ship Street, Brighton. Registered office: 28, Boundary Road, Hove.

Multi Relays, Ltd.—Private co. Capital £3,000. Manufacturers of and dealers in wireless apparatus. Directors: W. Graham, W. Roberts, and J. C. Wareing. Registered office: The Queen's Cinema, Nelson.

NEW COMPANIES

N. B. Mouldings, Ltd.—Private co. Capital £5,000. Moulders. Directors: H. S. Newman and E. C. Bell. Registered office: 6, Holborn Viaduct, E.C.1.

N. R. S., Ltd.—Private co. Capital £10,000. Manufacturers, importers and exporters of and dealers in radio. Directors: W. A. Hunt, H. S. Prince, and A. W. Hambling. Solicitors: Blundell Baker and Co., 16, Serjeants Inn, E.C.4.

Neon Ads. Products, Ltd.—Private co. Capital £1,000. Radio engineers. Subscribers: A. W. Bayley and C. D. Lowings. Solicitors: Burchell, Wilde and Co., 36, Victoria Street, S.W.1. Registered office: 36, Victoria Street, S.W.1.

Newport Rediffusion Service, Ltd.—Private co. Capital £5,000. To relay wireless programmes. Directors: W. W. Wakefield and C. Whitcroft. Solicitors: Medlicott and Co., 1, New Square, Lincoln's Inn, W.C.2. Registered office: 4-5, Commercial Street, Newport, Mon.

G. Nissen, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless apparatus, Directors: G. A. Huxley, T. Kolb, and A. Rothschild. Solicitors: Orgill and Llewellyn, 10, Norfolk Street, W.C.2. Registered office: 740, High Road, Tottenham, N.17.

Norcross Panel Plywood Co., Ltd.—Private co. Capital £1,000. Cabinet makers, manufacturers of and dealers in gramophones, records. Subscribers: A. Russin and S. R. Dudley.

North Regional Film Corporation, Ltd.—Private co. Capital £1,000. Producers of television. Directors: Mrs. G. Wilkinson, W. R. Challinor, M.B.E., and J. A. Bishop.

Northern Wireless Relay Company, Ltd.—Private co. Capital, £10,000. To relay wireless programmes in Newcastle-on-Tyne and neighbourhood. Subscribers: G. C. Robinson and Christina I. Scott. Solicitors: R. Hodgson, 47, Pilgrim Street, Newcastle-on-Tyne. Registered office: 22, Grove Street, Newcastle-on-Tyne.

Nuvolion Electrics, Ltd.—Private co. Capital £2,000. To adopt an agreement with F. Walters for the purpose of taking over, as from June 1, 1932, the business now carried on by him as "Nuvolion Electrics," at Meredith Yard, Clapham Park Road, S.W. Directors: P. J. Olivesi, G. Adams, and C. P. Burnley.

Oakes and Liversage, Ltd.—Private co. Capital £1,500. Radio engineers. Directors: G. H. Oakes and P. L. Liversage. Solicitors: R. Heaton and Son, Wedgwood Chambers, Burslem.

Oral Broadcast Advertising Co., Ltd.—Private co. Capital £1,000. To carry on the business of oral broadcasting for advertising purposes. Subscribers: T. W. Newham and E. G. Bell. Solicitor: J. Allen, 3, Salter's Hall Court, Cannon Street, E.C.

Orling's Patents, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in instruments of measurement or instruments used for recording sound, light or any other vibrations. Subscribers: H. Braten and C. Osborne. Solicitors: Last, Riches and Fitton, 18, Bolton Street, Piccadilly, W.1.

J. Orton (Electricians), Ltd.—Private co. Capital £4,000. Radio engineers. Subscribers: J. Orton and R. Orton. Solicitors: Evan, Barlow and Son, Berridge Street, Leicester. Registered office: 60-62, Southgate Street, Leicester.

Oxford Broadcasting Relay, Ltd.—Private co. Capital £3,000. To relay wireless programmes in Oxford and neighbourhood. Subscribers: W. D. Cavendish and F. J. A. Walsh.

Padiham Supply Co., Ltd.—Private co. Capital £1,000. Manufacturers, suppliers of, and dealer in wireless. Directors: C. C. V. Parsons, J. C. Dennett, and Mrs. M. Parsons.

Paish and Co., Ltd.—Private co. Capital £2,000. Gramophone and wireless dealers. Subscribers: F. A. Bell and G. F. Taylor. Solicitors: Laytons, 29, Budge Row, E.C.4. Registered office: Billiter House, Billiter Street, E.C.

H. Payne (Coventry), Ltd.—Private co. Capital £1,500. Manufacturers of and dealers in wireless. Directors: H. Payne, Mrs. Annie Payne, and Vera M. Payne. Registered office: 5, Jesson Street, Coventry.

E. Pearce and Co., Ltd.—Private co. Capital £1,000. Radio engineers. Directors: E. Pearce Marjorie K. Pearce, W. R. Pearce, and W. J. Matthews. Solicitors: Andrews, Stanton and Ringrose, Bourne, Lincs.

W. Pellant and Sons, Ltd.—Private co. Capital £1,400. Radio dealer. Directors: W. Pellant, F. W. Pellant, H. Pellant, and Emma Pellant. Solicitor: C. S. Tuckey, Harpenden.

Perrins Bros., Ltd.—Private co. Capital £1,000. Manufacturers of wireless, etc. Directors: P. Perrins and S. C. Perrins. Solicitors: Geoffrey Taylor and Co., 19, Devereux Court, W.C.2. Registered office: 20, Broad Street, Teddington, Middlesex.

Peter Grassmann, Ltd.—Private co. Capital £1,000. Manufacturers, importers and exporters of wireless. Directors: P. Grassmann, L. Holzman, and M. Holzman. Solicitor: H. B. de Mesquita, 47, Albemarle Street, Piccadilly, W. Registered office: 2-3, Upper Rathbone Place, W.1.

Philco Distributors (Yorkshire), Ltd.—Private co. Capital £5,000. Manufacturers, importers and exporters of wireless. Directors: C. Greenwood, A. Holmes, and H. Cockshott. Solicitors: Wm. Dewhurst and Sons, Keighley. Registered office: 3, Queen Square, Leeds.

Philco Radio and Television Corporation of Great Britain, Ltd.—Private co. Capital £20,000. Manufacturers of radio apparatus. Subscribers: M. O. Marshall and T. E. Baldwin. Directors: J. M. Skinner, C. L. Dyer, H. W. McAteer, J. S. Thomas and E. S. Peyton. Solicitors: Clarke Rawlins and Co., 380, Gresham House, E.C.2 Registered office: 380, Gresham House, Old Broad Street, E.C.2.

Picturetone Sound Equipment, Ltd.—Private co. Capital £15,000. To adopt an agreement with the Ratcliffe Tool Co., Ltd., to acquire the benefit of or other rights or interests in inventions or discoveries relating to or connected with methods of recording sound on celluloid, wax or other material suitable for reproduction with pictures. Subscribers: W. H. Rawles and G. R. Glegg. Solicitors: Garland Wells and Co., Donington House, Norfolk Street, W.C.1.

Pioneer Radio Manufacturing Co., Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless goods. Directors: H. Cohn and Mrs. Millie Cohn. Registered office: 166, Shaftesbury Avenue, W.1.

C. Pitt and Co., Ltd.—Private co. Capital £2,000. Manufacturers of and dealers in wireless. Subscribers: R. Pitt, Mrs. A. Pitt, and Mrs. E. L. Phillips.

Pix-Crossley, Ltd.—Private co. Capital £1,000. Manufacturers of radio. Subscribers: H. Talbot, and C. S. Garland.

Plug-In Wireless Exchange, Ltd.—Private co. Capital £6,000. To establish and maintain wireless signal stations. Subscribers: J. M. Thomas, Alice Thomas, H. Solomon, and J. F. Powell. Registered office: 17, Loveday Road, West Ealing, W.13.

Plus-Four Radio Co., Ltd.—Private co. Capital £5,000. Manufacturers of and dealers in wireless. Subscribers: G. W. R. Rees, S. R. Rinks, and N. S. Oakley. Solicitors: Leader, Plumkett and Leader, 49-50, Newgate Street, E.C.

Pontypridd Radio Central Exchange, Ltd.—Public co. Capital £5,000. To relay wireless programmes. Directors: A. B. Winch, W. T. Whalley, D. G. Ball, and J. G. Evans. Solicitors: Routh, Stacey and Castle, 14, Southampton Street, Bloomsbury, W.C.1. Registered office: 37, Walbrook, E.C.4.

Portsmouth Central Wireless Company, Ltd.—Private co. Capital £1,000. Dealer in and manufacturer of wireless apparatus. Directors: H. W. Lamb and Madeline A. Lamb.

Potteries Electrical Warehouse, Ltd.—Private co. Capital £2,000. Wholesale radio factors and distributors. Subscribers: G. H. Oakes and Mrs. E. Oakes.

R.M.P., Ltd.—Private co. Capital, £1,000. Manufacturers of and dealers in wireless. Directors: H. Foster and T. W. Atkinson. Solicitor: H. Collings, 5, John Dalton Street, Manchester. Registered office: 3, Queen Street, Manchester.

R. and R. Trading Co., Ltd.—Private co. Capital £3,625. Manufacturers of, agents for and dealers in wireless. Directors: G. Petrides, F. P. Borman and D. B. H. Robinson. Solicitor: E. B. Nichols, 90, Cannon Street, E.C.4. Registered office: 74, Old Oak Common Lane, Western Circus, East Acton, W.3.

Radio Service (Nelson), Ltd.—Private co. Capital £1,000. Dealers in wireless. Subscribers: T. G. Hopkinson, F. Duckworth, and six others.

Radiocabinets (Walsall), Ltd.—Private co. Capital, £1,000. Manufacturer of and dealer in radio cabinets. Directors: H. A. Archer and H. J. Macnamara. Solicitor: C. L. Hodgkinson, Imperial Chambers, Bridge Street, Walsall.

Radiomonic, Ltd.—Private co. Capital £3,000. Manufacturers of and dealers in instruments and materials used in connection with television and wireless. Directors: H. Levy, A. Gerson and A. Salkind. Registered office: Regency House, Warwick Street, Regent Street, W.1.

Radiovision, Ltd.—Private co. Capital £2,000. Wireless manufacturers, etc. Directors: J. McConnel and A. L. Nathan. Registered office: 233, St. Vincent Street, Glasgow, C.2.

Read Radio (1931), Ltd.—Private co. Capital £2,000. To develop inventions relating to wireless telegraphy and telephony, the radio control of clocks, fire alarms, boats and other apparatus. Subscribers: E. Rudland and J. Cookson. Solicitors: Linklaters and Paines, 2, Bond Court, Walbrook, E.C.4.

T. J. Read and Co., Ltd.—Private co. Capital £2,000. Manufacturers of radio apparatus. Directors: H. F. Read and W. E. Howell. Registered office: 22, Queen Street, E.C.4.

Rhythm Agencies, Ltd.—Private co. Capital £2,000. Wireless and gramophone dealers. Subscribers: J. R. Beckensall and J. R. Bowrings. Solicitors: Mayo, Elder and Rutherfords, 10, Drapers Gardens, E.C.2. Registered office: 19, Church Street, Reigate.

Selective Radio Relay Co., Ltd.—Private co. Capital £10,000. Broadcast programme diffusers. Directors: H. Noble and A. Ward.

Selectors (1931), Ltd.—Private co. Capital £1,000. Makers and retailers of wireless apparatus. Directors: T. Hall and D. Morris. Solicitor: D. Morris, 22, Charterhouse Square, E.C.1. Registered office: 22, Charterhouse Square, E.C.1.

Sittingbourne Relay Service, Ltd.—Private co. Capital £4,000. To relay wireless programmes Directors: J. E. Ball and J. W. Field. Registered office: Trotts Hall, Bell Road, Sittingbourne.

Sound Sales, Ltd.—Private co. Capital £1,000. Manufacturers of and dealers in wireless apparatus, etc. Subscribers: Miss Marjorey Friend and Miss G. C. Cadogan. Directors: W. R. J. Doe, R. N. Wellington (managing director) and H. S. Gill. Solicitors: Kenneth E. Bartlett, Elliott and Co., 83, Cannon Street, E.C.4. Registered office: Tremlett Grove Works, Junction Road, Highgate N.19.

Southern Counties Radio, Ltd.—Private co. Capital £6,000. Manufacturers of and dealers in radio apparatus. Directors: R. de Ste. Croix and F. O. Tosswill. Solicitors: Capron and Sparkes, 56, Quarry Street, Guildford.

"Speakeasie" Home Recorders, Ltd.—Private co. Capital £10,000. To acquire the right to manufacture, use, exercise and vend home recording machines, under the name of "Speakeasie." Directors: G. E. Millner and E. W. Hobson. Solicitors: Messrs. William Charles Crocker, 21, Bucklersbury, E.C.4. Registered office: 24, Berners Street, W.

Southern Relay Service, Ltd.—Private co. Capital £3,000. To relay wireless programmes. Directors: L. C. Field and Kathleen Field.

Stretford and District Radio Central Exchange Ltd.—Public co. Capital £10,000. To maintain a broadcast relay service. Directors: A. B. Winch and W. T. Whalley. Solicitors: Routh, Stacey and Castle, 14, Southampton Street, Bloomsbury, W.C.1. Registered office: 37, Walbrook, E.C.4.

J. Strohmenger and Sons, Ltd.—Private co. Capital £9,500. Manufacturers of radio. Directors: G. R. Strohmenger, K. P. Strohmenger and W. H. Strohmenger.

Trusound Pictorial Records, Ltd.—Private co. Capital £10,000. Manufacturers of gramophones and records. Directors: W. R. Lyttleton, G. Hilhouse, H. E. Wiltshire, and A. H. P. Howard. Solicitors: L. A. Blackbourn and Sons, 3, Staple Inn, W.C.1. The registered office is at 410, St. John Street, E.C.1.

Tunewell Radio, Ltd.—Private co. Capital £2,000. Manufacturers of wireless. Directors: G. Turner, R. L. Turner and Miss M. A. Turner. Solicitors: Greenwood and Knocker, 1, Mitre Court Buildings, Temple, E.C.4. Registered office: 54, Station Road, New Southgate, Middlesex.

Ernest Turner Electrical Instruments, Ltd.—Private co. Capital £30,000. Manufacturers of electrical measuring instruments. Directors: J. E. Turner and N. Turner. Solicitors: A. Bates, 3, Pancras Lane, Queen Street, E.C. Registered office: Chiltern Works, Totteridge Avenue, High Wycombe, Bucks.

Turnpress, Ltd.—Private co. Capital £10,000. Manufacturers of and dealers in radio. Subscribers: J. Prior and Mrs. M. Prior. Solicitor: J. Prior, 7, Brazennose Street, Manchester.

Tyrela Electric, Ltd.—Private co. Capital £5,000. Manufacturers, importers and exporters of wireless. Directors: E. J. F. Tyler and B. E. J. Tyler. Solicitors: Payne and Co., 10, New Square, Lincoln's Inn, W.C.2. Registered office: 21, East Road, City Road, N.1.

Vince's Dry Batteries (1932), Ltd.—Capital £100,000. Directors: C. H. Vince, sen., C. H. Vince, jun., G. E. Fisher, E. M. Gorst, and Mrs. W. M. Mennie. Solicitors: Kenneth Brown, Baker, Baker, Essex House, Essex Street, W.C.2. Registered office is at Garford Works, Garford Street, Poplar, E.14.

W. R. C., Ltd.—Private co. Capital £5,000. Manufacturers of, agents for, and dealers in radio. Subscribers: A. Wilson and V. E. Davey. Solicitors: Zeffertt and Heard, 17, Coleman Street, E.C.

Wallasey Rediffusion Service, Ltd.—Private co. Capital £7,750. To relay wireless programmes. Directors: W. W. Wakefield and C. Whitcroft. Solicitors: Medlicott and Co., 1, New Square, Lincoln's Inn, W.C.2. Registered office: Bush House, Aldwych, W.C.2.

Wards (Cambridge), Ltd.—Private co. Capital £5,000. Gramophone and wireless dealers. Subscribers: W. Cairns and Hilda F. Ward. Solicitors: W. J. and J. G. Taylor, Cardigan Lodge, Newmarket. Registered office: 30, East Road, Cambridge.

Watson and Henderson, Ltd.—Private co. Capital £5,000. Dry battery manufacturers. Directors: H. Lees, C. E. Watson and F. G. Henderson. Solicitos: J. H. and G. Nicholson, Hexham.

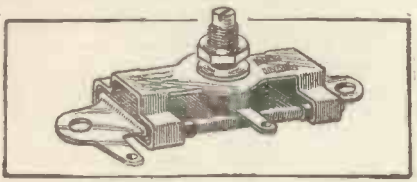
Wembley Manufacturing Co., Ltd.—Private co. Capital £5,000. Manufacturers of and dealers in wireless. Subscribers: A. Wilson and V. E. Davey. Solicitors: Zeffertt and Heard, 17, Coleman Street, E.C.

Wessex Service Factors, Ltd.—Private co. Capital £3,000. Dealers in and manufacturers of wireless. Directors: E. R. Wade, D. J. Craig F. W. B. Gilbert and F. R. Gilbert.

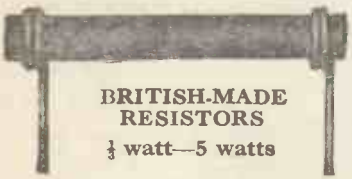
York Relay Services, Ltd.—Private co. Capital £4,000. To relay wireless programmes. Directors: S. Flowitt and F. Netherwood.

Zetavox Radio and Television, Ltd.—Private co. Capital £10,000. Manufacturers of and dealers in radio apparatus and gramophones. Directors: P. Klugh, C. E. Marshall and M. Sobel. Solicitors: Blundell, Baker and Co., 16, Serjeants Inn, E.C.4.

AND—WHAT WILL THE HOUSE OF LYONS DO NEXT?



The "HUM-DINGER" (Reg. No. 503668) For suppressing Mains "Hum."



BRITISH-MADE RESISTORS
⅓ watt—5 watts
"BEST. AFTER. TEST."

IT WILL CONTINUE TO ANNOUNCE NEW LINES —AND THEY WILL BE FAST SELLERS!

Our "Hum-Dinger" is selling to the "Trade" in enormous, ever-growing quantities and has been adopted by most leading Set-Makers. Our "B.A.T." (Best-After-Test) Resistors are employed by over 60% of the R.M.A., and are also "specified" oftener in Journals than any other British make. Over 75% of the R.M.A. employ one or more of our range of scores of "B.A.T."-ARROW "Q.M.B." Radio Switches, and the constructing Public also absorb over a quarter-of-a-million annually.

No. 728

British Made Q.M.B. Switches—Very many patterns.

Other Popular items in our range include: "B.A.T." Microphones (10 Types) and Accessories: "B.A.T." 2-3-, and 4-Gang Precision Ganged Variable Condensers: "ClarOstat" Volume, Voltage, "Tone," "Modulator" and "Fader" Controls: "Audak" Super-Pick-ups: "Diehl" Induction Gramo-Motors, etc.

Catalogues, Display Aids and Bulk Supplies of Leaflets on Application

CLAUDE LYONS LTD. 76, OLD HALL ST., LIVERPOOL

LONDON: 40, BUCKINGHAM GATE, WESTMINSTER, S.W.1

DIRECTORY SECTION.

This directory of "The Broadcaster Radio and Gramophone Trade Annual" is divided into five sections.

Most of the information contained in each of these sections has been obtained direct from the manufacturers and wholesalers concerned, but no responsibility can be assumed in respect of any possible errors, although every precaution has been taken to prevent the presentation of inaccurate information. Inaccuracies or omissions should be communicated to the Editor.

For the purpose of identification coloured paper has been used to distinguish the various sections. The five sections of the directory are :—

1. MANUFACTURERS AND SOLE CONCESSIONNAIRES. The names are arranged alphabetically with addresses, telephone numbers and telegraphic addresses. Yellow.—Pages 219-236

2. WHOLESALERS OF RADIO AND GRAMOPHONE APPARATUS ALPHABETICALLY ARRANGED. All names and addresses, with telephone numbers and telegraphic addresses of radio and gramophone wholesalers are given. Pink.—Pages 237-243

3. WHOLESALERS OF RADIO AND GRAMOPHONE APPARATUS TERRITORIALLY ARRANGED. Listed under the towns in which radio and gramophone wholesale businesses are situated are the names of the factors concerned. The list under each town is alphabetical. For addresses, telephone numbers, etc., see section (2). Pink.—Pages 245-248

4. TRADE NAMES. All trade names used as brands by radio and gramophone manufacturers are alphabetically arranged. No addresses are given, this information being obtained by cross reference to section (1). Details of the type of goods to which each trade name applies are given in this section. Green.—Pages 249-267

5. PRODUCTS SUPPLIED. This is in two sections, radio and gramophone. In each section, alphabetically arranged, are all types of radio and gramophone instruments, components and accessories. Under each heading is an alphabetical list of makers or sole concessionnaires of each particular appliance. Buff.—Pages 269-316

ADDITIONS AND CORRECTIONS.

The Editor will be glad to receive notification of inaccuracies in the directory section of "The Broadcaster Annual" or of additions or deletions which may become necessary after the publication of the annual.

Such information should be sent to "The Broadcaster" Radio and Gramophone Trade Annual, 93, Long Acre, W.C.2.

MANUFACTURERS' DIRECTORY

ALPHABETICAL

Makers of radio and gramophone instruments, parts and accessories with addresses and telephone numbers are listed in this section.

A

Abbey Engineering Works, Watton, Norfolk. Watton 2. Abbey, Watton, Norfolk.

Abbey Radio, 47, Victoria Street, Westminster, S.W.1. Victoria 3914. Abbicab, Sowest, London.

Abingdon Wireless Supplies, 45, Stert Street, Abingdon, Berks. Abingdon 149.

Academy Gramophone Co., Academy House, 96, Clerkenwell Road, E.C.1. Clerkenwell 3501-5.

Accles and Pollock, Ltd., Oldbury, Birmingham. Broadwell 1611. Accles, Oldbury.

Accumulator Makers' Association, 66, Victoria Street, S.W.1. Victoria 3286. Acmakas, Sowest, London.

Accumulators Elite, Hebble Mill, Salterhebble, Halifax. Halifax 4304.

Acme Album Service (Lunn, Wright and Co.), 47-51, Featherstone Street, City Road, London, E.C.1. Clerkenwell 3196.

Ad-a-grams, Carlton House, Lower Regent Street, London, S.W.1. Whitehall 4816 and 3984.

Adey Portable Radio, 99, Mortimer Street, Regent Street, London, W.1. Langham 3258.

Adie and Co., Ltd., 2, Aldermanbury Avenue, E.C.2. Metropolitan 2474-5.

Adolph, F., 27, Fitzroy Street, W. Museum 8329.

Advance Components, Ltd., Lorrimore Street, Walworth Road, London, S.E.17. Rodney 3869.

Aerialite, Ltd., 10, Amber Street, Shudehill, Manchester.

Aladdin Gramophone and Accessories Co., 93, Tabernacle Street, E.C.2. Clerkenwell 3852.

Alklum Storage Batteries, Ltd., Waterside Works, Halifax. Halifax 3020.

All British Valve Co., Empire House, Piccadilly, London, W.1. Regent 6574.

Allen and Co., Ltd., E., Imperial Steel Works, Sheffield 9. Attercliffe 41055. Allen, Sheffield, Artillery House, Westminster, London, S.W.1. Victoria 4528.

Alliance Radio, Ltd., Burleigh Parade, London Road, Sutton, Surrey. Sutton 2439.

Allwood, Blackband and Co., Alexander Works, Alcester.

Alpha Coil and Component Co., Hawksley Avenue, Hillsborough, Sheffield. Sheffield 43335.

Altham Radio Co., 25, Mosley Street, Manchester. City 0231. Slaportco, Manchester.

Amalgamated Manufacturers, 431, Coventry Road, Birmingham. Victoria 1662.

American Hard Rubber Co. (Britain), Ltd., 95, Hatton Garden, E.C.1. Holb. 6037. Eboniseth, Smith, London. Hardrubber, London.

Amplion (1932), Ltd., 82-4, Rosoman Street, Rosebery Avenue, London, E.C.1. Clerkenwell 5440.

Andrews and Co., A. E., 31, Tollington Park, Finsbury Park, N. 4. Archway 1948.

Aneloy Radio, 36, Hindman's Road, S.E.22. New Cross 4074.

Anglo Swiss Screw Co., Ltd., Trout Road, West Drayton, Middlesex. West Drayton 66. Accuracy, Yiewsley.

Anglo-Swiss Electrical Co., Ltd., 15, Victoria Street, S.W.1. Victoria 2002.

Apollo Gramophone Co., Ltd., 4, Bunhill Row E.C.1. Metropolitan 5112.

Appletons (Leeds) Ltd., Hanover Place, Leeds. Leeds 21694-5-6. 96, New Bridge Street, Newcastle-on-Tyne. Newcastle 27651. Gramophones, Newcastle.

Ardea Vulcanizer Syn., Ltd., 318, King Street, Hammersmith, W.6. Riverside 0365.

Arnull, Watt and Co., S., 64, King's Cross Road, W.C.1. Clerkenwell 5452.

Artic Fuse and Electrical Mfg. Co., Ltd., Birtley, Co. Durham. Birtley 61. Artic, Birtley.

Arundel, Clarke and Co., 18, Benton Street, London, W.1.

Ashdown (Birmingham), Ltd., H. E., Aldridge Road, Perry Bar, Birmingham, 20. Birchfields 4259. Segment, Birmingham.

Ashford, Dunn and Co., Ltd., Ryde Avenue, Hull. Central 7577. Mantel, Hull.

Ashley Wireless Telephone Co. (1925), Ltd., Finch Place, Falkland Street, London Road, Liverpool. North 238. Rotary, Liverpool.

Ashton, Ltd., F. J., 20, Cheapside, E.C.2. City 9510.

Ashton and Co. (Est. 1787), Ltd., 45, Chorlton Street, Manchester. Central 0365. Klaretun, Manchester.

Ashton's Wireless Depot, 8-10, Bull's Head Yard, Market Place, Manchester. City 3314.

Associated Radio Productions, Ltd., 1-6, Beech Lane, London, E.C.4. National 2132.

Atalanta, Ltd., 1-3, Brixton Road, S.W.9. Reliance 2681.

Atlas Carbon and Battery Co., Ltd., 56, Southwark Bridge Road, S.E.1. Hop 0795. Atlasbatry, Sedist, London.

Attwater and Sons, Hopwood Street Mills, Preston. Preston 4045. Attwaters, Preston.

Audiovisor, Ltd., 28, Little Russell Street, London, W.C.1. Museum 4531.

Austin Mills and Co., 396, Wellington Road North and St. Albans Avenue, both at Heaton Chapel, Stockport. Heaton Moor 2621. Austin Mills, Heaton Chapel.

Automatic Coil Winder and Electrical Equipment Co., Ltd., Winder House, Douglas Street, S.W.1. Victoria 3405-7. Autowinda, Churton London.

Automatic Rectifying Plants, Ltd., 4, Halvergate Parade, Burnt Oak, Middx. Colindale 8436.

Automobile Accessories (Bristol), Ltd., Clifton Terrace, Sion Road, Bedminster, Bristol 3. Bristol 64067.

Aviss (Rugby), Ltd., Alfred, 161-3, Railway Terrace, Rugby. Rugby 229. Aviss, 229, Rugby.

Avon India Rubber Co., Ltd., Melksham, Wilts, and Mabledon Place, St. Pancras, London, W.C.1. Melksham 120 and Museum 4420.

A.B. Compton Cabinet Co., Ltd., 63, Old Compton Street, London, W.1. Gerrard 8389.

A.D. Models, 6, Wine Office Court, Fleet Street, London, E.C.4. Central 4387.

A.E.F. Manufacturing Co., Ohmic Works, Queensway, Ponders End, Middlesex. Enfield 3249. Juicepotz, Enfield.

A.E.G. Electric Co., Ltd., 131, Victoria Street, S.W.1. Victoria 1241. Aegmachapp, Sowest, London. Aegmachapp, London.

MANUFACTURERS' SECTION.

B

Baird Television, Ltd., 133, Long Acre, W.C.2. Temple Bar 5401. Televisor, Rand, London
Bakelite, Ltd., 68, Victoria Street, S.W.1. Works: Birmingham. Victoria 5441. Bakelite, London.
Baker and Finnemore, Ltd., Bakfin Works, Newhall Street, Birmingham. Central 2838. Bakfin, Birmingham.
Baker, G. F., and Co., Ltd., Xaltona House, Lecke Street, Corner, King's Cross Road, London, W.C.1. Terminus 4302. Ocrekab, Kincross, London.
Baker's Selhurst Radio, Sussex Road, South Croydon. Croydon 1618.
Balcombe, Ltd., A. J., 52-58, Tabernacle Street, E.C.2. Clerkenwell 1322. Abalgramo, Finsquare.
Barber and Kent, 27, Mark Lane, London, E.C.4.
Barrett and Elers, Ltd., Dace Road, Old Ford, E.3. Amherst 1187-8.
Barrow, Hepburn and Gale, Ltd., Grange Mills, Grange Road, Bermondsey, S.E.1. Bermondsey 3112-6. Rossoc, Berm, London.
Bastock, E., 135, Showell Green Lane, Sparkhill, Birmingham.
Bate, Jabez, and Co., Ltd., Verona Works, Brearley Street, Birmingham. Aston Cross 0243. Jabez Bate, Birmingham.
Batteries, Ltd., Redditch. Astwood Bank 4, Batteries, Redditch.
Baty, E. J., 157, Dunstable Road, Luton. Luton 229. Baty, Luton.
Baxendale and Co., Ltd., Miller Street, Manchester. Blackfriars 8282. Hanover Street and School Lane, Liverpool. Royal 5555. Baxendales. Grassmarket, Edinburgh. Edinburgh 27047. Baxendales.
Bayliss, William, Ltd., Sheepcote Street, Birmingham. Midland 1409. Drawbench, Birmingham.
Beacon Radio Manufacturing Co., Ltd., 8, St. James Road, Halifax.
Beddoes, Ltd., J. G., 11, Great Hampton Street, Birmingham, 18. Central 4340. Tantivy, Birmingham. 4, Moorfields, London, E.C.2. Metropolitan 3786. Beddofram, London.
Bedford Electrical and Radio Co., Ltd., 22, Campbell Road, Bedford. Bedford 2343. Peerless, Bedford.
Beedham Patent Record Cabinets, Chapel Works, Failsworth, near Manchester.
Bell Piano Co., Ltd., The Hyde, Hendon, London, N.W.9. Colindale 6223. 39H, Oxford Chambers, Oxford Place, Leeds. Leeds 23858.
Belling and Lee, Ltd., Cambridge Arterial Road, Enfield, Middlesex. Enfield 3322-5.
Benjamin Electric, Ltd., Brantwood Works, Tariff Road, Tottenham, N.17. Tottenham 1500. Benjalect, Tottlane, London.
Bennett Heyde and Co., J., 18, New Cannon Street, Manchester. City 1364. Benhey, Manchester.
Benoit, M., 4, Manor Gardens, Gunnersbury Avenue, W.3.
Berclif, Ltd., 38, Rabone Lane, Smethwick. Smethwick 0751.
Berk and Co., Ltd., F. W., 106, Fenchurch Street, E.C.3. Monument 3874. Berk, Phone, London.
Berrage-Moulton Speaker, Ltd., 35, Bessborough Place, Grosvenor Road, London, S.W. 1. Victoria 8893.
Beswick, Ltd., K. E., Albert Works, Seven Kings. Seven Kings 1987.
Beuttell, Ltd., A. W., 96, Victoria Street, S.W.1. Franklin 6173. Lytanclip, Sowest, London.
Bijou Radio Co., 1A, Sparsholt Road, London, N.19.
Bi-Metals, St. Mary's Works, Eldon Road, Wood Green, London, N.22. Tottenham 3979.
Bird and Sons, Ltd., Sydney S., Cyldon Radio, High Road, Whetstone, London, N.20. Hillside 2244.
Bird and Sons, W., 33, Fulham Palace Road, W.6, and 469, Chiswick High Road, W.4. Riverside 2738 and Chiswick 4760.
Birkbys, Ltd., Liversedge, Yorks. Cleckheaton 103. Woodfield, Liversedge.
Birmingham Mica Co., Ltd., 3, South Road, Hockley, Birmingham. Northern 0118. Insulation, Birmingham.
Birmingham Products, Ltd., Claremont Works, Claremont Street, Old Hill, Staffs. Cradley Heath 6370. Electronic, Old Hill.
Birmingham Sound Reproducers, Claremont Works, Claremont Street, Old Hill, Staffs. Cradley Heath 6370. Electronic, Old Hill.
Blair, J. Martin, Gorst Road, Park Royal, London, N.W.10. Willesden 1632.
Bligh, S. W., 1 and 2, North Lane, and 11, St. Dunstan's Street, Canterbury. Canterbury 289. Bligh, Canterbury.
Block Batteries, Ltd., Abbey Road, Barking, London, E. Grangewood 3346.
Blue Comet, Ltd., Comet Works, Gartside Street, Manchester. Blackfriars 7773.
Blundell-Curtis, Ltd., 155-157, Fairfield Road, Droylsden, Manchester. Droylsden 1372. Induline, Manchester.
Bond and Sons, Ltd., V. C., 61, Hackney Grove, E.8. Amherst 0883. Veeceebee, Hack, London.
Bonson, E. W., 2, Tichborne Court, Holborn, London, W.C.1. Holborn 0664.
Botolph Radio, Ltd., 119, Bishopsgate, London, E.C. 2. Bishopsgate 8172. 2, Ravenscourt Square, W. 6. Riverside 3881.
Boumphrey, Arundel, 1, Whitcomb Street, London, W.C.1.
Bowerman, Ltd., Geo., 67, Edgware Road, London, W.2. Paddington 7714. Quesolar, Edge.
Bowley, J. W., 26-28, Mossbury Road, Clapham Junction, S.W.11. Battersea 2958.
Bowyer-Lowe and A.E.D., Ltd., Diamond Works, Coombe Road, Brighton. Brighton 2404. Selfwind, Brighton.
Boxfoldia, Ltd., Pershore Road, Ten Acres, Birmingham. Selly Oak 1148. Boxfoldia, Birmingham.
Boynten and Co., Ltd., 65-8, Stafford Street, Birmingham. Central 1525. Portables, Birmingham; 139, Corporation Street, and 23-33, Ashley Passage, Birmingham.
Braby and Co., Ltd., F., 352, Euston Road, London, N.W.1. Museum 3096.
Bradnam and Co., 15, Heywood Street, Moss Side, Manchester.
Bramley, J. W., Radio House, Corporation Street, Halifax. Halifax 3394.
Brandon Label Co., 82, Scawfell Street, Hackney Road, E.2. Bishopsgate 5008.
Brasse, Ltd., Manor Works, High Street, Hornsey, N.8. Mountview 3295. Artapanus, London.
Brexton, Ltd., successors to Brookes and Sexton, Ltd., Brexton Works, Green Lane, Small Heath, Birmingham. Victoria 0684.
Bridger and Co., R. O. 334, Goswell Road, E.C.1. Clerkenwell 4432.
Bright Co., 47, Topsfield Parade, Crouch End, N.8. Mountview 1296.
Britain's Best Crystal, Ltd., Atom House, Springfield Road, Kingston-on-Thames. Kingston 4612. Mightestom, Kingston-on-Thames.
Britannia Batteries, Ltd., 233, Shaftesbury Avenue, W.C.2. Temple Bar 7971. Britanicus Westcent. Britannia Works, Union Street, Redditch. Redditch 155. Britanicus.
Britannia Lathe and Oil Engine Co., Ltd. (Head Office, 125, High Holborn, London, W.C.1. Holborn 2525. Britlathes, Westcent.) (works), Britannia Works, Colchester. Colchester 3847. Britannia, Colchester.
Britannia Rubber and Kamptulicon Co., Ltd., 7, Newgate Street, E.C.1. Central 2168/9, Britannia, Cent., London.
British Aluminium Co., Ltd., Adelaide House, King William Street, London, E.C.4. Mansion House 5561-3 and 8074-5. Cryolite, Bilgate, London. Cryolite, London. 25/29, Pancras Road, London, N.W.1. North 5301-2. 21, Barwick Street, Birmingham; 274, Deansgate, Manchester; 66, Kirkstall Road, Leeds.

British Battery Co., Ltd., Clarendon Road, Watford, Herts. Watford 3617.
British Blue Spot Co., Ltd., Blue Spot House, 94-96, Rosoman Street, Rosebery Avenue, London, E.C.1. Clerkenwell 3570. Bluospot, Isling, London.
British Celanese Ltd., Celanese House, Hanover Square, W.1. Mayfair 8000. Celanese Wesdo, London.
British Central Electrical Co., Ltd., 6 and 8, Rosebery Avenue, E.C.1 Clerkenwell 2525. Briticent, Holb., London.
British Clarion Co., Ltd., 15, Miller Street, Camden Town, London, N.W.1. Museum 3624-5. Crosradcla, Norwest, London.
British East Light, Ltd., 18, St. Clare Street, Minories, London, E.1. Royal 0884. Filcastli.
British Ebonite Co., Ltd., Hanwell, London, W.7. Ealing 1560. Ebonitical, Han., London.
British Electric Resistance Co., Ltd., Ohmic Works, Queensway, Ponders End, Middlesex. Enfield 2252-3. Vitrohm, London.
British General Mfg. Co., Ltd., Brockley Works, Tyrwhitt Road, Brockley, S.E.4. Lee Green 5055-6 Supertran, Lewis, London.
British General Radio Co., Ltd., 1, Central Place, Yeovil.
British Goldring Products, Ltd., Balfour House, 115-119, Finsbury Pavement, London, E.C.2. National 8838. Eckergram, Phone, London.
British Goodrich Rubber Co., Ltd., 50, Pall Mall, London, S.W.1. Regent 5162-3-4. Brit-goods, Piccy, London.
British G. W. Z. Battery Co., Ltd., 205-7, Bedford Avenue, Trading Estate, Slough, Bucks.
British Hard Rubber Co., Ltd., Ponders End, Middlesex. Enfield 1414-5.
British Homophone Co., Ltd., Barry Road, Stonebridge Park, London, N.W.10. Willesden 0386-7-4394. Homochord, Harles, London. Studios, 84A, High Road, Kilburn, London, N.W.6. Maida Vale 4806-7. 9/9A, High Street, Bull Ring, Birmingham. Midland 6233. 9, Fleet Street, Liverpool. Royal 3920. 13, Dumfries Place, Cardiff. Cardiff 5611.
British Ideal Patents, Ltd., Green Street, Brimsdown, Middlesex. Enfield 1808, 3327-9. Daptacon, Enfield.
British Insulated Cables, Ltd., Prescot, Lancs. Prescot 6571. Insulator, Prescot.
British Lumophon, Ltd., Stal House, Judd Street, King's Cross, London, W.C.1. Museum 2267-8, 5144-5. Lumobrit, Kincross, London,.
British Needle Co., Ltd., Argosy Works, Redditch. Redditch 119. Argosy, Redditch, 9, Falcon Avenue, Aldersgate Street, London, E.C.1. 52, Spencer Street, Birmingham.
British N.S.F. Co., Ltd., Building No. 3, Wadden Factory Estate, Wadden, Surrey. Fairfield 4166. Enesef, Croydon.
British Pens, Ltd., Pedigree Pen Works, Bearwood Road, Smethwick, Birmingham. Smethwick 1167. Penmen, Birmingham.
British Pix Co., Ltd., 118, Southwark Street, London, S.E.1. Hop 1001.
British Radio Gramophone Co., Ltd., Pilot House, Church Street, Stoke Newington, London, N.16. Clissold 6287.
British Radio Mfg. Co. (Liverpool), Ltd., 9, South Castle Street, Liverpool. Central 2311.
British Radio Valve Manufacturers' Association, 59, Russell Square, W.C.1. Museum 1206. Bradval, Westcent, London.
British Radiophone. Ltd., Aldwych House, Aldwych, W.C.2. Holborn 6744.
British Radiostat Corporation, Ltd., 29, George Street, Hanover Square, London, W.1. Mayfair 4438-9. Briradstat, Wesdo, London.
British Resistor Co., Ltd., Trafford Park, Manchester, Trafford Park, 0293.
British Rola Co., Ltd., 179, High Road, Kilburn, London, N.W. Maida Vale 5017-9.
British Ropes, Ltd., Wire Sales Dept., Doncaster. Doncaster 1348.
British Talkatome, Ltd., Wells Street, Jermyn Street, London, S.W.1. Whitehall 5330.
British Thomson-Houston Co., Ltd., Crown House, Aldwych, W.C.2. Temple Bar 8040. Asteroidal, Estrand, London; Asteroidal, London.
British Zonophone Co., Ltd., 98. Clerkenwell Rd., London, E.C.1. Clerkenwell 7620. Twinzono, Smith, London.
Brodersen, A., 61, Spencer Street, London, E.C.1. Clerkenwell 7058.
Bromley-Langton Electric Wire and Insulator Co., Ltd., 34-5, Newman Street, Oxford Street, W.1. Museum 2256-7, Elewires, Rath, London.
Brookes Measuring Tools, 51-3, Church Street, Greenwich, London, S.E.10. Greenwich 1828.
Brookes, Kenneth (Radio and Television). Ltd., Zetavox Works, Coles Green Road, Cricklewood, London, N.W.2. Gladstone 5464.
Brown, A. A., 25, Arcadia Street, Glasgow, S.E. Bridgeton 685. Bridgeton 685 Glasgow.
Brown, Ltd., F., Langley Works, Long Acré, W.C.2. Temple Bar 7222.
Brownie Wireless Co. of Great Britain, Ltd., Nelson Street Works, Mornington Crescent, N.W. Mus. 8666-9. Browircom, Norwest, London.
Bruntons (Musselburgh), Ltd., Musselburgh, Scotland. Musselburgh 28. Wiremill, Musselburgh.
Buck and Hickman, Ltd., 2 to 8, Whitechapel Road, E.1. Bishopsgate 6543. Roebuck, Edo. London. 29-30, Whittall Street, Birmingham; 37-39, Robertson Street, Glasgow; 277, Deansgate, Manchester.
Bulgin and Co., Ltd., A. F., Abbey Road, Barking, Essex. Grangewood 3266-7. 9-11, Cursitor Street, Chancery Lane, E.C.4. Holborn 2072.
Bulle Clock Co., 83, Hatton Garden, E.C.1. Holborn 3153.
Bullers, Ltd., 6, Laurence Pountney Hill, E.C.4. Mansion House 9971. Bullers, Cannon, London. Bullers, London.
Bullphone Radio, Nightingale Works, New North Road, Barkingside. Chigwell 162. Disallowed, Fin-square, London.
Bulmer, Fred, 4, Carlton Terrace, Scarborough. Scarborough 723. Bulmer 723, Scarborough.
Burall Bros., Patent Label Factory, Wisbech. Wisbech 113. Burrall, Wisbech.
Burgoyne Wireless (1930), Ltd., 34A, York Road, King's Cross, N.1. North 3266.
Burnand and Co., W. E., Duo Works, 66-106, Shoreham Street, Sheffield 1. Central 20766 and 24850. Burnand, Sheffield.
Burndept, Ltd., 51-53, Church Street, Greenwich, London, S.E.10. Greenwich 2651.
Burne-Jones and Co., Ltd., 296, Borough High Street, S.E.1. Hop 6257-8. Burjomag, Sedist, London; Burjomag, London.
Burovox (1931), Ltd., 60, Rochester Row, London, S.W.1. Victoria 4032.
Burton, Ltd., C. F. and H., Progress Works, Bernard Street, Walsall, Staffs. Walsall 3960.
Burton, Delingpole and Co., Ltd., Moseley Street, Birmingham. Midland 2573-4. Delingpole, Birmingham.
Burwood's Wireless, New York House, Cork, I.F.S. Cork 990.
Busby and Co., Ltd., 43-47, Price Street, Birmingham. Aston Cross 5696. Busco, Birmingham.
Bush Engineering Co., Ltd., Watcoben Works, Stebbing Street, Latimer Road, London, W.11. Park 1370.
Bush Radio, Ltd., Woodyer Road, Shepherd's Bush, London, W.12. Shepherd's Bush 2050. Soundifilm, Shepherds, London.
Butcher and Sons (Rows), Ltd., W., The Wireless Depot, Ross, Herefordshire. Ross 140.
Bygrave, W., and Sons, 129, Constitution Hill, Birmingham. Central 3700. Bygrave, Birmingham.
B. and J. Wireless, Ltd. Alsen Works, Alsen Road, Holloway, London, N.7. Archway 1695. Archway ,Phone 1695.

MANUFACTURERS' SECTION

C

Calders, Ltd., 29, Regent Street, London, S.W.1. Regent 1293. 33, Brewery Road, London, N.7. North 5274.

Callender's Cable and Construction Co., Ltd., Hamilton House, Victoria Embankment, London, E.C.4. Central 5241. Callender, Fleet, London.

Calmont, King and Co., Ltd., 84, Milton Street, London, E.C. Metropolitan 1159.

Calvete, Ltd., I., 59, North Street, Clapham, S.W.4. Macaulay 3202. Elecalvete, Clapcom, London.

Cambridge Instrument Co., Ltd., 45, Grosvenor Place, London, S.W.1. Sloane 9146. Unipivot, Knights, London.

Campart, C., 32, Theobalds Road, London, W.C.1. Holborn 9772. Cecampart, London.

Cann, Ltd., J. Churly, 23, Farringdon Avenue, E.C.4. Central 4975.

Carborundum Co., Ltd., Trafford Park, Manchester. Trafford Park 2381. Carborund, Phone, Manchester.

Carrington Mfg. Co., Ltd., Camco Works, Sanderstead Road, South Croydon. Croydon 0623-4. Camco, Croydon. Sales Department and Showrooms, 24, Hatton Garden, London, E.C.1. Holborn 8202.

Carson, F. M., 27, Upper Thames Street, E.C.4. Cent. 6887. Irishism, Central, London; Irishism, London.

Castagnoli, Gordon, A.M.I.R.E., Culver Street, Colchester. Colchester 814.

Castle, T. L., 2, Cricklewood Broadway, London, N.W.2. Gladstone 5496. Skrusadys, Phone, London.

Caxton Wood Turnery Co., Market Harborough. Market Harborough 59. Haddon, Market Harborough.

Celebrity Gramophones, (1932), Ltd. 16, Hardwidge Street, London, S.E.1. Hop 6882.

Celestion Ltd., London Road, Kingston-on-Thames. Kingston 5656. Celestion, Kingston-on-Thames. 106, Victoria Street, London, S.W.1. Victoria 3955-6.

Cellgrave Co., 49-51, Dartmouth Road, London, S.E.23. Sydenham 4759.

Celluloid Printers, Ltd., 204, South Park Road, Wimbledon, S.W.19. Liberty 1905. Celluprint, Wimble, London.

Certex Products, 7a, Keen's Yard, St. Paul's Road, Highbury, London, N.1. North 1134.

Chalkley, C. G. (Incorporating Chalgrove Radio), 6, Grove Street, Wellingborough, Northamptonshire. Chalgrove, Radio, Wellingborough.

Champion Accumulator Co., 2, Prebend Street, Leicester. Leicester 58109. Leicester, Phone, 58109.

Chapman, Ltd., A. W., Ranelagh Gardens, Hurlingham, S.W.6. Putney 2372-3. Nevajah, Phone, London.

Charlesworth, W. J. Albert Road and Station Road, Stechford, Birmingham. Stechford 2148.

Charterhouse Radio, 2-3, Charterhouse Street, London, E.C.1.

Chester Bros., 495, Cambridge Road, Cambridge Heath, London, E.2. Bishopsgate 6160.

Chloride Electrical Storage Co., Ltd., Exide Works, Clifton Junction, near Manchester. Swinton 2011. Chloridic, Pendlebury. 137, Victoria Street, S.W.1. Victoria 6308; Lexden Road, Acton, W.3.; 205-231, Shaftesbury Avenue, W.C.2; 18, Bridge Street, Manchester; 57-58, Dale End, Birmingham; 16-18, Broadmead, Bristol; 40-44, Tureen Street, Glasgow; 8, Pearse Street, Dublin, C.5.; 1, Franklin Street, Belfast.

Cholerton, F., Bridge Street, St. Helens. St. Helens 636.

Chorlton Metal Co., Ltd., Millgate House, 55, Blossom Street, Manchester. Central 6642/3. Chorlmet, Manchester.

Christie and Sons, Ltd., Jas., 246, West Street, Sheffield. Sheffield 22732. Christie, Sheffield.

Cifel Products, Ltd., 134, Pentonville Road, London, N.1. North 5146.

City Accumulator Co., 7, Angel Court, Strand, London, W.C.2. Temple Bar 8620.

Clarion Radio Furniture, 28-38, Mansford Street, E.2. Bishopsgate 6371.

Clarion Radio Valve Co., 7, Duke Street, London, W.C.2. Temple Bar 1693.

Clarith Reproducers, Ltd., 76, East Street, Leeds. Leeds 29645. Amplifier, Leeds.

Clarke and Co. (Manchester), Ltd., H., Atlas Works, George Street, Patricroft, Manchester. Eccles 2001. Pirtoid, Phone, Manchester.; Bush House, Aldwych, London, W.C.2. Temple Bar 3862 and 7130. Pirtoid, Phone, London.

Clarke and Co., W. T., Redding Lane, Hackney, E.8. Amherst 3244. Etalspinne, Hack, London.

Clarke's (Redditch), Ltd., Sinew Works, Redditch. Redditch 100. Sinew, Redditch.

Clayton (Rubber Sales), Ltd., Progress Works, Clayton, Manchester. East 0788. Crepechouc, Manchester.

Cleveleys Engineering Co., Back Victoria Parade, Cleveleys, Blackpool.

Clifft and Cockle, 21, Cannon Street, Manchester. Central 1137.

Climax Radio Electric, Ltd., Haverstock Works, Parkhill Road, Hampstead, N.W.3. Primrose 1171-3.

Colassi, W. L., Mark Lane Station Buildings, London, E.C.3. Royal 2860.

Cole, Ltd., E. K., Ekco Works, Southend-on-Sea. Southend 6635-9-6630. Ekco, Southend-on-Sea.

Collaro, Ltd., Culmore Works, Culmore Road, Peckham, S.E.15. New Cross 2050. Korllaro, Peck, London.

Collet Mfg. Co., S. H., 341, Goswell Road London, E.C.1. Clerk. 7984.

Collie and Co., J. H., 10, Canning Place, Liverpool. Central 5039.

Collinson's Precision Screw Co., Ltd., Provost Works, Macdonald Road, E.17. Walthamstow 0532. Elecolvern. 150, King's Cross Road, London, W.C.1. Clerkenwell 5362.

Columbia Graphophone Co., Ltd., Columbia House, 98-108, Clerkenwell Road, E.C.1. Clerkenwell 7620-4. Talkington, Smith, London. Fibrillose, London.

Colvern, Ltd., Mawney's Road, Romford. Romford 1. 150, King's Cross Road, London, W.C.1. Clerkenwell 5362.

Commercial Engineering Co., late of 15, Bedford Street, Rhyl, 88, Colne Road, Brierfield, Lancs.

Concerton Radio and Electrical Co., Ltd., 256-7, Bank Chambers, 329, High Holborn, London, W.C.1. Holborn 8667.

Concordia Electric Wire Co., Ltd., Trent Mills, New Sawley, Derbyshire. Long Eaton 249. Polianite, Long Eaton. 81, Milton Street, Sydney Avenue, E.C.2. Metropolitan 9780.

Connollys (Blackley), Ltd., Blackley, Manchester. Cheetham Hill, 1801-2-3. Connollys, Manchester.

Consolidated Radio Co., Ltd., 75, Kilburn Lane, London, N. W.10. Willesden 1878.

Contal Radio, Ltd., Regency House, 1-4, Warwick Street, London, W.1., Gerrard 3792. Radinenta, Piccy, London.

Cooke, and Co., H. S., Resilient Works, Redditch, Worcs. Redditch 72. Redditch, Stancap.

Cookson and Co., 25, New Oxford Street, W.C.1. Holborn 8503.

Coppock, J. T., 61-67, Old Street, E.C.1. Clerkenwell 0430. Jatocop, Barb, London.

Coquantin and Co., Ltd., M., 1 and 3, Wilson Street, Drury Lane, W.C. 2. Temple Bar 5251-2. Pokantinoc, Phone, London.

Cordesia Batteries, Ltd., 56, Marlborough Road, London, N. 19. Archway 1895.

Cordo Electrical Products, Ltd., 68, Victoria Street London, S.W.1. Victoria 6873.

Coryton Radio, Imperial House, 84, Regent Street, London, W.1.

Corona Engineering and Motor Co., Ltd., Woodside Lane, Finchley, N.12. Hillside 3018.

Cossor, Ltd., A. C. Cossor House, Highbury Grove, N.5. North 5900. Amplifiers, Phone, London, Amplifiers, London. 14-16, Carrs Lane, Birmingham. Midland 6671-2. 14 Bath Street, Bristol. Bristol 20271-2. 21, Waterloo Street, Glasgow. Central 4446-7. 17, Wellington Street, Leeds. Leeds 21581. 42, Paradise Street, Liverpool. Central 1811. 8-10, Cannon Street, Manchester. Blackfriars 9777-8. 15, High Bridge, Newcastle. Newcastle 26801. 3, Porter Street, Moor Head, Sheffield. Sheffield 23103-4. 184, Pearse Street, Dublin. Dublin 44897.

Cowlishaw Bros., Shardlow, Derby. Shardlow 23, Cowlishaw Bros., Shardlow.

Crabtree, J. A., and Co., Ltd., Lincoln Works, Walsall, Staffs.

Crane Chemical Co., Ltd., Fredk., Armoury Close, Bordesley Green, Birmingham. Victoria 0416 (3 lines). Chemical, Birmingham.

Crawford Wireless, 24-26, Holborn, E.C.1. Holborn 7391.

Crawford and Co. (Tottenham), Ltd., Derby Road, West Green, N.15. Mountview 1835.

Cressall Mfg. Co., Eclipse Works, 31-2, Tower Street, Birmingham 19. Central 3463-4. Ohmic, Birmingham.

Crossley Radio, Ltd., 15, Miller Street, Camden Town, N.W.1. Museum 3625. Crosradcla, Norwest, London.

Cruickshank, Ltd., R., Camden Street, Birmingham. Central 7213. Cruickshank, Birmingham.

Crystalate Gramophone Record Mfg. Co., Ltd., Imperial House, 60-62, City Road, London, E.C. 1. Clerkenwell 2633, 2116. Town Works, Tonbridge, Kent. Tonbridge 35. Golden Green, Tonbridge, Kent. Hadlow 33.

Culkin, W. E., School Close Mills, Neville Street, Leeds. Leeds 27917.

Curtis Mfg. Co., Ltd., 32, Spring Street, Paddington, W.2. Paddington 4076. Rheofaire, Phone, London.

Custerson, R., Old Factory, Bateshill, Redditch.

C.A.V. Small Tools, Ltd. (See Lehmann, Archer, and Co., Ltd.), 5, Farringdon Road, London, E.C.1. Holborn 1434 and 6256. Tapsandies, London.

C.I.V.A.R.E., 67, Edgware Road, London, W.2, Paddington 7714. Quesolar, Edge, London.

D

Dagnall, Ltd., S., 420, Stratford Road, Sparkhill, Birmingham. Victoria 0015-6.

Dallas and Sons, Ltd., John E., 6-10, Betterton Street, W.C.2. Temple Bar 6351-4. Lensidern, Westcent. Lensidern, London.

Dallow Mfg. Co., Dallow Hall Works, Dallow Street, Burton-on-Trent.

Daly, H. C., 12-14, Ansdell Street, Kensington High Street, W.8. Western 2520.

Danipad Rubber Co., Ltd., 5-7, Market Street, Finsbury, E.C.2. Bishopsgate 7322 Padonko, Finsquare., London.

Darwins, Ltd., Fitzwilliam Wks., Sheffield.

Daventry and Co., Pomfret Mill, Derby Mill, Preston. Preston 503.

Davis and Timmins, Ltd., York Road, King's Cross, N.1. North 0580. Conductivity, London.

Dawkins Trading Co., Old Sessions House, Clerkenwell Road, London, E.C.1. Clerkenwell 1331. Nightingale Works, 347, Hornsey Road, London, N.

Daws, Clarke and Co., 23, The Avenue, Bedford Park, London, W.4. Chiswick 0368.

Decca Gramophone Co., Ltd. and Decca Record Co., Ltd., 1-3, Brixton Road, S.W.9. Reliance 3311.

De-La-Rue and Co., Ltd., Thos., Shernhall Street, Walthamstow, E.17. Walthamstow 2900. Telenduron, Walt, London.

Deemark Products, Glynde Street, Crofton Park, S.E.4. Lee Green 3558.

Dennis and Co., W. F., 70, Queen Victoria Street, E.C.4. City 1620 and Central 9600-1. Fredennis, Cannon, London. Fredennis, London.

Dent and Co., and Johnson, Ltd., Linwood Works, Linwood near Paisley, Johnstone 109. Dentcompa, Linwood.

Detex (1931), Ltd., 10, White Lion Street, Bishopsgate, E.1.

Diamond Fibre Co., Ltd., 38, Southwark Bridge Road, London, S.E.1. Hop 3386/7. Dymofyber, Boroh, London.

Dibben and Sons, Ltd., W., 80, St. Mary's Road, Southampton. Southampton 3141 (6 lines). Stoves.

Diehl, H., 40; Sun Street, London, E.C.2. Bishopsgate 7949.

Digby, F., 9, The Oval, Hackney Road, E.2. Bishopsgate 6458.

Diggle & Co., A., Jane Street, Rochdale. Rochdale 2869.

Disque Cabinet Co., Ltd., 11, Poultry, London, E.C.4. City 6631. Towundal, Cannon, London.

Distavox, Ltd., 119, Bunhill Row, London, E.C.1. National 8672.

Doherty and Sons, Edward, 700-710, Seven Sisters Road, N.15. Tottenham 3321.

Donophone, 7, Ely Place, Holborn Circus, London, E.C.1. Holborn 4562.

Dowler and Sons, Wainwright Street Works, Aston, Birmingham. East 1349.

Downing and Sons, Ltd., John S., Crown Works, Commercial Street, Birmingham. Midland 1372. Downing, Birmingham.

Dr. Nesper, Ltd., Colindale Avenue, Hendon, N.W.9. Colindale 6223-5.

Drummond Bros., Guildford. Guildford 156. Lathes, Stoughton.

Dual Motors, Ltd., 85-86, New Bond Street, W.1. Mayfair 1648-9. Dualmoto, Wesdo, London.

Dubilier Condenser Co. (1925), Ltd., Victoria Road, N. Acton W.3. Acorn 2241. Hivoltcon, Phone, London.

Dulcetto Polyphon, Ltd., 2-3, Newman Street, W.1. Museum 4201. "Dulcetpoly," London.

Dundas Fox, Ltd., 11, Farringdon Ave., London, E.C.4. Central 6100.

Dunster and Son, Ltd., J. J., Atherden Works, Atherden Road, London, E.5. Amhurst 4507.

Duo-Mains Radio, Ltd., 14, Cranbrook House, Cranbrook Road, Ilford, Essex. Ilford 0472.

Duray, 4, Suffolk Road, Lowestoft. Lowestoft 165.

Dux Chemical Solutions Co., Ltd., The, St. Leonard's Works, Hancock Road, Bromley-by Bow, London, E.3. East 1175. Cuprammate, Bochurch, London.

Dyson & Co. (Works), Ltd., J., 2, Coleman Street, E.C.2. Metropolitan 7988. Londepot, Ave. London. 5, Goodwin Street, Bradford. Bradford 6037. Equipment, Bradford.

D.X. Coils, Ltd., 542, Kingsland Road, E.8. Clissold 3599.

E

Eagle Engineering Co., Ltd., Eagle Works, Warwick. Warwick 126-7. Eagle, Warwick.

Eagle Transfer, Ltd., Spring Road, Hall Green, Birmingham. Acocks Green 1416 and 1519. Eagtranco, Birmingham.

Earnshaw Brothers and Booth, Pentridge Mill, Holmes Street, Burnley. Burnley 4043. Mahogany, Phone, Burnley.

East Ham Wireless Supplies, 427 and 429, Barking Road, East Ham, E.6. Grangewood 1038.

Eastham, Thos., Cabinet Works, Holmes Road, Thornton, Blackpool. Cleveleys 64. Eastham, Thornton, Lancs.

Eastick and Sons, J. J., 118, Bunhill Row, London, E.C.1. Metropolitan 0314. 9, Library Place, Jersey. 10/11, St. Helens Place, Swansea. Commercial House, Place Road, Portsmouth.

Ebonestos Insulators, Ltd., Excelsior Works, Rollins Street, Canterbury Road, S.E.15. New Cross 1913. Ebonestos, Phone, London.

Ecco Battery Co., Ltd., Ecco Works, Bow Common Lane, E.3. East 4904-5. Eccobatri, Pop, London.

MANUFACTURERS' SECTION

Eckersley, John P., 398, Bridgeman Street, Bolton.

Edison Bell, Ltd., Edison Bell Works, Glengall Road, S.E.15. Bermondsey 2211. Phonokino, Kent, London.

Edison Storage Battery Distributors, Ltd., Victoria House, Southampton Row, W.C.1. Holborn 6673-4. Accedison, Westcent. London, Accedison, London.

Edison Swan Electric Co., Ltd., 123-5, Queen Victoria Street, E.C.4. City 9881. 155, Charing Cross Road, W.C.2. Gerrard 8660. 71, Victoria Street, S.W.1. Victoria 6407. Windmill Brae, Aberdeen (Sub store operating from Dundee). 12, King Street, Belfast (Sub store operating from Dublin). 23-25, Constitution Hill, Birmingham. Central 6471-4. 32, Duke Street, Brighton. Brighton 2518. 43, Park Street, Bristol. Bristol 20161. 89-90, Frederick Street, Cardiff. Cardiff 3157-8. 47, Dawson Street, Dublin C.2. Dublin 43581-2. Ediswan House, Bank Street, Dundee. Dundee 3129. 127, George Street, Edinburgh. Edinburgh 27231. 74, Waterloo Street, Glasgow, C.2. Central 1609. Ediswan House, Storey Street, Hull. Central 36823. 15-15a, Wellington Street, Leeds, Leeds 29634-5. 27, Highcross Street, Leicester. Leicester 58124-5. 16, South Castle Street, Liverpool. Central 2002. Lloyds House, Albert Square, Manchester. Blackfriars 4423-6. A.E.I. House, Northumberland Road, Newcastle. Central 27473-5. 23, Goldsmith Street, Nottingham. Nottingham 42511-2. 9, Whimple Street, Plymouth (Sub store operating from Southampton). Mappin Buildings, Norfolk Street, Sheffield. Sheffield 22144. 24, High Street, Southampton. Southampton 6121-2. 4, Nelson Street, Swansea (Sub store operating from Cardiff). Telegraphic address in each case: Ediswan, followed by name of town.

Edmonds, Ltd., G., Soho Hill Works, Birmingham. Northern 0129. Reciprocal, Birmingham. 49, Gamage Building, London, E.C.1. Holborn 0128.

Edwards, E., 5, Bradford Street, Chelmsford.

Edwards, F. W., 15, Clerkenwell Green, London, E.C.1. Clerkenwell 1038.

Edwards and Co., W., 8a, Allendale Road, Denmark Hill, S.E.5. Rodney 2332-3. Edcohivac, Phone, London.

Edwards and Co., Ltd., Rowland, Old Sessions House, Clerkenwell Road, London, E.C.1. Clerkenwell 1331.

Efandem Co., Ltd., Fallings Park Works, Wolverhampton. Wolverhampton 1123-4, and 1450. Efandem, Wolverhampton. 11, Fitzroy Square, W.1. Museum 2265.

Electric Depot, Ltd., Pritchett Street, Aston, Birmingham. Aston Cross 1673.

Electric Gramophones, Ltd., 7, The Quadrant, Winchmore Hill, N.21. Palmers Green 0766. Elecgrams, Winchmore, London.

Electric Lamp Service Co., Ltd., Stal House, Judd Street, King's Cross, London, W.C.1. Museum 2267-9.

Electric and Ordnance Accessories Co., Ltd., Havelock and Shelton Potteries, Hanley, Stoke-on-Trent. Hanley 2863. Eoa, Hanley.

Electrical Equipment and Carbon Co., Ltd., 107, New Oxford Street, London, W.1. Temple Bar 7058.

Electrical Devices Co., 62, Conduit Street, London, W.1. Holborn 9752.

Electrical Measuring Instrument Co., 55, Cardington Street, Hampstead Road, London, N.W.1. Museum 1042.

Electrical Ohms, Ltd., 6, Bridge Street, Glasgow. South 328.

Electrical and Radio Products (1931), Ltd., Empire Works, Salfords, Redhill. Horley 404-405. Ammeter, Horley.

Electrical Trading Association, Ltd., The, Aldwych House, Aldwych, W.C.2. Holborn 8139 Eltradax, Estrand, London.

Electriclocks and Radio, Ltd., Avenue Works, Hanover Park, Peckham, London, S.E.15. New Cross 4677. Triclocks, Peck, London.

Electrocet Radio Co., Poplar Road, Solihull, Birmingham. Solihull 0750. Electrocets, Solihull.

Electrocolour Products, Ltd., 63, New Broad Street, London, E.C. London Wall 1883. Electrocolor, Hanovesco, London.

Electro-Dynamic Construction Co., Ltd., Devonshire Grove, S.E.15. New Cross 4972-5. Eledamic, Phone, London.

Electrolines, Ltd., Denmark Street, Bristol. Bristol 21679. Grams as phone.

"Elektra" Supplies, 1, Belmont Street, Chalk Farm Road, N.W.1. Gulliver 2347.

Elephant Chemical Co., Ltd., 171-3, Neate Street, S.E.5. Rodney 3243. Exterminophone, London.

Elldons, 48, Newhall Hill, Birmingham. Central 2061.

Ellin (Footprint Works), Ltd., Thos. R. Hollis Croft, Sheffield. Sheffield 22171. Footprint, Sheffield.

Elliott, E., 315, Summer Lane, Birmingham. Aston Cross 1156. Galalith, Birmingham.

Elliott Radio Mfg. Co., Ltd., 87, Senhouse Street, Maryport, Cumberland. Maryport 104.

Ellison Insulations, Ltd., Wellhead Lane, Perry Barr, Birmingham. Birchfields 4554. Tufnol, Phone, Birmingham.

Ellison Manufacturing Co., Ltd., Dragon Works, Harrogate.

Elmar Mouldings Co., Cardigan Works, Belmont Row, Birmingham. Aston Cross 3232. Machinery, Birmingham.

Elmesan (London), Ltd., 66, Victoria Street, S.W.1. Victoria 3326. Elmesan, Sowest, London.

Elvy, C. L., 1, Dyott Steeet, Shaftesbury Avenue, London, W.C.1. Temple Bar 3791.

Elvy and Anderson, 1, Dyott Street, Shaftesbury Avenue, London, W.C.1. Temple Bar 3791.

Emaree, Ltd., 29, High Street, Clapham, S.W.4. Macaulay 1925.

Emerson, R. Waldo, 3, St. Anne's Terrace, St. John's Wood, London, N.W.8. Primrose 1517.

Emkabe Radio Co., Ltd., 47, Farringdon Road, E.C.1. Holborn 0622.

Emmott (Pawsons), Ltd., George, Wadsworth Mill, Oxenhope, near Keighley, Yorks. Haworth 14. Emmott, Oxenhope.

Enderlein, E., 16, Charterhouse Street, London, E.C.1. Holborn 0668. Enderlein, Smith, London.

Enfield Cable Works, Ltd., Lincoln House, 296-302, High Holborn, W.C.1. Holborn 0591. Enfelcama, Phone, London.

English Steel Corporation, Vickers Works, Sheffield.

Eon Vacuum Wireless Co., 7, Pool Valley, and Old Steine, Brighton. Brighton 5246.

Epoch Radio Mfg. Co., Ltd., Exmouth House, Exmouth Street, London, E.C.1. Clerk 6666.

Ercolani and Sons, E., 27, Claremont Road, London, E.17. Walthamstow 1252.

Ericsson Telephones, Ltd., 67-73, Kingsway, W.C.2. Holborn 3271. Works: Beeston, Notts.

Erie Resistor, Ltd., Waterloo Road, North Circular Road, London, N.W.2. Gladstone 2582.

Erinoid, Ltd., Lightpill Mill, Stroud, Glos., and 11-12, Finsbury Square, E.C.2. Stroud 239. Erinoid, Stroud.

Erith Battery Co., Ltd., Belvedere Works, Belvedere, Kent. Erith 189. Callender, Fleet, London. Callender, London.

Ernest Turner Electrical Instruments, Ltd., Chiltern Works, High Wycombe, Bucks. High Wycombe 301. Gorgeous, High Wycombe.

Essex Accumulator Co., Ltd., 499, Grove Green Road, London, E.11. Leytonstone 1749.

Eta Tool Co., 70a/c, Asylum Street, Leicester, Leicester 5386. Eta Tool Co., 5386 Leicester.

Europa Radio, Ltd., Colindale Avenue, London, W.9.

Ever Ready Co. (Gt. Britain), Ltd., Hercules Place, Holloway, N.7. Archway 3030. Eveready, Holway, London.

Everett, Edgcumbe and Co., Ltd., 117, Victoria Street, S.W.1. Victoria 3020-1. Everectus, Sowest, London.
Evershed and Vignoles, Ltd., Acton Lane Works. Chiswick, W.4. Chiswick 1370. Dorothea, Chisk, London.
Evington Electrical Mfg. Co., 5, Beckingham Road, Leicester. Leicester 59221. Evington Electric, Leicester.
Exact Mfg. Co., Croft Works, Priory Street, Coventry.

F

Fabian, J. Ltd., 25, Cowper Street, E.C.2. Clerkenwell 0236. Stadionet, Finsquare, London.
Fairfield Mfg. Co., 20, Laurel Road, Liverpool. Anfield 1848.
Falk, Stadelmann and Co., Ltd., 83-93, Farringdon Road, E.C.1. Holborn 7654. Lamps, London. Veritas House, Clyde Street, Glasgow, C.1. Central 9494. Veritas House, Rochdale Road, Manchester. City 8250. Veritas House, 81-84, Lionel Street, Birmingham. Central 8031-3. Effesco. Veritas House, 3-11, Prudhoe Street, Newcastle. Newcastle 22483-4. Veritas House, 85-87, Frederick Street, Cardiff. Cardiff 5757. Veritas House, 15-19, New Station Street, Leeds. Leeds 29741. Effesca House, Exchequer Street, Dublin. Dublin 21694-5. 60, Hanover Street, Liverpool. Royal 2942. Telegraphic address in each case: Trilux, except Birmingham.
Fallowfield, Ltd., Johnathan, 61-62, Newman Street, W.1. Museum 8318. Fallowfield, Rath, London.
Faraday All-wave Wireless, Ltd., 1, Salcott Road, Battersea, London, S.W.11. Battersea 2085. Faradaho, Batt, London.
Faraday Radio Gramophones, Ltd., 8, Bridewell Place, E.C.4.
Fay Home Recorders, Ltd., 121, Victoria Street, London, S.W.1. Victoria 7784-5. Fayedisk, Sowest, London.
Fel-Electric Radio, 56, Garden Street, Sheffield. Sheffield 20795.
Feldman, M. (Radio XXX Supplies), 58, Meanwood Road, Leeds. Leeds 23768.
Fenriss (1932), Ltd., 42, Hatton Garden, London, E.C. Holborn 2846.
Ferranti, Ltd., Hollinwood, Lancs. Failsworth 2000. Ferranti, Hollinwood. Bush House, London, W.C.2. Temple Bar 9325-6. Ferranti, Bush, London.
Film Industries, Ltd., 60, Paddington Street, W.1. Welbeck 2293-4. Troosound, Baker, London.
Fletcher and Co., Ltd., H. J., Bridge Works, New North Road, N.1. Clerkenwell 8720-1. Dulciphone, Phone, London. Dulciphone, London.
Fluxite, Ltd., West Lane Works, West Lane, Rotherhithe, S.E.16. Bermondsey 2660.
Forbat, E., c/o Nivalight (1928), Ltd., 1, Rosebery Avenue, London, E.C.1. Clerkenwell 1227. Nivalight, Holb., London.
Formo Co., Crown Works, Southmill Road, Regents Park, Southampton. Southampton 71329. Formodensa, Southampton. Golden Square, Piccadilly Circus, London, W.1. Gerrard 2088-9. Formodensa, London.
Franchi Endura Co., Canal Bridge Works, Abbey Road, Park Royal, London, N.W.10. Willesden 4562.
Francis, Ltd., E. M., 36, Heathcote Grove, Chingford, E.4. Silverthorn 1355.
Francis, T. R., 28, Gloucester Street, E.C.1. Clerkenwell 8455.
Francke, E., 28, Bloomfield Road, Maida Vale, London, W.9. Abercorn 1987.
Francois, E. J., 89, Clerkenwell Road, E.C.1. Holb. 6055. Nosamfran, Holb, London. Nosamfran, London.
Franklin and Freeman, Ltd., 17-19, Finsbury Street, Finsbury, E.C.2. Metropolitan 2954. Franfreeoy, Finsquare, London. Franfreeoy, London.
Franklin Electric Co., Ltd., 150, Charing Cross Road, London, W.C.2. Temple Bar 3682-5833. Elecfranko, Westcent, London. Elecfranko, London.
Fraser Radio, 38, Crawley Road, London, N.22. Tottenham 4919.
Freed, S. R. F., Addington, Surrey. Addiscombe 2056. Freed, Addington, Surrey.
Frost Radio Co., 21, Red Lion Street, London, E.C.1.
Fry's (London), Ltd., 24-25, King Street, London, E.1. Royal 6152-3. Fryonia, Ald, London.
Fuller Accumulator Co., (1926), Ltd., Woodland Works, Grove Road, Chadwell Heath. Seven Kings 1200. Fuller, Chadwell Heath. 29, Guildhall Buildings, Navigation Street, Birmingham. Midland 3103. Fullerite, Birmingham. 19, Chapel Walks, Cross Street, Manchester. Blackfriars 5811. Fullerite, Manchester. 28, Cumberland Street, Bristol. Bristol 20958. Brunwec, Bristol. 9, Mill Hill, Leeds. Leeds 22865. Illuminate, Leeds. 48, Sandford Grove Road, Sheffield. Sheffield 51187. 73-8, High Holborn, London, W.C. Chancery 7453, 10-11, St. Helens Road, Swansea. Swansea 3208. 10, Dougall Square East, Belfast. Belfast 8009. 5, Oswald Street, Glasgow, Central 6052. 46, Sandhill, Newcastle. Central 24068.
Fullotone, Ltd., 73, Camden Road, N.W.1. Gulliver 1017. 41, George Street, Croydon. Croydon 0286. 561, High Road, N.17. Tottenham 3527. 149, High Street North, E.6. Grangewood 1884. 13, Paradise Street, Liverpool. 312, Argyle Street, Glasgow.

G

Gale, A. E., 16, Archer Street, W.1. Gerrard 7851.
Galloway, Ltd., J. and L., 38, Mair Street, Plantation, Glasgow. Ibrox 1303. Advice, Glasgow.
Galt and Sons, R., 85, York Street, Belfast. Belfast 2355. Galt Wireless, Belfast.
Gambrell Radio, Ltd., Merton Road, Southfields, London, S.W.18. Putney 3641-2.
Garnersound, Ltd., 51, Wicker Lane, Sheffield.
Garrard Engineering and Manufacturing Co., Ltd., Newcastle Street, Swindon. Swindon 534-5. Garrard, Swindon.
Garratt Stores, 193, Garratt Lane, S.W.18. Battersea 0458.
Gee (Birmingham), Ltd., 249-250, Icknield Street, Birmingham. Northern 1232.
Geipel, Wm., Ltd., 156, Bermondsey Street, London S.E.1. Hop 0594.
General Chemical and Pharmaceutical Co., Ltd., Judex Works, Sudbury, Middlesex. Wembley 3883. Chemipharm, Wembley, London. Chemipharm, London.
General Electric Co., Ltd., Magnet House, Kingsway, W.C.2. Temple Bar 8000. Electricity, Westcent, London. Polyphase, London.
Gent and Co., Ltd., Faraday Works, Leicester. Leicester 24151. Gents, Leicester. 47 Victoria Street, London, S.W.1. Victoria 2655. Tangent House, Blackett Street, Newcastle-on-Tyne. Newcastle 20135.
Giffens (London) Ltd., 373, Edgware Road, London, W.2. Paddington 6038. Whizgif, Padd, London.
Gilbert and Co., Ltd., C., Arundel Street, Sheffield. Sheffield 21244. Gilrad, Sheffield. Pall Mall, Hanley. South Street, Hull. St. Mary's Place, Newcastle-on-Tyne.
Gillart, J., Victoria Works, Graham Street, Birmingham.
Glasscoe, R. H., 71, Moorgate, E.C.2. London Wall 1176. Kushagram, London.
Godfrey (Radio) Ltd., F. E., 63/7, Chenies Mews, Francis Street, London, W.C.1. Museum 8134.
Goodman Instrument Co., 99, Old Street, E.C.1. Clerk. 9180.
Goodmans, 69 and 97, St. John Street, Clerkenwell, London, E.C.1. Clerkenwell 3838-9.
Goodwin Radio, Ltd., 395, St. John Street, E.C.1. Clerkenwell 5992.

MANUFACTURERS' SECTION

Gordon, Fredk. J., and Co., Ltd., 92, Charlotte Street, W.1. Mus. 3811. Normalcy, Eusroad, London.

Gorman Radio Electric Service Depot, 132, Manchester Road, Lomeshaye, Nelson.

Gould, Harper and Co., Ltd., Fleets Bridge, Upton Road, Poole. Poole 7.

Goulden, Ltd., H. J., 36, 39, 40, High Street, Canterbury. Canterbury 139. Goulden's, Canterbury.

Grabow, D., 45, Litchfield Way, Golders Green, London, N.W.11. Speedwell 3344. Dagrabow, Gold, London.

Graham and Co., R. F., Norbiton Engineering Works, 45 and 47, Cambridge Road, Kingston.

Graham Farish, Ltd., 153, Masons Hill, Bromley, Kent. Ravensbourne 3377-8. Grafar, Bromley.

Gramo Depot, 57, Gray's Inn Road, W.C.1 Holborn 8325.

Gramophone Co., Ltd., 363-367, Oxford Street, W.1. Mayfair 1240. Jabberment, Wesdo, London. Factories: Hayes, Middlesex. Southall 2468.

Gramo-Radio, Ltd., Commercial Works, Blackburn Road, Church, Lancs. Accrington 2576.

Grampian Reproducers, Kew Gardens, Surrey, Richmond 3610.

Grayson and Co., Campo Lane, Sheffield. Sheffield 20703 and 70679. Grayson 20703, Sheffield.

Great Western Radio Co., 15, Great Western Road, London, N.9. Abercorn 2284.

Greatrex and Co., R. G., 184, Regent Street, London, W.1. Regent 3575.

Green, A. W., 70, High Holborn, London, W.C.1. Chancery, 7004.

Green and Faulconbridge, Ltd., 11, Queen's Road, Coventry. Coventry 3543.

Green, David and Son, Albert Street, Lytham. Lytham 199. Energy, Lytham.

Green's Wireless Stores, 94-6, Hurst Street, Birmingham. Midland 3750.

Greengate and Irwell Rubber Co., Ltd., Greengate, Salford, Manchester. Blackfriars 5652. Sincolor, Manchester.

Gresley Radio, Ltd., Oldshall Lane Works, Salford, Manchester. Blackfriars 6961.

Gre-Solvent Co., Leeds. Leeds 27441. Perco, Leeds.

Griffiths Bros., and Co. (London), Ltd., Macks Road, Bermondsey, S.E.16. Bermondsey 1151-3, Aquol, Phone, London.

Gripso Co., 32, Victoria Street, S.W.1. Victoria 2433. Unmuzzled, Vic.

Groombridge (Sidcup), Ltd., 10, Clare Terrace, Sidcup. Sidcup 378. Groombrig, Sidcup.

Grosvenor Electric Batteries, Ltd., 2-3, White Street, Moorgate, E.C.2. Metropolitan 6866-8. Works, Watford.

Groves Bros., St. Mary's Place, Shrewsbury. Shrewsbury 2415.

Guillaume and Sons, Ltd., Riverside Needle Works, Alcester. Alcester 81. Guillaume, Alcester.

Guiterman and Co., Ltd., S., 35, Aldermanbury, E.C.2. Metropolitan 8074. Guiterman, Phone, London.

H

Hacker and Sons, H., Perfecta Works, Ray Lea Road, Maidenhead, Berks. Maidenhead 1211.

Halford Radio, Ltd., 39, Sackville Street, London, W.1. Regent 7136-7. Julhalford, London.

Hall, H., Navigation Street, Walsall. Walsall 2030.

Hambling, Ltd., A. W., 15-16, Alfred Place, London, W.C.1. Museum 7651-3.

Hampton Radio, Ltd., 1-3, Vicarage Road, Hampton, Middlesex. Kingston 6306.

Hanson, Scott and Co., Ltd., Stockport. Stockport 664. Scott, Stockport.

Harding and Co., Ltd., A. F., 115, Exmouth Street, Stepney, E.1. East 3024. Dyeing, E.D.O., London.

Harlie, Ltd., Cambridge Arterial Road, Enfield, Middlesex. Enfield 3431-2.

Harmo Products, 46a, Hoe Street, London, E.17. Walthamstow 1193.

Harmonic Radio Co., Goldsmith Place, Nottingham. Nottingham 45320. Harmonic Radio, Nottingham.

Harris and Co. (Birmingham), Ltd., A. E., 95, Camden Street, Birmingham. Central 1181.

Harris, G. and R., Anderton's Square, Whittall Street, Birmingham. Central 3215.

Harrison, A. T., and Co., Kintore Works, Bermondsey, S.E.1. Bermondsey 1155.

Harrison and Norris, Radio House, 75, Parade, Leamington Spa. Leamington Spa 279. 51, Bedford Street, Leamington Spa.

Hart Bros. Electrical Mfg. Co., Ltd., Queensway, Ponders End, Middlesex. Enfield 1880-1 Harbros, Enfield.

Hart Collins, Ltd., 38a, Bessborough Street, Westminster, S.W.1. Victoria 3738. Gilboyding, Churton, London.

Hartley and Co., A., 37, Standish Street, Burnley, Burnley 3380.

Haslam and Newton, Ltd. (formerly Newton Bros. (Derby), Ltd.), Alfreton Road, Derby. Derby 777-9 Dynamo Derby. Dynamo, Derby, England.

Havenhand, Lewis and Co., Kingsley Works, Young Street, Sheffield. Sheffield 23788.

Haynes Radio, 75, Hatton Garden, London, E.C.1. Chancery 8023.

Healey, Ltd., P., 239-241, Gt. King Street, Birmingham. North 1835. Perceal.

Healey Mouldings, Ltd., 239-241, Gt. King Street, Birmingham. North 1835. Perceal.

Heayberd and Co., F. C., 10, Finsbury Street, E.C.2. Metropolitan 7516-7. Heayberd, Finsquare, London.

Hellesens, Ltd., Hellesen Works, Morden Road, S. Wimbledon, London, S.W.19. Liberty 2404. Hellesens, Toot, London.

Hemelik, J., 8, Cullingworth Road, N.W.10. Gladstone 3033.

Henderson and Co., D. M., Ltd., 45, Hatton Garden, E.C.1. Holborn 6874. Wedgeful, Smith, London. Wedgeful, London.

Henrion Carbons, Ltd., 19, Grosvenor Place, S.W.1. Sloane 2247.

Hercus Mfg. Co., 56a, Woodhouse Street, Leeds. Leeds 24917.

Hewitt, A. J., 21, South Street, Greenwich, S.E.10. Greenwich 2242.

Hicking, H. B., 6, Albemarle Street, Beckenham, Kent. Beckenham 2638.

Higgs Motors, Witton, Birmingham. East 1181. Higswiton, Birmingham. 6, Dudley House, Southampton Street, Strand, London, W.C.2. Temple Bar 4616. 47, Corporation Street, Manchester, Blackfriars 8800. 74, York Street, Glasgow, C.2. Central 5863. 7, Unity Street, College Green, Bristol. Bristol 24902.

Hightensite (1930), Ltd., Normandy Works, Normandy Street, Custom House, E.16. Albert Dock 1157. Hitensite, Vicdoc.

Hildick and Hildick, Walsall Tube Works, Pleck Road, Walsall. Walsall 2123. Hildick. 'Phone, Walsall.

Hilger, Ltd., Adam, 98, Kings Road, London, N.W.1. Gulliver 5426. Sphericity, Phone, London. Sphericity, London.

Hill, Ltd., Ernest, H. Beta Works, 56, Broomhall Street, Sheffield. Sheffield 23019. Inflator, Sheffield.

Hill and Co., F. C., 154, Compton Road, Wolverhampton. Wolverhampton 22259.

Holmes, A. W., 27, Foley Street, Great Portland Street, London, W.1.

Holmes Bros., (London), Ltd., Howard Works, Billet Road, Walthamstow, E. 17. Walthamstow 1340-1. Dogfish, Phone, London. Dogfish, London.

Holzman, Louis, Ltd., Spencer House, South Place, London E.C.2. National 4500.

Horstmann Gear Co., Ltd., Newbridge Works, Bath. Weston Bath 7241-2. Horstmann, Bath.
Hounslow and Co., C., 96a, Coleridge Street, Hove. Brighton 4878. Hovoware, Phone, Hove.
Howard, Butler, Ltd., Crown Works, Lincoln Road, Walsall. Walsall 4085. Instrument, Walsall.
Howard, Thomas and Co., Ltd., Morley House, 320, Regent Steet, W.1. Langham 4231.
Hughes and Co., Ltd., F. A., 204-6, Great Portland Street, W.1. Museum 8630. Distancing, Wesdo, London. Distancing, London.
Hunter and Co., H. K., Phœnix Radio Works, Phœnix Lane, Dunfermline. Dunfermline 140.
Hustler, Simpson and Webb, Ltd., 317, Hoe Street, Walthamstow, London, E.17. Walthamstow 2535-6-7. Twycetwo, Walt, London.
Hyatt and Co., Ltd., J., Ento Works, De Beauvoir Road, London, N.1. Clissold 7635-6.
Hyde and Telford, 10-14, Eccleston Place, S.W.1. Sloane 5000.
H. and B. Radio Co., 4, Upper James Street, Golden Square, London, W.1. Gerrard 2834.
H.C.H. Co., The, 2, John Street, Harrogate. Harrogate 3723.
H.S.P. Wireless Co., Langford Works. Weston-super-Mare. Weston-super-Mare 1324. Sales Department, Weston-super-Mare, 620. H.S.P. Wireless, Weston-super-Mare.

I

Igranic Electric Co., Ltd., 149, Queen Victoria Street, E.C.4. Central 7123. Igranic, London. 73-74, Exchange Bldgs. B'ham. 1, Small Street, Bristol. 50, Wellington Street, Glasgow. Standard Buildings, Leeds. 30, Cross Street, Manchester. 90, Pilgrim Street, Newcastle.
Imp Radio Co., 33a, Edith Road, Nunhead, London, S.E.15. New Cross 2391.
Imperial Cabinet Co., 18, Summerhill Street, Birmingham.
Imperial Chemical Industries, Ltd., Cunard Building, Liverpool. Bank 9280. Impkem, Liverpool.
Impex Electrical, Ltd., 538, High Road, Leytonstone, E.11. Leytonstone 2328. Dariolect, Leytonstone, London.
Improved Radio Co., Church Road, Egham, Surrey. Egham 96.
Improved Wilson Microphone and Electrical Co., Ltd., 16, Prince of Wales Terrace, Chiswick, London, W.4. Chiswick 6235.
Incorporated Radio Society of Great Britain, 53, Victoria Street, London, S.W.1. Victoria 4412.
India-rubber, Gutta-Percha and Telegraph Works, Ltd., Aldwych House, Aldwych, London, W.C.2. Holborn 8461.
Inductor, Ltd., 70, New Oxford Street, London, W.1.
Indurite Agency, Ltd., 7-9, St. James Street, S.W.1. Whitehall 7795.
Innes, D. and G., 8, Deanhaugh Street, Edinburgh. Edinburgh 23667.
Insulators, Ltd., Derby Road Works, Montague Road, Edmonton, London, N.18. Tottenham 4256.
Invicta Spring Co., Ltd., Wentworth Street, Sheffield. Sheffield 24972. Mainspring, Sheffield.
Ioco Rubber and Waterproofing Co., Ltd., Netherton Works, Anniesland, Glasgow, W.3. Scotstoun 2201.
Ionic Alkaline Batteries, Ltd., 26, High Street, Stratford, London, E.15. Maryland 3291.
Itonia, Ltd., 58, City Road, E.C.1. Clerkenwell 2033. Overturish, Finsquare, London. 44, Wellington Street, Leeds. Leeds 30081–2. Overturish, Leeds. 17, Commercial Road, Portsmouth. Portsmouth 2411–2. Overturish, Portsmouth.
Ivory Electric, Ltd., 18, Wall Street, London, W.1. Gerrard 2378.

J

Jaccard, L. E., 17, 19, 21 and 23, Clerkenwell Road, E.C.1. Clerkenwell 8576. Jaccardwel Smith, London. Jaccardwel, London.
Jackson Bros. (London), Ltd., 72, St. Thomas Street, S.E.1. Hop 1837. Walfilco, Boro'l London.
Jackson Bell Distributors, Ltd., 68, Victoria Street, S.W.1. Victoria 4671. Voxbertius, Sowest, London.
Janes and Co., W. H., 202, Dale Street, Chatham.
Jarvis & Co., M. H., Corelli Works, Coombe Martin, N. Devon.
Jeacock, W., 14, Gloucester Street, Clerkenwell, E.C.1. Clerkenwell 1725.
Jeb Trading Co., 49, Avenue Road, Acton, W.3. Acorn 2286–7. Jetraco, Act, London.
Jelectro Laboratories, 72, Bartholomew Close, E.C.1. National 0606.
Jewel Pen Co., Ltd., 21 and 22, Gt. Sutton Street, E.C.1. Clerkenwell 3326. Calstylo, London.
Jobling and Co., Ltd., J. A., Wear Glass Works, Sunderland. Sunderland 2882–3. Greener, Sunderland.
Johnson, Mathey and Co., Ltd., 78, Hatton Garden, E.C.1. Holborn 6989. 71, Viltoria Street, Birmingham. Central 6726.
Johnson and Phillips, Ltd., Charlton, London, S.E.7. Greenwich 0400. Juno, London.
Johnson, W., Radio Corner, Esplanade, Lerwick, Shetland, N.B. Lerwick 130. Johnson, Radio Corner, Lerwick.
Johnson Talking Machine Co., Ltd., Academy House, 96, Clerkenwell Road, E.C.1. Clerkenwell 3501–6. Jotamaco, Smith, London.
Johnstone, C. G., 154, Southwark Bridge Road, London, S.E.1.
Jones, Edwin, 62, Duke Street, Liverpool.
Jones and Sons, Ltd., William, Cecil Street Foundry, Birmingham. Aston Cross 5203–4. Malleable, Birmingham.
Joseph, H., 11, Red Lion Square, W.C.1. Chancery 8770. Lockabinet, Holb, London. Lockabinet, London.
Junction Engineering Co., Ltd., 149A, Junction Road, Highgate, N.19. Archway 3811.
Junit Mfg. Co., Ltd., Junit Works, Steele Road, Chiswick, W.4.
J. B. Mfg. Co. (Cabinets), Ltd., Gainsford Road, Walthamstow, London, E.17. Walthamstow 2833.

K

Kalisky (Aldgate), Ltd., S., 146, Theobald's Road, London, W.C.1. Museum 8446–7–8. Wanie-Blade, Holb, London. 16, Withy Grove, Manchester. Blackfriars 4054. Wanie-Blade, Manchester.
Kay Brothers, Ltd., St. Petersgate, Stockport. Stockport 2247. Kay, Stockport.
Keith Prowse and Co., Ltd., 159, New Bond Street, W.1. Regent 6000 (12 lines). Stalls, Wesdo, London.
Kemp's Vulcanizing Co., Ltd., 69, Hardman Street, Manchester. Central 1473–4. Kempoleum, Manchester.
Kent Bros.' Electric Wire Co. and E. H. Phillips, Ltd., Kew Works, Mortlake Road, Kew Gardens, Surrey. Prospect 1032–3. Encosil, Richmond Surrey.
Kent, W. H., 66, Hatton Garden, E.C.1. Holborn 1642.
Kenwell Radio, Ltd., 200, City Road, London, E.C.1. Clerkenwell 3326 and 5746. Vrocordmer, Isling, London.
Kestrel Radio Supply Co., 18, Fairfield Road, Higham Hill, Walthamstow. Walthamstow 2862.
Kimber, Allen and Co., Myron Place, Lewisham, London, S.E.13. Lee Green 3491.
Kingstophone Co., Ltd., 91, Tottenham Court Road, W.1. Museum 1816, 6061–2, 9776.
Kniveton, F., 78, London Road, Enfield, Middlesex. Enfield 3097.
Knopf, A., 25, Waterloo Road, S.E.1. Hop 1884. Curaturum, Watloo, London.

MANUFACTURERS' SECTION

Kohn, B. E., 112, Wood Street, E.C.2. National 0904. Brunkopens, Cent, London.
Kolster-Brandes, Ltd., Cray Works, Sidcup, Kent. Sidcup 1188-93. Kolster, Phone, Sidcup. Matchtone, Sidcup.
Kone-Dope Co., 1, Plashet Road, Upton Park, E.13. Maryland 4685.

L

Laker Co., Ltd., J. and J., Kent House Road, Beckenham, Kent. Sydenham 3721. Lakerco, Beckenham. Jaylakerco, London.
Lamparex Electrical Supply Co., 3, Dyers Buildings, Holborn, E.C.1. Holborn 4442.
Lamplugh, Ltd., S. A., Little Park Street, Coventry. Coventry 2057–8. Woodlam, Phone, Coventry.
Lancashire Dynamo and Crypto, Ltd., Trafford Park, Manchester. Trafford Park 2161–2166. Ironclad, Manchester. Acton Lane, London, N.W.10. Willesden 6363. And at Birmingham, Leeds, Nottingham, Sheffield.
Lancashire Ignition Co., Ltd., 288, Deansgate, Manchester. Central 7342.
Lanchester Laboratories, Ltd., Spring Road, Tyseley, Birmingham. Acocks Green 1404. Lanlab, Birmingham.
Lang and Squire, Ltd., Wales Farm Road, Acton, W.3. Acorn 0493. Lang Squire, Acton.
Lathwood, J., 3, Maidstone Road, Bowes Park, N.11.
Lawrence, Percy Harold, 38, Market Street, and Aldergate, Tamworth. Tamworth 70. Lawrence, Tamworth.
Lawson and Raphael, 137, Regent Street, London, W.1. Regent 4424. Lighters, Piccy, London.
Lawwol Co., 144, Theobald's Road, London, W.C.1. Holborn 6457.
Le Carbone Co., Ltd., Coventry House, South Place, E.C.3. National 4536. Lacombe, Ave, London. Battery Works, Portslade, Sussex.
Lectro Linx, Ltd., 254, Vauxhall Bridge Road, S.W.1. Victoria 3541–2. Trolinx, Churton, London. Trolinx, London.
Lee, A. T., Alvaston, Derby. Derby 381.
Lee-Castle Co., 160, Highgate Road, Sparkbrook, Birmingham.
Lehmann, Archer and Co., Ltd., 5, Farringdon Road, E.C.1. Holb 1434 and 6256. Tapsandies, London.
Leibovici, J., 7, Banner Street, Bunhill Row, London, E.C.1. Clerkenwell 6601.
Lesingham, F. L., 13, Victoria Street, S.W.1. Victoria 2919. Lesingham, Sowest, London.
Lever (Trix), Ltd., Eric J., 8–9, Clerkenwell Green, E.C.1. Clerkenwell 3014-5. Trixadio Smith, London. 5, Evans Terrace, Trealaw, Glam.: 50, Wellington Street, Glasgow.
Lewis, S. W., and Co., Ltd., 3, Furlong Road, Holloway Road, London, N.7. North 2483. Eslewicoy, Nordo. Eslewicoy, London.
Lichtenberg, M., 4, Gt. Queen Street, London, W.C.2. Holborn 8687.
Lilley and Son, Ltd., S., 80, Alcester Street, Birmingham. Midland 2385. Biron, Birmingham. Mid. 2385. Uncedus, Birmingham.
Limit Engineering Co., Ltd., 15–29, Windsor Street, Essex Road, N.1. Clerkenwell 2721–2. Gramolimit, Nordo, London.
Limit Radio, Ltd., 15–29, Windsor Street, Essex Road, N.1. Clerkenwell 2723. Gramolimit, Nordo, London.
Line and Co., F., Old Mill Works, Birmingham. Central 5336. Linco.
Lion Spring Co., Broadwell Road, Oldbury, near Birmingham. Oldbury 73.
Lisenin Wireless Co., 66, Newman Street, London, W.1. Museum 6064. Posgrip, Rath, London.
Lissen, Ltd., Lissenium Works, Worple Road, Isleworth, Middlesex. Hounslow 2361 (12 lines). Lissenium, Phone, London. Lissenium London.
Lithanode Co., Ltd., 190, Queen's Road, Battersea. Macaulay 4541–2. Lithanode, Battpark, London.
Litholite Insulators, Ltd., 55–7, Hackney Grove, E.8. Amherst 3992. Litho ite, London.
Liverpool Radio Supplies, 64, Myrtle Street, Liverpool Royal 1567.
Lock, Ltd., W. and T., St. Peter's Works, Bath. Bath 2396. Kabilok, Bath. 11, Red Lion Square, London, W.C.1. Chancery 8770. Lockabinet, Holb, London.
Loewe Radio Co., Ltd., Fountayne Road, Tottenham, N.15 Tottenham 3911–2. Loewerad, Southtot, London. Loewerad, London.
London Aluminium Co., Ltd., Westwood Road, Witton, Birmingham.
London Electric Wire Co. and Smiths, Ltd., Church Road, Leyton, E.10. Leytonstone 3636. (10 lines). Lewcos, Phone, London.
London Electrical Co. (Sherborne Lane), Ltd., 1, Sherborne Lane, King William Street, London, E.C.4. Mansion House 6201-2-3. Electa, Phone, London. 23. College Hill, E.C.4. 35, Arch, Gt. Suffolk Street, S.E.1.
London Metal Warehouses, Ltd., 27, Victoria Street, Westminster, London, S.W.1. Vic. 3631-2. Stebraware, Sowest, London. Works and warehouse, Hill Street, Pocock Street, London, S.W.1. Hop 6992.
London Radio Electric Co., Hazelwood Works, Fortis Green, East Finchley, London, N.2. Tudor 4660.
London Super Cabinet Co., 35-37, Wadeson Street, Cambridge Road, Cambridge Heath, E.2. Clissold 9050.
London Zinc Mills, Ltd., 23, Wenlock Road, London, N.1. Clerkenwell 4324.
Londona, Ltd., 66, Hatton Garden, E.C.1. Holborn 5713.
Longley Radio Manufacturing Co., 63, Longley Road, Harrow, Middlesex.
Longton and Co., H., Joseph's Road, Guildford. Guildford 1316. Indsupply, Guildford.
Lorival Mfg. Co. (1921), Ltd., Norwood Works, Southall, Middlesex. Southall 1014 (2 lines). Lorinsulor, Phone, Southall.
Losonczi, E., Grosvenor Works, 113, Cottenham Road, Holloway, London, N.19.
Lotus Radio, Ltd., Lotus Works, Mill Lane, Old Swan, Liverpool. Old Swan 1493-4. Loradcoil, Liverpool.
Loudspeaker Engineering Co., Ltd., Gt. Western Street, Aylesbury, Bucks. Aylesbury 357.
Lugton and Co., Ltd., 203, Old Street, London, E.C.1. Clerkenwell 0257. Maxitone, Finsquare, London. 161, Howard Street, Glasgow. Central 5602.
Lundberg and Sons, Ltd., A. P., 477-489, Liverpool Road, London, N.7. North 1746. Lundberg, London.
Lustrolux, Ltd., Lower House Mills, West Bollington, Macclesfield. Bollington 81. Lustrolux, Bollington.
Lyons, Ltd., Claude, 76, Oldhall Street, Liverpool. Central 4641. Minmetkem, Liverpool. 40, Buckingham Gate, Westminster, London, S.W.1. Victoria 7595. Minmetkem, Sowest, London.
L.P.S. Electrical Co., Ltd., Ealing Road, Alperton, Wembley. Perivale 5621. Engineyor, Phone, London.
L. S. Units, 46A, Lonsdale Road, Barnes, London, S.W.13. Riverside 3220.

M

Macintosh Cable Co., Ltd., Derby. Derby 2306. Macintosh, Derby.
Mackintosh and Co., E. V., London Road, West Malling, Kent.
McLeod and McLeod, 329, High Holborn, W.C.1. Chancery 8696-7. Macleodius, Holb, London. Macleodius, London.
McMichael, Ltd., L., Wexham Road, Slough, Bucks. Slough 441-2-3. Radiether, Slough. 179 and 265, Strand, London, W.C.2. Temple Bar 6988 and Holborn 2466.

McMillan and Co., J., Clun House, Surrey Street, Strand, W.C.2. Temple Bar 8250. Elektriken, Estrand, London.
McNeill and Co., Ltd., F., 52, Russell Square, W.C.1. Museum 9016. Eyeball, London.
McWhirr, Paterson and Co., Keens Yard Engineering Works, St. Paul's Road, Highbury, N.1. North 1134.
Maestro Radio, 1A, Oxford Road, Kilburn. Maida Vale 4737.
Maestrophone Radio Gramophone and Wireless Co., Halesowen, near Birmingham. Halesowen 1330. Maestrophone Co., Halesowen.
Magnacore, Ltd., Magnacore Works, 57, James Street, Camden Town, London, N.W.1.
Magnavox (Great Britain), Ltd., 89, Kingsway, London, W.C.2. Holborn 6468. Magnavox, Westcent, London. Magnavox, London.
Magnetic and Electrical Alloys, Ltd., Lancelot Road, Wembley, Middlesex. Wembley 4933 Magnetic, Wembley.
Mains Power Radio, Ltd., Broadway Works, Eastern Road, Romford, Essex. Romford 338.
Mains Radio Gramophones, Ltd., Vaughan Street, Bradford. Bradford 6795. Emmaghee, Bradford.
Mains Radio Mfg. Co., 103A, Parchmore Road, Thornton Heath, Surrey. Livingstone 1164.
Maisner and Co., Ltd., E. H., 4, Attneave Street, Farringdon Road, E.C.1. Clerkenwell 2026. Maisner, Smith, London.
Majestic Electric Co., Ltd., Majestic Works, Tariff Road, Tottenham, N.17. Tottenham 4461-2-3. Majestelec, Tottlane, London.
Mall Radio and Electric, Ltd., 7/8, Little Turnstile, Holborn, London, W.C.1. Holborn 9036.
Mansell and Ogan, Ltd., Power Road, Gunnersbury, London, W.4. Chiswick 6386.
Manuwares Co., 79, Lots Road, Chelsea, London, S.W.10.
Marconiphone Co., Ltd., Radio House, 210-212, Tottenham Court Road, London, W.1. Museum 4144. Marconifon, Rath, London. Registered office and factories, Hayes, Middlesex. Marconifon, Hayes, Middlesex. Southall 2468—Service Depots: 10, West Campbell Street. Glasgow Central 1109. Marconifon Glasgow.—10, Dolefield, off Deansgate, Manchester. City 8671-2. Marconifon, Manchester.—13, St. Andrew Lane, Trinity Street, Dublin. Dublin 22095. Radvalve, Dublin.
Marconi's Wireless Telegraph Co., Ltd., Marconi House, Strand, London, W.C.2. Temple Bar 4321. Expanse, Estrand.
Margolin, J. and A., 112 to 116, Old Street, E.C.1. Clerkenwell 5528.
Marks and Son, S., Oval Works, 57, James Street, N.W.1. Gulliver 5166. Metcrafts, Norwest, London.
Marlborough Radio Co., Ltd., Primrose Mill, Primrose Bank, Ashton Road, Oldham. Main 4713.
Martin and Co., F. R., 44, Edgbaston Street, Birmingham.
Mason, E., 44, East Road, London, N.1 Clerkenwell 9096.
Master Radio Co., 102-105, Shoe Lane, London, E.C.4. Central 2279.
Maul and Murphy, Ltd., 21-22, Chapel Street, Milton Street, E.C.2. National 2372. Centuplico, Barb, London.
Mavis Radio Mfg. Co., Ltd., 77, Woodside Terr. Lane, Glasgow.
Mavox All-Electric Radio, 17, Maddox Street, Regent Street, London, W.1. Mayfair 5621.
Mechanical Utilities Co., Ltd., 57, Praed Street, Paddington, W.2. Paddington 0251.
Melbourne Radio Supply, Norwood Bldgs., Hoe Street, Walthamstow, London, E.17. Walthamstow 1062.
Mellow Tone Co., Ltd., The, 1c, Stebbing Street, Latimer Road, London, W.11. Park 7976.
Meridian Electric Co., Baltic Chambers, 50, Wellington Street, Glasgow. Central 3338.
Merrington Bros., Ltd., India Pavilion, Exhibition Grounds, Wembley. Wembley 3116.
Metropolitan Lighting Co., Ltd., 25, Atlantic Road, S.W.9. Brixton 1535.
Meyer and Co., E., 66, Newman Street, London, W.1. Museum 3706.
Mic Wireless Co., White Horse Place, Market Street, Wellingborough. Wellingborough 98. Mic, Wellingborough.
Mica Mfg. Co., Ltd., Volta Works, Bromley, Kent. Ravensbourne, Micamanu.
Micanite and Insulators Co., Ltd., Empire Works, Blackhorse Lane, Walthamstow, London, E.17. Walthamstow 2001.
Michelson Bros., Mark Lane Station Buildings, London, E.C.3. Royal 9056.
Microfuses, Ltd., 36, Clerkenwell Road, London, E.C.1. Clerkenwell 4049. Microfuses, Clerkenwell 4049.
Micro-Perophone and Chromogram, Ltd., 76-78, City Road, E.C.1. Clerkenwell 3200.
Midgley-Leighton, Ltd., Wembley Hill Estate, Wembley, Middlesex. Wembley 4690. Midgleigh, Wembley.
Midland Electric Wire Co., Ltd., Lutterworth. Lutterworth 8. Conductors.
Mile End Radio Co., 358A, Commercial Road. Mile End Place, Portsmouth. Portsmouth 3233. Renown, Portsmouth.
Millar and Son, J. S., Annan, Scotland. Annan 38.
Millet, J., 39, Farringdon Road, E.C.1. Holborn 0293 and 4299. Alembic, Smith, London.
Milnes Radio Co., Cottingley Bridge, near Bingley, Yorks. Bingley 500. Milnes Radio, Bingley.
Miscellaneous Trading Co., Ltd., 13-17, New Oxford Street, London, W.C.1. Holborn 4894.
Money Hicks, Ltd., 100, Hackford Road, S.W.9. Reliance 3124.
Montague Radio Inventions and Development Co., Ltd., Beethoven Works, Gt. College Street, Camden Town, N.W.1. North 4046-7-8.
Morgan Crucible Co., Ltd., Battersea Works, Church Road, S.W.11. Battersea 2250.
Morogoro Trading Corporation, Ltd., 12, Union Court, Old Broad Street, London, E.C.2. London Wall 8236. Morogoro, Stock, London.
Mortley, Sprague and Co., Ltd., Nelson Road, Tunbridge Wells. Tunbridge Wells 159.
Morton, Ltd., E. R., 22, Bartlett's Buildings, Holborn Circus, E.C.4. Central 8867.
Morton and Co., Ltd., R., Mappin Buildings, Norfolk Street, Sheffield. Sheffield 23905.
Moulding Developments, 34, Victoria Street, London, S.W.1. Victoria 4571.
Mountford Rubber Co., Ltd., 13, Weaman Street, Birmingham. Central 1657. Nipples, Birmingham.
Muirhead and Co., Ltd., Elmers End, Beckenham, Kent. Beckenham 0041. Muirheads, Elmers End.
Mullard Radio Valve Co., Ltd., Nightingale Works, Nightingale Lane, Balham, S.W.12. See Mullard Wireless Service Co., Ltd. Battersea 3368. Emvalco, Phone, London.
Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, W.C.2. Gerrard 7733. Radiovalve, Westcent, London.
Muller and Co. (England), Ltd., Sphinx Works, Chase Road, Park Royal, London, N.W.10. Willesden 7282-3.
Multitone Electric Co., Ltd., 95-8, White Lion Street, London, N.1. North 5063. Multonelec, Isling, London.
Murdoch Trading Co., 59-61, Clerkenwell Road, London, E.C.1. Clerkenwell 6144. Putiel-Smith, London. 64, Edgbaston Street, Birmingham. 38, Charles Street, Cardiff. 7, Biggmarket, Newcastle-on-Tyne. 79, Dunlop Street, Glasgow. Woodcock Street, Castle Cary, Somerset.
Murphy Radio, Ltd., Broadwater Road, Welwyn Garden City, Herts. Welwyn Garden 800.
Musikon, Ltd., 17, Lisle Street, Leicester Square, London, W.C.2.
M.C.L. and Repetition, Ltd., Pool Lane, Langley, Birmingham. Broadwell 1115. Karlyteko, Langley, Worcs.
M.O. Valve Co., Ltd., Osram Works, Brook Green, Hammersmith, W.6. Riverside 3431. Thermionic, Phone, London.
M.P.A. Wireless (1930), Ltd., 62, Conduit Street, Regent Street, W.1. Regent 5131. Ethatrope, Piccy, London.

MANUFACTURERS' SECTION

N

Nash Products, 93, Victoria Road, Stechford, Birmingham. Stechford 2472.
Nassak Manufacturing Co., Ltd., 85, Chiswell Street, London, E.C.2. Metropolitan 5557.
National Accumulator Co., Ltd. (Incorporating Peto and Radford and Hart Accumulator Co., Ltd.), 50, Grosvenor Gardens, S.W.1. Sloane 6368. Nationaccu, Sowest, London. 107A, Pimlico Road, London S.W.1. 29, Bury Street, Salford, Manchester. 158, Clyde Street, Glasgow.
National Radio Service Co., 15-16, Alfred Place, Tottenham Court Road, London, W.C.1. Museum 7651.
Neill and Co. (Sheffield), Ltd., James' Composite Steel Works, Napier Street, Sheffield. Sheffield 24371-2-3. Composite Phone.
Neophone Engineering Co., 8, Garrick Street, W.C.2. Temple Bar 1039.
Neutron (1927), Ltd., 54, Lamb's Conduit Street, London, W.C.1. Holborn 6455. Veezed, Holb, London.
New London Electron Works, Ltd., East Ham, E.6. Grangewood 1408-9 and 1363. Stannum, London.
Newtons of Taunton, Ltd., 319, Regent Street, London, W.1. Langham 4311. Guidepost, Wesdo.
Nicklin and Co., Ltd., J., 166, Gt. Charles Street, Birmingham. Central 1389.
Nixon and Sons, J., 13, Clerkenwell Green, E.C.1. Clerkenwell 2803-4.
Noebel Chemical Finishes, Ltd., Slough, Bucks. Slough 528 (10 lines). Belco, Slough.
No-Mast Plate Aerial Co., 110, Singleon Avenue, Birkenhead.
North Eastern Instrument Co., Durham Road, Low Fell, Gateshead-on-Tyne. Low Fell 76654. Instrument Co., Lowfell.
North London Valve and B.U.R.T.S., Ltd., 2A, Yonge Park, Finsbury Park, N.4. North 0984. Monomark, B.C.M./B.U.R.T.S., London
Northampton Plating Co., St. Giles Street, Northampton. Northampton 2130.
Nuvolion Electrics, Ltd., Meredith Yard, Park Crescent, Clapham Park Road, London, S.W.4. Macaulay 4294.

O

O'Brien, Ltd., T., Slater Street Factory, Liverpool. Royal 1398.
Octron, Ltd., Phœnix Works, Tyburn Road, Erdington, Birmingham. Birmingham 1291. 7, Duke Street, Adelphi, London, W.C.2. Temple Bar 1693.
Oldham and Son, Ltd., Denton, near Manchester. Denton 2431. Oldhams, Denton. 40, Wicklow Street, King's Cross, London, W.C.1. Terminus 4446. Shurestart, London.
Olympia Radio, Ltd., 49A, Shudehill, Manchester. Blackfriars 9128.
Oppenheim and Co., Ltd., E., 3, Finsbury Square, London, E.C.2. Metropolitan 1607. Hukabuk, Finsquare, London.
Ormond Engineering Co., Ltd., Ormond House, Rosebery Avenue, Clerkenwell, E.C.1. Clerkenwell 5334-6—9344-6. Ormondengi, Isling.
Orr Radio, Ltd., 63, Lincoln's Inn Fields, London, W.C.2. Holborn 7791.
Osborn, C. A., The Regent Works, Arlington Street, Islington, London, N.1. Clerkenwell 5095. 21, Essex Road, Islington, N.1. Clerkenwell 5634.
Overseas Receivers, Ltd., 18, Ganton Street, Regent Street, W.1. Regent 3462-3.
O.V. Aerial Co. (1931), 3, Stockwell Green, London, S.W.9. Brixton 6874.

P

Pandona, Ltd., 184, Aston Road, Birmingham. Aston Cross 2472.
Paramount Gramophone Co., 9, Fitzroy Square, London, W.1. Museum 4025.
Park Royal Engineering Co., Ltd., Cumberland Avenue, Park Royal, London, N.W.10. Willesden 2223, 2224 and 4715. Isobar, Phone, London.
Parlophone Co., Ltd., 102, Clerkenwell Road, London, E.C.1. Clerkenwell 7620. Parlocord, Finsquare.
Paroussi, E., 10, Featherstone Buildings, High Holborn, W.C.1. Chancery 7010. Chancery Phone 7010.
Partridge and Mee, Ltd., 74, New Oxford Street, W.C.1. Museum 5070.
Partridge, Wilson and Co., Davenset Works, Evington Valley Road, Leicester. Leicester 24612. Davenset, Leicester. 200, St. Vincent Street, Glasgow. Central 4015. Davenset, Glasgow.
Patent Die-Casting Co., Ltd., 64, Strode Road, N.W.10. Willesden 0733.
Patton, Ltd., David J., Colwell Road, London, S.E.22. Sydenham 2544. Davipatt, Eastdue, London.
Paull's Wireless Stores, 43, Caroline Street, and 81, St. Mary Street, Cardiff. 196, Dock Street, Newport, Mon.
Peace, Henry, Ltd., Lloyd Street Works, Wednesbury, Staffs. Wednesbury 0082. Peace, Ltd., Wednesbury. 320, Regent Street, London, W.1. Langham 4231.
Pearson Bros. and Co., 90, Victoria Street, London, S.W.1. Victoria 8078. Church Avenue, Cotton Street, Poplar, London E.14. East 6408 and 5147.
Pegasus, Ltd., Low Mills, Nussey Mill Lane, Lower Wortley, Leeds. Armley 38901.

Peke Distributing Co., 721, North Circular Road, N.W.2. Gladstone 2319.
Pepper, T., 48, Wake Green Road, Moseley, Birmingham.
Perfectavox, Ltd., Alexandra Works, High Street, Yeadon, near Leeds. 2, Bond Place, Leeds. Rawdon 308. Perfectavox.
Perks and Co., H., The Foundry, South Harrow. Byron 3011.
Person and Son, L., 63, Shaftesbury Street, London, N.1. Clerkenwell 7139.
Peto-Scott Co., Ltd., 77, City Road, E.C.1. Clerkenwell 9406. 62, High Holborn, W.C.1.
Philco Radio and Television Corporation of Great Britain, Ltd., 1, Argyll Street, London, W.1. Gerrard 3671.
Philips Industrial, 145, Charing Cross Road, London, W.C.2. Gerrard 7777. Phildustry, Westcent, London.
Philips Lamps, Ltd., 145, Charing Cross Road, W.C.2. Gerrard 7777. Phillamps, Westcent, London; Phillamps, London. 30, Handyside Arcade, Percy Street, Newcastle; Newcastle 21236-7. 14-16, Bridge Street, Manchester; Blackfriars 2261. Stylebridge House, 12, Swinegate, Leeds; Leeds 29001-2-3. 28, Warser Gate, Nottingham; Nottingham 40581. 16, Temple Street, Bristol; Bristol 20307. 55, Cornwall Street, Birmingham; Central 7201-2-3. 6-8, Cadogan Street, Glasgow; Central 4302-3. Victoria Buildings, Tithe barn Street, Liverpool; Central 4584. 3, Lower Abbey Street, Dublin; Dublin 44357.
Philomel Radio Equipment Co., Philomel Works, Dover Road, Slough Trading Estate, Bucks. Slough 848.
Pickett's Wireless Cabinet Works, Albion Road, Bexleyheath. Bexleyheath 194.
Pioneer Mfg. Co., Cromwell House, Fulwood Place, London, W.C.1. Chancery 7054. Pioneer, Jamarker, London.
Plessey Co., Ltd., Vicarage Lane, Ilford. Ilford 0041. Plessey, Ilford.
Plowden and Thompson, Ltd., Dial Glass Works, Stourbridge. Stourbridge 57243. Dial, Stourbridge.
Pohlmann and Son, Ltd., Princess Street and Hall Street, Halifax, Yorks. Halifax 2872. Pohlmann 2872 Halifax.
Pollock and Co., Ltd., W. J., 79-81, Mortimer Street, W.1. Museum 2874.
Pomona Rubber Co., 1129, Ashton Old Road, Openshaw, Manchester. East 0316. Pomrub.
Pooley, G. J., 25, Kenilworth Avenue, London, E.17. Silverthorne 1264. Woodside Works, 37A, Hall Lane, London, E.4.
Portable Gramophone Co., Ltd., Albion Works, Albion Street, London, N.1. North 4656. Portogramo, Kincross.
Portadyne Radio, Ltd., Gorst Road, North Acton, N.W.10. Willesden 7541-2.
Porter, C. J., Wellowgate, Grimsby.
Postlethwaite Bros., Kinver Works, Kinver, Stourbridge. Kinver 68.
Potter and Co., Ltd., H. B., Duke Street, Rochdale, Lancs. Rochdale 3485. Octopus, Rochdale.
Poupard and Co., Ltd., C. Haddon, Thermion Works, Ilford. Ilford 1443. Poupard, Ilford.
Powertone Products, 88, Cromer Street, London, W.C.1. Terminus 6184.
Pozzudli, F., Western Joinery Works, 16A, Croxley Road, Paddington, London, W.9. Willesden 0665.
Precision-Electric, Ltd., 21-23, St. Paul's Square, Birmingham. Central 4031.
Precision Radio and Mfg. Co., Ltd., 8, Board School Road, Woking, Surrey. Woking 1272. Precirad, Woking.
Preh Manufacturing Co., Ltd., 150, Charing Cross Road, W.C.2. Temple Bar 5765.
Premier Radio Co., 160, Aston Road, Birmingham.
Pressland Products, Ltd., 84, Eden Street, Kingston-on-Thames. Kingston 2762. Pressland, Hampton, Middlesex.
Prideaux, Junr., Ralph, 101, Hatton Garden, E.C.1. Holborn 6244.
Primus Mfg. Co., Primus House, Willow Street, E.C.2. Bishopsgate 5681. Aatsolo, London.
Provincial Incandescent Fittings Co., Ltd. (Pifco, Ltd.), Pifco House, 71, High Street, Manchester. City 4044 and 0831. Provencal, Manchester.
Psychon, Ltd., 4, Westminster Palace Gardens, London, S.W.1. Victoria 4392.
Purdy, B. N., St. James' Street, Derby. Derby 2126. 8, Bream's Buildings, Fetter Lane, London, E.C.4. Holborn 4919.
Pye Radio, Ltd., Radio Works, Cambridge. Cambridge 2020-1. Pyrad, Cambridge. Sales Organisation: Africa House, Kingsway, London, W.C.2. Holborn 5384. Pyradlim, Westcent, London.

Q

Quartz Crystal Co., 63A, Kingston Road, New Malden, Surrey. Malden 0671.
Queen's Engineering Co., 60-62A, Queen's Road, Battersea, S.W. Battersea 0954.

R

Radiamp Co., Orchard Works, Farningham Road, Tottenham, London, N.17. Tottenham 2157.
Radio Cabinets (Walsall), Ltd., Stafford Street, Walsall. Walsall 2475. Cabinets, Walsall.
Radiocraft Supplies, Ltd., 9, The Arcade, Walsall. Walsall 3919. Radiocraft, Walsall.
Radio Gramophone Development Co., Ltd., 18-20, Frederick Street, Birmingham. Central 6272. Gramorad. 40, Doughty Street, London, W.C. Holborn 7360. 17, Bridge Street, Manchester. Blackfriars 1951.
Radio and Gramophone Trades Guardian Association, Ltd., The, 78, New Oxford Street, London, W.C.1. Museum 9621. Radguardio, Westcent, London.
Radio Instruments, Ltd., Purley Way, Croydon. Thornton Heath 3211. Instradio, Croydon.
Radio Mfrs. Association, The, Astor House, Aldwych, W.C.2. Holborn 3346-7. Oldarion, Estrand, London.
Radio Service Co., 21A, Bridge Street, Itchen, Southampton. Woolston 88429.
Radio Service (London), Ltd., 105A, Torriano Avenue, Leighton Road, Kentish Town, N.W.5. Gulliver 1091.
Radio Speciality Co., 15, Baldwin Gardens, Gray's Inn Road, London, E.C.1.
Radio Sundries Co., 63, Spencer Street, Clerkenwell, E.C.1. Clerkenwell 0610.
Radiomonic, Ltd., Regency House, 1-4, Warwick Street, Regent Street, London, W.1. Gerrard 3792. Radinenta, Piccy, London. Works, Enfield.
Ramsey, F. W., 63, Shaftesbury Street, New North Road, N.1. Clerkenwell 7139.
Randall, Williams Mfg. Co., Ltd., 12, Station Road, N.22. Palmers Green 1682.
Rawlplug Co., Ltd., Rawlplug House, Cromwell Road, London, S.W.7. Frobisher 1061-5. Rawlplug, Southkens, London.
Rawswood Electrical, Preston New Road, Blackpool.
Ready Radio, Eastnor House, Blackheath, S.E.3. Lee Green 5678.
Realistic Speakers, 72, Penton Street, London, N.1. North 5237.
Record Auto-Brush Co., 227, Pentonville Road, King's Cross, N.1. Clerkenwell 2684. Vescothong, Kincross, London. Vescothong, London.
Record Electrical Co., Ltd., Broadheath, Altrincham, Cheshire. Altrincham 164. Infusion, Altrincham.
Rectifiers, Ltd., Brierley Street, Leicester. Leicester 59548.
Redfern's Rubber Works, Ltd., Hyde, Cheshire. Hyde 622. Rubbers, Hyde. 21-24, Gt. Portland Street, London, W.1. Museum 0381. Berrub, Wesdo. 7, Albion Street, Leeds. Leeds 22166.

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Rees Mace Manufacturing Co., Ltd., 39A, Welbeck Street, W.1. Welbeck 7961-2. Resmace, Wesdo, London.
Regent Fittings Co., 120, Old Street, London, E.C.1. Clerkenwell 2923.
Regentone, Ltd., 21, Bartlett's Buildings, Holborn Circus, E.C.4. Cent. 8745-7. Worton Road, Isleworth, Middlesex. Hounslow 3801.
Reliance Manufacturing Co. (Southwark), Ltd., Westbury Works, Westbury Road, Walthamstow, London, E.17. Walthamstow 0235.
Reliance (Nameplates), Ltd., Richmond Bridge Works, Twickenham. Popesgrove 2282 (five lines). Reliance Twickenham.
Remax Cables, 3-6, Alfred Place, London, W.1.
Remus Co., Ltd., 7, Mallow Street, E.C.1. Clerk. 1992. Teoremus, Finsquare, London. Teoremus, London.
Reproducers and Amplifiers, Ltd., Frederick Street, Wolverhampton. Wolverhampton 22241. Audio, Wolverhampton.
Resistor Co., 1, Golden Square, Piccadilly, London, W.1.
Rex Gramophone Co., Ltd., 59, Chiswell Street, London, E.C.1. Metropolitan 3249. Lyrecodisc, Barbican, London.
Rhapsody-Twin, 23, Bunhill Row, London, E.C.1. National 3405.
Rhythm Radio Manufacturing Co., Ltd., 49-51, Monks Road, Lincoln.
Rich and Bundy, Ltd., New Road, Ponders End, Middlesex. Enfield 0777.
Rigaut, J., 100N, Blackstock Road, London, N.4. North 3445.
Rigby and Woolfenden, Sun Works, Milnrow Road, Rochdale. Rochdale 2948.
Rigby Bros., Robert Street Works, Cheetham, Manchester.
Righton and Co., Ltd., Henry, 218, Pentonville Road, King's Cross, N.1. North 5213-4-5. Balfourite, London.
Riley and Sons, Ltd., John. P.O. Box 62, Accrington. Accrington 21378. Rileys, Hapon.
Ripaults, Ltd., King's Road, N.W.1. North 4374. Ripault, Norwest, London. Ripault, London.
Ritherdon and Co., Ltd., North Bridge Mill, Deansgate, Bolton. Bolton 1024. Ritherdon, Bolton.
Robins, Ltd., 119, Queen's Street, Cardiff. Cardiff 5176. Robinite, Cardiff.
Robinson, Geo., and Co., Ltd., River Plate House, South Place, E.C.2. Metropolitan 5886.
Robinson and Co., Ltd., Lionel, 3, Staple Inn, W.C.1. Holb. 6322. Ferrydom, Holb, London.
Roladisc Co., 65, London Wall, E.C.2. Metropolitan 0480.
Romac Motor Accessories, Ltd., Romac Works, The Hyde, Edgware Road, N.W.9. Colindale 6055-9. Strength, Hyde, London.
Rondo Co., Ltd., Elysium Street, Fulham Park Gardens, S.W.6. Putney 1393.
Rooke Brothers, Ltd., 32, Queensway, Ponders End, Middlesex. Enfield 2823-4.
Rose, Morris and Co., Ltd., 57, City Road, E.C.1. Clerk. 5377.
Rose, T. A., and Son, Ltd., 25, Milton Street, E.C.2. Metropolitan 6368.
Ross, Courtney and Co., Ltd., Ashbrook Road, Holloway, N.19. Archway 1272. Homonyms, Holway, London.
Rotax, Ltd., Willesden Junction, London, N.W.10. Willesden 2480.
Rotherinel Corporation, Ltd., 1, Willesden Lane, Kilburn, N.W.6. Maida Vale 6066.
Rotor Electric, Ltd., Spencer House, South Place, London, E.C.2. National 5734. Rotorstat, London.
Royce-Rex, Ltd., 11, Jewry Street, London, E.C.2.
Rubon, Ltd., 189, New King's Road, S.W.6.
Ruhl (1922), Ltd., O., 200, City Road, London, E.C.1. Clerkenwell 5746 and 3321. Urcordmer, Islin, London.
Runbaken Magneto Co., Ltd., 280, Deansgate, Manchester. Blackfriars 5515. Runbaken, Deansgate, Manchester. 3, Furlong Road, London, N.6. North 2483.
Russell and Shaw, 148, Walm Lane, Willesden, N.W.2. Gladstone 2646.
R.C.A. Photophone, Film House, Wardour Street, London, W.1. Gerrard 5252 and 3647.
R.C. Radio-Electric, Ltd., 51, Whitcomb Street, London, W.C.2. Whitehall 8876. Loudsigs, Lesquare, London.
R.L.M. Co., Turnpike Lane, Hornsey, N.8. Mountview 3819.
R.M. Radio, Ltd., 11, Garrick Street, W.C.2. Temple Bar 3721. Arremmarad, Les Sq., London. Arremmarad, London.

S

St. Helens Cable and Rubber Co., Ltd., Trading Estate, Slough, Bucks. Slough 333. St. Helens, Slough. Branch offices and stores: 70-71, Petty France, London, S.W.1. Franklin 6181-2; King Alfred's Place, Broad Street, Birmingham. Midland 2102; 30, Wood Street, Deansgate, Manchester. Blackfriars 8004; 45, Hope Street, Glasgow. Central 566; 50, Charles Street, Cardiff. Central 5500; St. Helens House, Wemyss Road, Blackheath, London, S.E.3. Lee Green 0817; 11, College Street North, Belfast. Belfast 663; 91, Thornton Road, Bradford. Bradford 2286; 37, Moorfields, Liverpool. Central 1138; 1A, St. James Street, Okehampton. Okehampton 93.
St. Paul's Radio, Ltd., 18A, Watling Street, London, E.C.4. City 1843.
Sandler, Frank, 2, Mayes Street, Shudehill, Manchester. Blackfriars 5065. Adaptable, Manchester.
Sankey and Sons, Ltd., Joseph, 168, Regent Street, W.1. Regent 2748. Permeable, Phone, London.
Savage, W. B., 292, Bishopsgate, London, E.C.2. Bishopsgate 1474-5. Companincx, London.
Saxon Radio Co., Henry Street Works, South Shore, Blackpool. Blackpool 1894.
Saxonia Electrical Wire Co., Ltd., Roan Works, Greenwich, S.E.10. Greenwich 0463 and 1672. Saxonist, London.
Scott, A. C., and Co., Ltd., 39, City Road, Manchester.
Scott, Geo. L., and Co., Ltd., 86-88, Acre Lane, Brixton. Brixton 6562.
Scott Insulated Wire Co., Ltd., 44-6, Queensland Road, N.7. North 3408-9. Silcotenam, London.
Scott and Co., James, 57-59, Queen Anne Street, Dunfermline; Chapel Street, Dunfermline; 6-8, Princes Street, Perth. Perth 968. Dunfermline 601-2-3.
Scott and Co., S. W., 110, Lothian Road, S.W.9. Reliance 2504.
Scott, Sessions and Co., 9, Muswell Hill, N.10. Tudor 5326. King's Buildings, Dean Stanley Street, Westminster, London, S.W.1.
Screw Grip Co., 105, Osborne Road, Romford.
Segal, R., Ltd., 85, Crowlands Road, N.15. Tottenham 2864.
Selecta Gramophones, Ltd., 81, Southwark Street, S.E.1. Hop 6671.
Service Equipment Co., Ltd., Drayton House, 30, Gordon Street, London, W.C.1. Museum 5956. Equiparage, Eusroad.
Shalless and Evans, Tranquil Works, Tranquil Vale, Blackheath, London, S.E.3. Lee Green 5191.
Shapland and Petter, Ltd., Raleigh Works, Barnstaple. Barnstaple 183. Raleigh, Barnstaple. 18, Newman Street, W.1. Museum 4947.
Shearing, A. E., Ltd., 385B, Liverpool Road, London, N.1. North 1281.
Sheffield Magnet Co., 116-126, Broad Lane, Sheffield. Sheffield 20866. Magnet 20866 Sheffield.

Sicaloid, Ltd. (Societe Nobel Francaise), 1-3, St. Paul's Churchyard, London, E.C.4. Central 4314. 487A, Coventry Road, Birmingham.
Siemens Electric Lamps and Supplies, Ltd., 38-9, Upper Thames Street, London, E.C.4. City 5350 (10 lines). Siemotor, Cent., London.
Siemens Shuckert (Gt. Britain), Ltd., 30-34, New Bridge Street, E.C.4. Central 8461-2-3. Elefes, Lud, London.
Sifam Electrical Instrument Co., Ltd., York Works, Browning Street, London, S.E.17. Rodney 3573. Sifamafis, Sedist, London.
Simpson's Electricals, Ltd., Grange Road, Leyton, London, E.10. Leytonstone 2295.
Sinclair Speakers, Caledonian Street, London, W.1.
Six-Sixty Radio Co., Ltd., Six-Sixty House, 17-18, Rathbone Place, Oxford Street, W.1. Museum 6116-7. Dullemitta, Westcent, London.
Skeldings, Ltd., 126, Oldbury Road, Smethwick. Smethwick 0441. Skeldings, Ltd., Smethwick.
Slektun Products, Ltd., 21, Douglas Street, Vauxhall Bridge Road, S.W.1. Victoria 3406.
Smith Radio, Ltd., A., Hazel Works, 56, Hazel Road, Kensal Rise, London, N.W.10.
Smith (Birmingham), Ltd., J. F., 92, Hurst Street, Birmingham. Midland 3333. Unlimited, Birmingham.
Smith and Sons (Motor Accessories), Ltd., S., Cricklewood Works, London, N.W.2. Gladstone 3333. Speedofac, Phone, London.
Smith, W., and Son, 23, Crescent Street, Weymouth. Weymouth 41.
Smith's Cabinets, Ltd., 18-20, Hertford Road, London, N.1. Clissold 3725.
Smith's English Clocks, Ltd., 179-185, Great Portland Street, W.1. Welbeck 7916. Rightime, Wesdo, London.
Smurthwaite, F. W., Harmony Works, Ross Parade, Wallington, Surrey. Wallington 1982.
Snap Switches, Ltd., 153, Masons Hill, Bromley, Kent. Ravensbourne 3377-8. Grafar, Bromley.
Solidite and Synthetic Mouldings, Ltd., Albion Works, North Street, Clapham, S.W.4. Macaulay 4533.
Sondchorde Reproducers, Ltd., 1, Willesden Lane, London, N.W.6. Maida Vale 6066.
Sorbo Rubber Sponge Products, Ltd., Sorbo Works, Woking. Woking 966. Sorbo, Woking.
Sound Sales, Tremlett Grove, London, N.19. Archway 3871.
Sovereign Products, Ltd., 52-54, Rosebery Avenue, London, E.C.1. Clerkenwell 2788-9.
Spalton Electrical Stores, Ltd., Beteco House, Cadman Lane, Sheffield. Sheffield 25588.
Sparkes and Co., J., 39, St. Andrew's Hill, London, E.C.4. Central 2340.
Speakeasie Home Recorders, Ltd., 24, Berners Street, London, W.1. Museum 4876. Speakeasie, Curwenphone, London.
Spears and Co., Capstan Repetition Works, 68, Park Road, Hockley, Birmingham. Northern 1565. Firettes, Birmingham.
Spedding, A., Trafalgar Terrace, West Park Street, Dewsbury.
Speedwell Gearcase Co., Ltd., 276, Broad Street, Birmingham.
Spencer Radio, Ltd., 136-142, Clerkenwell Road, E.C.1. Clerkenwell 9254. 44A, New Cavendish Street, London, W.1. Welbeck 4601.
Spicers, Ltd., 19, New Bridge Street, E.C.4. City 6251. Nykoping, Lud, London.
Spiers and Browne, Crown Works, Forest Hill, S.E.23. Sydenham 7562.
Spong and Co., Ltd., 27, Braemar Road, South Tottenham, London, N.15. Tottenham 1770. Spongolia, Southtot, London.
Squire, Frederick, Ltd., Queen's Works, Leswin Place, Stoke Newington, N.16. Clissold 0334.
Stadium, Ltd., 75-77, Paul Street, Gt. Eastern Street, E.C.2. Clerkenwell 9321-2-3-4. Etienoimex, London.
Standard Battery Co., 184-8, Shaftesbury Avenue, W.C.2. Temple Bar 6195.
Standard Insulator Co., Ltd., Percy Buildings, Gresse Street, Rathbone Place, London, W.1. Museum 4553. Hivoltsit, Rath, London. Grange Works, Oak Lane, London, N.2. Finchley 3268.
Standard Mfg. (Wireless) Co., Ltd., The, 8A, Snells Park, Edmonton, N.18. Tottenham 4109.
Standard Telephones and Cables, Ltd., Connaught House, Aldwych, London, W.C.2. Holborn 8765. Relay, Estrand, London. Relay, London. St. Chad's Place, 364, Gray's Inn Road, London, W.C.1. Terminus 6255.
Stanton, T., 9, Lime Grove, London, E.9.
Star Engineering, Albert Street, Didsbury, Manchester. Didsbury 1785.
Stead and Co., Ltd., J., Manor Works, Sheffield. Sheffield 20512. Steadfast, Sheffield.
Stebbings, J. R., 6, Warwick Street, Piccadilly Circus, W.1. Gerrard 6702.
Stenibac, Ltd., 303, Essex Road, Islington, London, N.
Sterling Varnish Co., Fraser Road, Trafford Park, Manchester. Trafford Park 1753-4. Dielectric.
Sterno Manufacturing Co., Ltd., 19, City Road, London, E.C.1. City 5886.
Stilwell and Sons, 7, Jordan Well, Coventry. Coventry 2263.
Stockall, Marples and Co., Ltd., 6-10, Clerkenwell Road, London, E.C.1. Clerkenwell 2781. 64, Bridge Street, Deansgate, Manchester.
Stonehouse Radio Supplies, 54, Union Street, Stonehouse, Plymouth, Devon. Plymouth 2496.
Storey Bros. and Co., 57, Church Street, Runcorn. Runcorn 41.
Storey, F. M., 367, Hylton Road, Sunderland.
Storey, R. D., Gt. North Road, Hatfield, Potters Bar 227.
Storrar and Balls, Reliance Works, Old Paradise Street, S.E.11. Reliance 2108.
Stott, J. E., 15, Clare Hill, Huddersfield. Huddersfield 2817. Stott, 2817, Huddersfield.
Strad Radio, 2, Brecknock Road, Camden Town, N.1. North 3263.
Stratton and Co., Ltd., Balmoral Works, Bromsgrove Street, Birmingham. Midland 3768. Stratnoid, Birmingham.
Sugden General Engraving Co., 57, Farringdon Street, London, E.C.4. Central 2724.
Sullivan, Ltd., H. W., Leo Street, Peckham, S.E.15. New Cross 1702. Deadbeat, Peck, London.
Sunbeam Electric, Ltd., Sunbeam Road, North Acton, London, N.W.10. Willesden 1575. Sunberad, Harles, London.
Sunlight Mfg. Co., Ltd., 3, Chapel Place, White Hart Lane, Tottenham, N.17. Tottenham 2668-9. Sumabatry, Tottlane, London.
Supertone Pianos, Ltd., New Tythe Street, Long Eaton, Near Nottingham. Long Eaton 317. Supertone, Long Eaton.
Supertone Radio Manufacturing Co., 6, Queen Anne's Gardens, Leatherhead, Surrey.
Supremus Specialities, Ltd., 118, High Street, Erdington, Birmingham. Erdington 1212. Supremus, Erdington, Birmingham.
Swain, C., Ltd., 32, Queensway, Ponders End, Middlesex.
Swift Levick and Sons, Ltd., Clarence Steel Works, Sheffield. Sheffield 20371. Levick, Sheffield.
Sylvex, Ltd., 144, Theobald's Road, W.C.1. Holborn 6456. Veezed, Holb, London.
Synchronome Co., Ltd., 19, Caxton House, London, S.W.1. Victoria 4157.
Synchrophone, Ltd., 24, Berners Street, W.1. Museum 4876.
Synlectric, Ltd., 56, Victoria Street, London, S.W.1. Victoria 5995.

T

Tannoy Products, 1/7, Dalton Street, W. Norwood, S.E.27. Streatham 6731. Streatham, 'Phone 6731.
Tarry's, 78, Wellingboro' Road, Northampton.
Taylor, F., 57, Studley Road, Stockwell.

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Taylor and Hobson, Ltd., 314, Regent Street, London, W.1. Langham 1262.
Taylor and Petters, Ltd., 3/11, Westmoreland Place, City Road, N.1. Clerkenwell 4105. Micaylor, London.
Taylor, Tunnicliff and Co., Ltd., 110, Cannon Street, E.C.4. Mansion House 7211.
Taylors (Huddersfield), Ltd., 9, Shambles Lane, Huddersfield. Huddersfield 214.
Tecalemit Radio Co., Great West Road, Brentford, Mdsx. Ealing 6138.
Tekade Radio and Electric, Ltd., 147, Farringdon Road, London, E.C.1. Clerkenwell 2486. Britekade, London.
Telegraph Condenser Co., Ltd., Wales Farm Road, Acton, W.3. Acorn 0061. Telefarad, Act, London.
Telephone Manufacturing Co., Ltd., Hollingsworth Works, Martell Road, S.E.21. Sydenham 7060.
Telsen Electric Co., Ltd., Thomas Street, Birmingham. East 1851 (8 lines P.B.X.). Escort, Birmingham.
Terry and Sons, Ltd., Herbert, Redditch. Redditch, 61. Springs, Redditch.
Terrytone Radio Products, 20, Upper Hornsey Rise, London, N.19. Archway 3986.
Thibouville-Lamy and Co., J., 10 and 12, Charterhouse Street, E.C.1. Holborn 1787. Tibouvil, London.
Thomas, B., Worsley Street, Hulme, Manchester. 28, Victoria Street, S.W.1. Victoria 4119.
Thompson, Diamond and Butcher, 34, Farringdon Road, London, E.C.1. Clerkenwell 5492 (6 lines). Thomdibu, London. Factory: 78, St. John Street, London, E.C.1.
Thorp Roderick, Ltd., 12, Balsall Street, Bedford. Bedford 2833.
Three Star Accumulators, Ltd., Rosebery Avenue, N.17. Tottenham 2777-8. Threcetar, Southtott, London.
Tinsel Mfg. Co., Ltd., 8, Noble Street, E.C.2. National 0515-7. Integridad, London.
Tonex Co., Tonex Works, Poulton Road East, Little Singleton, Near Blackpool. Poultone Le Fylde 157. Tonex, Pultone, Lancs 157.
Toubkin, J., 33, Long Millgate, Manchester. Blackfriars 9348 and 9349. Toubkin, Manchester. 130, High Holborn, W.C.1. Holborn 5997. Toubkin, London.
Tower Radio Supplies, 5, High Street, Shoreditch, London, E.1. Bishopsgate 3684.
Transformer Repair Co., 953, Garratt Lane, Tooting, London, S.W.17. Wimbledon 2060.
Trelleborgs Ebonite Works, Ltd., Union Place, Wells Street, W.1. Museum 6200. Trelebonite, Wesdo, London.
Trent Electric Wire Works, Ltd., 1, Dyott Street, Shaftesbury Avenue, W.C.2. Temple Bar 3791.
Triotron Radio Co., Ltd., 26, Bloomsbury Street, London, W.C.1. Museum 1908. Radiunited, Westcent.
True Screws, Ltd., 99, Clerkenwell Road, E.C.1. Holborn 2618 and 9100. Truescrews, Holb, 2618.
Truphonic Radio Co., Dryad Street, Putney, S.E.15. Putney 6451.
Tudor Accumulator Co., Ltd., 50, Grosvenor Gardens, S.W.1. Sloane 0168-9. Subconical, Sowest, London. Extudorex, London.
Tunewell Radio, Ltd., 54, Station Road, New Southgate, London, N.11. Palmers Green 0089.
Tungsram Electric Lamp Works (Great Britain), Ltd., 72, Oxford Street, W.1. Museum 5053. Tungselec, Rath, London.
Tungstalite, Ltd., Electric Lamp House, Farringdon Road, E.C.1. Holb. 2322. Tungslamp, Smith, London.
Tungstone Accumulator Co., Ltd., 3, St. Bride's House, Salisbury Square, E.C.4. Central 8156. Typify, Fleet, London. Dilutum, London.
Turler, H. A., 57A, Holborn Viaduct, E.C.1. Central 6467.
Turner, E., High Wycombe, Bucks. High Wycombe 301. Gorgeous, High Wycombe.
Turner Tool Mfg. Co., Princip Street, Birmingham. Aston Cross 1024. Linisher, Birmingham.
Tutills, Ltd., 7/9, Swan Street, Manchester. City 9038.
Tyrela Electric, Ltd., 21/26, East Road, N.1. Clerkenwell 4871. Tylarad, Nordo, London.
Tyrela Gramophones, Ltd., 21/26, East Road, N.1. Clerkenwell 4871. Tylagramo, Nordo, London.

U

Ultra Electric, Ltd., Ultra Works, Erskine Road, Chalk Farm, London, N.W.3. Primrose 3333-4-5. Radwaves, London.
Umello, Ltd., 55/7, Gt. Marlborough Street, W.1. Gerrard 3927. 275A, Ley Street, Ilford. Ilford 2409.
Unicfon, Ltd., 23, City Road, London, E.C.1. Metropolitan 0436. 27A, Edgbaston Street, Birmingham. Midland 3484.
Union Radio Co., Ltd., U.R. Works, Campbell Road, Croydon. Thornton Heath, 1533.
United Chemical Engraving Co., Ltd., Higham Place, Newcastle-on-Tyne. Newcastle 21938. Chemigrave, Newcastle-on-Tyne.
United Ebonite Manufacturers, Ltd., Chadwell Works, Grove Road, Chadwell Heath, Essex. Seven Kings 2171-3. Ebochad, Chadwell Heath.
United Radio Manufacturers, Ltd., 63, Lincoln's Inn Fields, W.C.2. Holborn 7791.
Unity Lamp and Accessories Ltd., 41, Call Lane, Leeds.
Universal Electric Co., Ltd., 4, Brown Street, Manchester. City 3409. Uniselco, Manchester.
Universal Gramophone and Radio Co., Ltd., Ryland Road, Kentish Town, London, N.W. 5. Gulliver 1165. Unigramrad, Kentish, London.
Universal Winding Co., Saville Street, Oxford Road, Manchester. City 6604. Leeson, Manchester.
Univolt Electric, Ltd., 119-125, Finsbury Pavement, London, E.C.2. National 0620. Eckergram, Phone, London.

V

Vandervelde, L., 35, Minories, London, E.C.3. Royal 1261. Splittings, Ald., London.
Vandervell, Ltd., C. A., Well Street, Birmingham. Northern 5201.
Varley (proprietors, Oliver Pell Control, Ltd.), 103, Kingsway, W.C.2. Holborn 5303-5. Olipel, Westcent, London.
Vee Cee Dry Cell Co. (1927), Ltd., Northwold Road, Stoke Newington, N.16. Clissold 4646.
Venner Time Switches, Ltd., Kingston By-Pass Road, New Malden, Surrey. Cloxwiches, Phone, London.
Vibranti Products Co., 308, Euston Road, London, N.W.1. Museum 0450.
Vinces Dry Batteries, Ltd., Garford Works, Garford Street, Poplar, London, E.14. East 1902. Vindribat, Pop.
Vocalion Gramophone Co., Ltd., 60, City Road, London, E.C.1. Clerkenwell 2633.
Volso Radio Co., 18, Randell's Road, N.1. North 0241.
Vortexion, Ltd., 150, Broadway, Wimbledon, London, S.W.19. Wimbledon 2814.
Vulco Dry Battery Co., Ltd., Vulco Works, Marlborough Road, London, N.19. Archway 1895. Vulcobatri.

W

Wade and Co., A., 9, Carlton Road, Burnley.
Waivis Engineering Co., Ltd., Minerva Road, Chase Estate, Park Royal, London, N.W.10. Willesden 1585.

[*Continued on page* 236.]

MANUFACTURERS' SECTION

[*Continued from page* 234.]

Walker, Fuller, and Ellis, Ltd., Dartmouth Works, Dartmouth Road, London, S.E.23. Sydenham 1015.
Walsall Electrical Co., Ltd., 61, Bridge Street, Walsall. Walsall 2045. Electrical, Walsall.
Walter, Ltd., J. and H., 31A, Farm Lane, Fulham, S.W.6. Fulham 5645.
Ward and Goldstone, Ltd., Frederick Road, Pendleton, Manchester. Pendleton 2442-6, Multum, Manchester.
Warner Brunswick Ltd., 1-3, Brixton Road, London, S.W.9. Reliance 3311.
Wates Radio, Ltd., 184-8, Shaftesbury Avenue, London, W.C.2. Temple Bar 6195.
Wathes and Co., Ltd., T. H., 86/8, High Street, Leicester. Leicester 5131. Wathes, Leicester. 38, London Road, Leicester.
Watmel Wireless Co., Ltd., Imperial Works, High Street, Edgware, Middlesex. Edgware 0323.
Watson, Saville and Co., Ltd., Bruce Steel Works, Mowbray Street, Sheffield. Sheffield 20266-7. Savico, Sheffield.
Waveola, Ltd., 20, Bedford Row, London, W.C.1. Chancery 7284. Waveola, Holb., London.
Webb Condenser Co., Ltd., 42, Hatton Garden, London, E.C.1. Holborn 2260. Webbconden, Smith, London.
Webber, Ltd., R. A., 8, Old King Street, Bristol. Bristol 23668. Webber, 23668, Bristol.
Webster and Co., Ltd., T., Diamine House, Middle Lane, Hornsey, N.8. Mountview 0952. Diamine, Liverpool.
Weedon Power Link Radio Co., 185, Earlham Grove, Forest Gate, London, E.7. Maryland, 4344.
Wego Condenser Co., Ltd., Bideford Avenue, Perivale, Middlesex. Perivale 2477.
Wembley Scientific Laboratories, Ltd., Raglan Gardens, Wembley, Middlesex. Wembley 3549.
Wendell Mfg. Co., Abbey Road, Park Royal, N.W.10. Willesden 0300. Carlisle House, Southampton Row, London, W.C.2. Holborn 8859.
West, W. G., 3, Bedford Road, Clapham, S.W.4. Brixton 6182.
Westinghouse Brake and Saxby Signal Co., Ltd., 82, York Road, N.1. North 2404-5, 2415-6-7-8. Westinghouse, Kincross, London. Westinghouse, London.
Weston Electrical Instrument Co., Ltd., Kingston By-Pass, Surbiton, Surrey. Elmbridge 6400. Pivoted, Surbiton.
Whetton and L. Gold, E.P., 19A,-20, Keens Yard, St. Paul's Road, London, N.1. North 2452.
White Bros. and Jacobs, Ltd., 46, Chalk Farm Road, London, N.W.1. Gulliver 5146. Luminware, Camroad, London.
Whitehall Radio Service Co., 5A, Palace Chambers, Bridge Street, London, S.W.1. Whitehall 1545.
Whiteley Electrical Radio Co., Ltd., Victoria Street, Mansfield, Notts. Mansfield 762. Whitebon, Mansfield.
Wholesale Radio Supplies Co., 126, High Road, Leyton, London, E.15. Leytonstone 1396. Leytonex.
Wilday and Sons, John, Stanley Works, Bond Street, Birmingham. Central 1004.
Wilkes and Co., S. J. H., Station Road, Stetchford, Birmingham. Stetchford 105.
Wilkins and Wright, Ltd., Utility Works, Holyhead Road, Birmingham. Northern 2974-5. Utility, Birmingham.
Wilkinson, L., 8, City Road, Finsbury Square, E.C.1. Metropolitan 7359.
Williams and Gray, Ltd., 30/32, St. Paul's Square, Birmingham 3. Central 6852.
Williams and Moffat, Ltd., Ladypool Road, Sparkbrook, Birmingham. Vic. 0659. Taffom, Birmingham.
Willmott, Son and Phillips, Ltd., St. John's House, Minories, E.C.3. Royal 8051. Imagica, Ald., London.
Wilson, E., 46, Navigation Street, Wolverhampton. Wolverhampton 969.
Wilson, Wm. Hamilton, 125/7, Red Lion Road, Tolworth, Surbiton, Surrey. Elmbridge 1648.
Wingrove and Rogers, Ltd., 188/9, Strand, W.C.2. Temple Bar 2244. Compounded, Estrand, London. Polar Works, Old Swan, Liverpool.
Winscombe Cabinet Works, Winscombe, Somerset. Winscombe 39.
Winston, T., 82, Ryland Road, Edgbaston, Birmingham. Calthorpe 1184-5. Limelight, Birmingham.
Wireless Apparatus, Ltd., 35, Panton Street, Haymarket, S.W.1. Regent 5688.
Wireless Gramophone and Electrical Trades Association, Ltd., The, 50/51, High Holborn, W.C.1. Chancery 7424 and 7550. Wiretrapa, Holb., London.
Wireless Retailers' Association of Great Britain and Northern Ireland, The (Gen. Sec. Capt. H. A. Bain), 1, Mitre Court, Fleet Street, E.C.4. Central 6838.
Wolf and Co., Ltd., S., 115, Southwark Street, S.E.1. Hop 2733. Widerstand, London.
Woodhams, Dade and Co., 74, Great Tower Street, E.C.3. Royal 2209 and 4539. Woodade, London.
Wright and Weaire, Ltd., 740, High Road, Tottenham, N.17. Tottenham 3847 and 3015. Writewea, Tottlane, London. Writewea, London.
W.R.C., Ltd., India Pavilion, Exhibition Grounds, Wembley. Wembley 841.

Y

Yagerphone, Ltd., Charlotte Works, Ponders End, Middlesex. Enfield 1321.
Yates, Sutton, Ltd., 35-37, Crafton Street, Leicester. Leicester 58713.
Yeldon (Radio), Ltd., 44, London Road, Portsmouth. Portsmouth 6005. Yeldons, Phone 6005 Portsmouth.
Yorkshire Radio Co., Western Works, Rockingham Street, Sheffield. Sheffield 25143. Silver, Sheffield.
Young Accumulator Co. (1929), Ltd., Burlington Works, Arterial Road, New Malden, Surrey. Malden 1171-2-3. Youngacc. New Malden.

Z

Zelco, Ltd., 53, Farringdon Road, E.C.1. Holborn 2053.
Zenith Electric Co., Ltd., Zenith Works, Villiers Road, Willesden Green, N.W.2. Willesden 4087-8. Voltaohm, Willroad, London.
Zetavox Radio and Television, Ltd., Zetavox Works, Coles Green Road, Cricklewood, London, N.W.2. Gladstone 1048.
Zimba Radio Co., 77, Lauriston Road, S. Hackney, E.9. Amherst 3661.

RADIO and RADIO-GRAMOPHONE WHOLESALERS

ALPHABETICAL

Wholesalers of radio and gramophone instruments and accessories are listed with addresses and telephone numbers. A territorially arranged section is on page 245.

A

Accessories (Edinburgh), Ltd., 4, Queensferry Street Lane, Edinburgh. Edinburgh 23107. Ignition. 18, Bank Street, Dundee. Dundee 6046. Magneto.

Albion Electric Stores, 9-13, New Station Street, Leeds. Leeds 20196/8. Filaments.

Altham Radio Co., 25, Mosley Street, Manchester. City 0231. Staportco, Manchester.

Appletons (Leeds), Ltd., Hanover Place, Leeds. Leeds 21694. 96, New Bridge Street, Newcastle 2. Newcastle 27651. Gramophones, Newcastle.

Arthurs (proprietors, Arthur Gray, Ltd.), 150, Charing Cross Road, London, W.C.2.

Ashton and Co., G., 1A, Queen Street, Edinburgh. Edinburgh 20874.

Attwoods (Factors), Ltd., Attwood House, Fryer Street, and Long Street, Wolverhampton. Wolverhampton 21686-8. Attwoods 21686. Wolverhampton.

B

Baker and Co., Ltd., G. F., Xaltona House, Leeke Street Corner, King's Cross Road, London, W.C.1. Terminus 4302. Ocrekab, Kincross, London.

Balmford, Walter, 116, Steelhouse Lane, Birmingham. Central 1264–5. Balmford, Birmingham.

Baxendale and Co., Ltd., Miller Street, Manchester. Blackfriars 8282 (26 lines). Grassmarket and King's Stables Road, Edinburgh. Edinburgh 27047 (4 lines). Capel Street, Dublin. Dublin 21607/8/9. Hanover Street and School Lane, Liverpool. Royal 5555 (6 lines).

Beadle and Co., Ltd., T., 3–5, Castle Street, Hull. Hull 3383. 4–8, Thomas Street, Liverpool. Bank 5824. 370, Cleethorpes Road, Grimsby. Grimsby 3146. 27, Fox Lane, Leicester. Leicester 20522. 96, Hamilton Street, Birkenhead. Birkenhead 2617. 12, Fletcher Gate, Nottingham. Nottingham 2276–7. Cleaver Street Works, Blackburn. Blackburn 5607.

Beardsall and Co., Ltd., W. E., Victoria Bridge, Manchester. Blackfriars 4255 (5 lines). Moonstone. 79, Fitzwilliam Street, Huddersfield. Huddersfield 3688.

Beaver Electrical Supply Co., 5, Gt. Chapel Street Oxford Street, W.1. Gerrard 3335–7.

Beck, F. J., 134, Culford Road, London, N.1. Clissold 3262. Autobaby, Kinland, London.

Becker, Geo., Ltd., 39, Grafton Street, Tottenham Court Road, W.1. Museum 7439. Vertreter, London.

Belfast Radio and Electrical Co., Ltd., 17/19, Queen Street, Belfast. Belfast 4045.

Bligh, S. W., 1 and 2, North Lane and 11, St. Dunstan's Street, Canterbury. Canterbury 289. Bligh, Canterbury.

Blitz Bros., 7, Shaa Road, Acton, London, W.3. Shepherd's Bush 3613.

Boynton and Co., Ltd., 65, Stafford Street, Birmingham. Central 1525–6. Portables, Birmingham.

Brand, T., 33, Frankfort Street, Plymouth. Plymouth 3181/2. Flashlamps, Plymouth.

Brighton Radio Stores, 1–2, Hampton Street, Brighton. Brighton 4453.

Brown Brothers, Ltd. (allied companies Thomson and Brown Brothers, Ltd., and Brown Brothers (Ireland), Ltd.), Great Eastern Street, London, E.C.2. Bishopsgate 7654. Imbrowned, Beth, London. 126, George Street, Edinburgh. Edinburgh 22033. Accelerate Edinburgh. Branches: 74, Huntly Street, Aberdeen. Aberdeen 3324. Accessory, Aberdeen. 31, Adelaide Street, Belfast. Belfast 4276. Imbrowned, Belfast. 77–81, Bristol Street, Birmingham. Midland 0149. Imbrowned, Birmingham. 25, Temple Street, Bristol. Bristol 25341. Imbrowned, Bristol. 86–88, Adam Street, Cardiff. Cardiff 3904. Imbrowned, Cardiff. Dunlop House, Lower Abbey Street, Dublin. Dublin 45154. Imbrowned, Dublin. 50, North Lindsay Street, Dundee; Dundee 3151; Factor, Dundee. 65, Mitchell Street, Glasgow. Central 4980. Accelerate, Glasgow. 19–23, Grace Street, Leeds. Leeds 27351. Imbrowned, Leeds. 3-7, Colquitt Street, Liverpool. Royal 6170; Imbrowned, Liverpool. 14 and 15, Upper Marylebone Street, London, (West End), W.1. Museum 1002. Submotoris, Eusroad, London. 265-273, Deansgate, Manchester. Blackfriars 2472. Broncho, Manchester. Carliol Square, Newcastle-on-Tyne. Newcastle 20631. Distribute, Newcastle-on-Tyne. Marsh Lane, Southampton. Southampton 2181. Imbrowned, Southampton.

Brown Bros. (Ireland), Ltd. (See Brown Bros., Ltd.).

Burner Radio Electric Factors, The, 51, Wellington Street, Woolwich, London, S.E.18. Woolwich 2081–2.

Burris and Sons, Ltd., Fred, 7/16, Redcliff Street, Bristol. Bristol 23521. Horsenail, Bristol.

B.N.B. Wireless, Ltd., 65, Renshaw Street, Liverpool. Royal 806. 25, Brazennose Street, Manchester. City 540 and Central 5701. 14, Grove Road, Colwyn Bay. Colwyn Bay 2463. 9, Brunswick Street, Belfast. Belfast 5939. 51, William Street, Dublin. Dublin 21964.

WHOLESALERS' SECTION.

C

Cadisch and Sons, R., 5/6, Red Lion Square, W.C.1. Chancery 8700 (14 lines). Cadisches, Holb., London.
Campart, C., 32, Theobalds Road, London, W.C.1. Holborn 9772. Cecampart, London.
Cann, Ltd., J. Churly, 23, Farringdon Avenue, London, E.C.4. Central 4975.
Capel's Wholesale Wireless Co., Ltd., Plymouth Street, Queen Street, Cardiff. Cardiff 6660-1. Waves, Cardiff.
Celtic Electric Co., 16, Wellington Quay, Dublin, C.4. Dublin 22876.
Cheshire and North Wales Manufacturing Co., Ltd., 161, Foregate Street, Chester. Chester 1873/4. Cyclaxs, Chester.
Chorlton Metal Co., Ltd., Millgate House, 55, Blossom Street, Manchester. Central 6642-3, Chorlmet, Manchester.
Churchmans, Ltd., 79, Maidenburgh Street, and 7, 8 and 14, George Street, Colchester. Colchester 2831. 18, North Street, Peterborough. Peterborough 895. 23, St. Helen's Street, Ipswich. Ipswich 4191. Tremlet Works, Tremlet Grove, London, N.19. Archway 3763.
Clark and Moir, Ltd., 147/149, Newington Causeway, S.E.1. Metropolitan 0314.
Clarke Bros. (Leicester), Ltd., Victoria House, off London Road, Leicester. Leicester 60113 (4 lines).
Cleave and Co., H. R., 6, Bristol Bridge, Bristol. Bristol 23452. Eclipse, Bristol. 160, Moor Street, Birmingham. Midland 6817/8.
Clive and Co., 26, Curzon Street, Derby. Derby 1305.
Coates, Ltd., J. G., King's Mill, Bridge Street, Burnley, Lancs. Burnley 2295. Coates, Ltd., Burnley.
Cohen, S. W., 7-15, King Street, Glasgow, C.1. Bell, 3255. Violins, Glasgow.
Commercial Engineering Co., The, 88, Colne Road, Brierfield, Lancs.
Craftcase, 37, Baker Street, Weston-super-Mare.
Currys, Ltd., 24-6-8, Goswell Road, E.C.1. Clerk, 9267-8-9. Currifacta, Phone, London.
Cuthbertson and Co., Ltd., 11, West Nile Street, Glasgow, C.1. Central 1687. Falkirk 486.

D

Dallas and Sons, Ltd., John E., 6, Betterton Street, London, W.C.2. Temple Bar 6351.
Daws, Clarke and Co., 23, The Avenue, Bedford Park, W.4. Chiswick 0368.
Dayzite, Ltd., 17, Lisle Street, W.C.2. Gerrard 4476 (2 lines). Titles, Westrand, London.
Delta Radio Distributors, Ltd., 1, Soho Square, London, W.1. Gerrard 6181. Selezl, Rath, London.
Denner and Sons, E. G., 284, Glossop Road, Sheffield. Sheffield 24026.
Dew and Co., Ltd., A. J., 32/34, Rathbone Place, W.1. Museum 8686. Dewmofal, London.
Dibben and Sons, Ltd., W., 80, St. Mary's Road, Southampton. Southampton 3141 (6 lines). Stoves.
Dickeson and Son, Ltd., C. B., 3, Tower Royal, Cannon Street, E.C.4. Central 6667/8.
Dick's Wireless and Electrical Factors, Ltd., 238, High Road, Kilburn, London, N.W.6. Malda Vale 3160.
Dixon Switchgear Co., Leslie, 218, Upper Thames Street, E.C.4. City 0191. Electradix, Cent, London.
Downes and Davies, 1/9, Stanley Street, Liverpool. Bank 5760 (7 lines). Utis, Liverpool. 3A, Norfolk Street, Pall Mall, Manchester. City 8846/7. Paternoster Row, Carlisle. Carlisle 631.
Drake and Gorham, Wholesale, Ltd., 77, Long Acre, London, W.C.2. Temple Bar 3993/4/5. Dragorlite, Rand, London. 29, Piccadilly, Manchester. City 3700/1. Accumulator, Manchester. 51, Waterloo Street, Glasgow. Central 1903. Accumulator, Glasgow. 35, Broad Street, Bristol. Bristol 23509. Dragorlite, Bristol. 24, Marlborough Place, Brighton. Brighton 3886. 2, Church Lane, College Green, Dublin. Dublin 22672. Accumulator, Dublin.
Dulcetto-Polyphon, Ltd., 2/3, Newman Street, W.1. Museum 4201. Dulcetpoly, London. 27, Jamaica Street, Glasgow. Central 8445-6. Dulcetpoly, Glasgow. 31, Quay Street, Manchester. Blackfriars 5006-7. Dulcetpoly. 3, Charlotte Square, Newcastle-on-Tyne. Newcastle 25661-2. Deebro, Newcastle-on-Tyne. 45, London Road, Southampton. Southampton 6561-2. Dulcetpoly, Southampton.
Dundas Fox, Ltd., 11, Farringdon Avenue, London, E.C.4. Central 6100.
Dutfield, Thomas J., 260, Victoria Park Road, London, E.9. Amherst 4031.

E

East London Rubber Co., 29/33, Great Eastern Street, E.C.2. Bishopsgate 4321. Kerry House, Furnival Street, Sheffield.
Eastick, J. J., and Sons, 118, Bunhill Row, E.C.1. Metropolitan 0314/5/6. 9, Library Place, Jersey. Commercial House, Commercial Place, Commercial Road, Portsmouth. 10-11, St. Helen's Place, Swansea.
Ecco Radio, Ltd., Ecco House, Princess Street, St. John's Wood, N.W.8; 55, St. Clements, Oxford, and 23A, Palmerston Road, Boscombe, Bournemouth. Paddington 6735 and 8373, Oxford 3397, and Boscombe 1958. Eccoradlim, Padd., London.
Edinburgh Rubber Co., 178/182, Rose Street, Edinburgh. Edinburgh 27168. Insertion, Edinburgh.
Eirco, Ltd., 20, Waring Street and 31, Rosemary Street, Belfast. Belfast 3659. Eirco.
Electric Lamp Factors, Ltd., 41, Rathbone Place, W.1. Museum 8623-6. 13, Stanley Street, Liverpool. Central 2922. 36, Topping Street, Blackpool. Blackpool 3577. 51, London Street, Southport. Southport 3813. 5, York Place, Leeds. Leeds 27916. 47, Crasswell Street, Portsmouth. Portsmouth 2031. Leen Lane, Chester. Chester 598. 170, Corporation Street, Preston. Preston 10. Barbauld Street, Warrington. Warrington 1120. Princes Street, Nuneaton. Nuneaton 591. 53, Hamilton Square, Birkenhead. Birkenhead 1037.
Electrical and General Distributors, Ltd., 154, King's Cross Road, London, W.C.1. Clerkenwell 0373-4. Elektangen, Kincross, London.
Electrical and Radio Supplies Co., 173, High Street, Swansea. Swansea 3749.
Electrical Ohms, Ltd., 6, Bridge Street, Glasgow. South 328.
Electrical Trades Supply, Ltd., The, Great Charles Street, Birmingham. Central 1601/2. Motors, Birmingham.
Electrocet Radio Co., Poplar Road, Solihull, Birmingham. Solihull 0750. Electrocets, Solihull.
Elektra Supplies, 1, Belmont Street, Chalk Farm Road, London, N.W.1.
Ellancee Radio, Ltd., 43, Wardwick, Derby. Derby 2585. Ellancee, 43, Wardwick, Derby.
Ellis and Mort, Ltd., 90/96, Topping Street, Blackpool. Blackpool 3426/7. 134A, Western Road, Brighton. Brighton 5721-2. 207, Corporation Street, Preston. Preston 3354.
Entley Co., Whitchurch, Shropshire. Whitchurch 157. Entleys. 69, Victoria Street, Bristol. 42, Stoke Road, Stoke-on-Trent.
E. G. S. Co., Ltd., 10/12, Trafalgar Street, Newcastle-on-Tyne. Central 23004/5. Volta. Gt. George Street and Woodhouse Lane, Leeds. Leeds 29584/5. Voltage. 18-26, Constitution Hill, Birmingham. Central 3855/6. Voltac.

F

Factors (Oxford), Ltd., Gloucester Street, Oxford. Oxford 3259.
Faudels, Ltd., 36-40, Newgate Street, London, E.C.1. City 0821.
Fletcher and Co., Ltd., H. J., Bridge Works, New North Road, London, N.1. Clerkenwell 8720-1. Dulciphone, Phone, London.
Flinders (Wholesale), Ltd., East Stockwell Street, Colchester. Colchester 3131-2. St. Margaret's Street, Ipswich. Ipswich 3781-2. Guildhall Chambers, Norwich. Norwich 2417 91, Regent Street, Cambridge. Cambridge 2554. Gladstone Buildings, Commercial Road, Portsmouth. Portsmouth 4997.
Flitton Bros., East Road, Cambridge. Cambridge 2440-1. 17, White Lion Street, Norwich. Norwich 2807.
Forum and Co., Ltd., 7 and 9, Pershore Street, Birmingham. Midland 2697.
Franks (Wholesale), Ltd., A., 3, South King Street, Manchester. Blackfriars 7960. Ukanhear, Manchester.
Furse Wholesale, Ltd., Traffic Street, Nottingham. Nottingham 8213/4/5. Elecshow, Nottingham. 13, Derby Road, Nottingham. Nottingham 43724. Elecshow, Nottingham. Victoria Buildings, 1, London Road, Derby. Derby 685. Furse, 685 Derby.

G

Galliers (Wholesale), Ltd., 32, St. James Street, Brighton. Brighton 3201.
General Electro-Motives, Ltd., 62, Hunslet Road, Leeds. Leeds 24512. Gemlectric, Leeds.
Gilbert and Co., Ltd., C., Arundel Street, Sheffield. Sheffield 21244. Gilrad, Sheffield. 23, South Street, Hull. Gilrad, Hull. 30, St. Mary's Place, Newcastle-on-Tyne. 37, Pall Mall, Hanley, Stoke-on-Trent.
Gledson and Co., Ltd., J., 48/50, Blackett Street, Newcastle-on-Tyne. Newcastle 24137/8/9. Radiate, Newcastle-on-Tyne.
Golding, H. J., 138a, Plough Road, Clapham Junction, S.W.11. Battersea 1883 (2 lines).
Gothic Electrical Supplies, Ltd., Severn Street, Birmingham. Midland 4511/2/3.
Gradley, Ltd., 1, Castle Street, London, E.C.2. Clerkenwell 7218-9. Slickserve, Finsquare, London.
Grafton Electric Co., 54, Grafton Street, Tottenham Court Road, W.1. Museum 0241.
Gratrix, Junr., and Bro., Ltd., S., Alport Works, Quay Street, Deansgate, Manchester. Blackfriars 6601. Lead, Manchester.
Gray and Son, Ltd., E., 18/20, Clerkenwell Road, E.C.1. Clerkenwell 0151. Materials, Smith, London.
Great Eastern Rubber Co., Ltd., 31, Norton Folgate, E.1. Bishopsgate 1807.
Greatrex and Co., R. G., 184, Regent Street, London, W.1. Regent 3575.
Gripton and Co., Corner High Street and Lombard Street, West Bromwich. Staffordshire 0438.

H

Hallamshire Electric Co., Ltd., 11-15, Matilda Street, Moorhead, Sheffield. Sheffield 20157.
Harris and Russell, Ltd., 91, Tottenham Court Road, W.1. Museum 1816-6061-2-9776. 4, Blagrove Street, Reading. Reading 1945.
Harrison and Norris, 51, Bedford Street, Leamington Spa. Leamington Spa 279.
Hart, Lionel, 47/49, Sparkenhoe Street, Leicester. Leicester 59463.
Harveyson and Co., E. R., 27, Hendon Lane, Finchley, London, N.3. Finchley 3352-3. 115, Bute Street, Treherbert, Glam. Treherbert 49.
Harwol Specialities Co., 11, Strand Street. Liverpool. Bank 9249. Harwol, Liverpool.
Haslam and Stretton (E. and M.U.), Ltd., 75, Victoria Street, Bristol. Bristol 23690. Thor, Bristol.
Hawnt and Co., 7/11, Imperial Buildings, Dale End, Birmingham. Central 3661.
Hayward and Son, C., 20-42, New Street, Ashford, Kent. Ashford 334. Haywards Wireless, Ashford.
Henderson Wireless and Electrical Service, 54, Queen's Road, Brighton. Brighton 5704-5. Vale Hall, Vale Road, Tunbridge Wells. 109, Chapel Road, Worthing.
Heys, Leonard, Faraday House, Henry Street, Blackpool. Blackpool 1894. Saxon, 1894, Blackpool.
Hillman Bros., 123/5, Albion Street, Leeds. Leeds 29574-6. Aerial, Leeds.
Hirst Bros. and Co., Ltd., 57, Roscoe Street, Oldham, Lancs. Main (Oldham) 3671.
Hirst, Ibbetson and Taylor, Ltd., 9, Blackfriars Street, Manchester. Blackfriars 9381 (6 lines). Beforehand, Manchester. 57-58, Chancery Lane, London, W.C.2. Holborn 4891. 30-36, Topping Street, Blackpool. Blackpool 3830. 1, Dover Street, Bank Top, Burnley. Burnley 3943.
Hobday Bros., Ltd., 21/27, Gt. Eastern Street, E.C.2. Bishopsgate 4343. Yadboh, Finsquare, London. 16/20, Turner Street, Manchester. Central 7020. Yadboh, Manchester. 32/3, Cleveland Road, Wolverhampton. Wolverhampton 1702/3. Yadboh.
Hollingdrake and Son, Ltd., H., 65, Princes Street, Stockport. Stockport 4801-4. Hollingdrake, Phone, Stockport.
Houghtons, The Wholesalers, 88/9, High Holborn, W.C.1. Holborn 6900. Bromide, Phone. 70/78, York Street, Glasgow. Central 4665-6. 170, Deansgate, Manchester. Blackfriars 7401. 61a, Long Row, Nottingham. Nottingham 43779. 7, Park Place, Leeds. Leeds 21064. 20, Orange Street, Swansea. Swansea 4163. 142, Fore Street, Exeter. Exeter 4003. 1, The Strand, Southampton. Southampton 2295. 3, Freeman Street, Moor Street, Birmingham. Midland 2695. 8, Museum Street, Ipswich. Ipswich 4140. 56, Wellington Place, Belfast. Belfast 502. 10, Best Lane, Canterbury. Canterbury 999.
Hulme and Co., E., 93a, Station Street, Birmingham. Midland 1263. Hulco, Birmingham.

I

Imp Radio Co., 33a, Edith Road, Nunhead, London, S.E.15. New Cross 2391.
Irvine and Co., Ltd., J. F., Caird Hall, Dundee. Dundee 2853. Irvine, Cairdhall.
Itonia, Ltd., 58, City Road, London, E.C.1. Clerkenwell 2033. Overturish, Finsquare, London. 44, Wellington Street, Leeds. Leeds 30081-2. Overturish, Leeds. 17, Commercial Road, Portsmouth. Portsmouth 2411-2. Overturish, Portsmouth.

J

Jepson, Ltd., R. L., Nova Scotia Mills, Kay Street, Blackburn. Blackburn 6420. Jepson, 6420 Blackburn.

K

Kay, Ltd., Philip, 287, City Road, Islington, London, E.C.1. Clerkenwell 4520.
Kerridge and Co., E., North Pole Road, North Kensington, W.10. Park 6368.
Kettle, H. E., Ltd., St. Peter's Street, Maidstone. Maidstone 3103. Kettle, Ltd., Maidstone.

WHOLESALERS' SECTION.

L

Lawrence, P. H., 38, Market Street, Tamworth, Staffs. Tamworth 70.
Lawrie and Co., 72, Holdenhurst Road, Bournemouth. Bournemouth 6814-5. 7a, Broad Street, Canterbury. Canterbury 920.
Lawson, G., 61, Fore Street, London, E.C.2. Metropolitan 1480. Gledic, Ave., London, Gleldic, London.
Lean, Taylor and Co., Ebrington Street, Plymouth. Plymouth 2901-2. Leantaylor, Plymouth.
Lever (Trix) Ltd., Eric J., 8-9, Clerkenwell Green, London, E.C.1. Clerkenwell 3014-5. Trixadio, Smith, London. 50, Wellington Street, Glasgow. 5, Evans Terrace, Trealaw, Glam.
Lewarn and Son, J. H., 2a, Bath Parade, Victoria Street, Bristol. Bristol 24720.
Lewis, B., and Co., Pioneer Works, Church Road, Leyton, E.
London Commercial Electrical Stores, Ltd., 13, Farringdon Avenue, London, E.C.4. Central 9471-2. Galvorite, London.
London Electrical Co. (Sherborne Lane), Ltd., 1, Sherborne Lane, King William Street, London, E.C.4. Mansion House 6201-3. Electa, Phone, London. 23, College Hill, London, E.C.4. 35, Arch, Great Suffolk Street, London, S.E.1.
London Radio Co. (Leeds), Ltd., 26, Queen's Arcade, Leeds. Leeds 24928. 41, The Headrew, Leeds. 50, Savile Street, Hull. Hull 31171. 32, Bridge Street, Northampton. 59, Whitefriar Gate, Hull. Hull 31171 Ext.
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M

MacEchern and Co., Ltd., 38, Southwark Bridge Road, London, S.E.1. Hop 3386-7. Celoron, Boroh, London.
Maclennan and Co., J., 115, Newgate Street, London, E.C.1. National 4575/6/7. Vanduara, Cent., London.
Manor Works Co., 58, Albert Road, Aston, Birmingham. Northern 0630. Manor, Northern 0630.
Manufacturers' Accessories Co. (1928), Ltd., 85, Gt. Eastern Street, E.C.2. Bishopsgate 3511-2-3: Dogeate, Beth, London.
Mason and Collins, Ltd., 19, Percy Circus, King's Cross Road, London, W.C.1. Clerkenwell 8538 and 3658.
Metal Agencies Co., Ltd., Queen Square, Bristol Bristol 21061. Themac, Bristol. "Russells," Colston Street, Bristol. Bristol 10040. Alma, Bristol.
Michael Black, Ltd., 80, Blythswood Street, Glasgow, C.2. Cent. 6681 (3 lines). Faneeka, Glasgow. 57-59, Elder Street, Edinburgh. Edinburgh 30390.
Michelson Brothers, Mark Lane Station Buildings, London, E.C.3. Royal 9056-7. Inland grams: Michemada, Fen., London. Foreign: Michemada, London.
Midland Auto Components, 58, Cambridge Street, Birmingham. Midland 6524 (5 lines). Replace, Birmingham. 169-171, High Road, Willesden, N.W.10. Willesden 3371/3.
Midland Electrical Co., 113, Coleshill Street, Birmingham. Central 1096.
Midland Motor Factors, Ltd., 17, Highcross Street, Leicester. Leicester 5101.
Midland Wireless Co., 32, The Broadway, Bedford. Bedford 2590.
Moores and Co., J., Ravald Street Works, Blackfriars Road, Salford, Manchester. Blackfriars 7618.
Morris (Gramophones), Ltd., 54, City Road, London, E.C.2. Clerkenwell 8563.
Morton, W. A., 71-73, Surrey Street, Sheffield. Central 25131 (2 lines). Morton, Sheffield 25131.
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Murdoch Trading Co., 59/61, Clerkenwell Road, London, E.C.1. Clerkenwell 6144. Putiel-Smith, London. 64, Edgbaston Street, Birmingham. 38, Charles Street, Cardiff. 79, Dunlop Street, Glasgow. 7, Bigg Market, Newcastle-on-Tyne. Woodcock Street, Castle Cary, Somerset.

N

Needham and Brother, Ltd., C. E., No. 3 Warehouse, Milk Street, Sheffield. Sheffield 21011 (5 lines). Pumps, Sheffield.
New Era Wireless and Electrical Co., Ltd., 3, Hobmoor Road, Small Heath, Birmingham. Victoria 0744.
Newcombe and Co., F. D., 25, Catherine Street, Exeter. Exeter 4116.
North British Engineering Equipment Co., Milburn House, Newcastle-on-Tyne. Newcastle 25252. Equipment, Newcastle-on-Tyne.
Northern Steel and Hardware Co., Ltd., 1/3, Southgate, Deansgate, Manchester. Blackfriars 3871. Assiduous, Manchester. Stores, 23, Larkhill, Blackburn. Blackburn 5833.
Nottingham Radio Supplies, Ltd., Sherwood Buildings, Sherwood Street, Nottingham. Nottingham 44351-2.

O

O'Brien and Hulme, 78, George Street, Manchester. Central 6486/7/8. Robanco, Manchester.
Olympia Radio, Ltd., 49A, Sudehill, Manchester. Blackfriars 9128.
Ormrod and Co., Ltd., A., Wigan. Wigan 80.
Overseas Trading Corporation, 18, Ganton Street, London, W.1. Regent 2462.

P

Payne and Hornsby, Ltd., 7, St. Andrews Buildings, Gallowgate, Newcastle-on-Tyne. Newcastle 24604. O'Connell Bridge, Dublin. Dublin 44227. 66, Camden Street, North Shields. N. Shields 743. 46, Crowtree Road, Sunderland. Sunderland 2768.
Pearson Bros., Woodland Place, Nottingham. Nottingham 44063. Pearson Bros., Nottingham.
Perseus Manufacturing Co., Perseus Street, Branston Road, Burton-on-Trent, Staffs. Burton 168. Perseus Co.
Priestley and Ford, 3-11, Carrs Lane, Birmingham. Midland 5941. Peeanef, Birmingham. Marconi, International. 59, Friar Lane, Nottingham. Nottingham 40326. Peeanef, Nottingham.
Provincial Incandescent Fittings Co., Ltd. (Pifco, Ltd.), Pifco House, 71, High Street, Manchester. City 0381. Provencal, Manchester.
Pulford Bros., Ltd., 102-106, Whitechapel, Liverpool. Royal 4940. Personal, Liverpool.

Q

Queen's Radio Supply Co., 632, Wandsworth Road, S.W.8. Macaulay 2466/7.

[*Continued on page 242.*]

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[*Continued from page 240.*]

R

Radio Trading Co., Service House, 309, Old Street, London, E.C.1. Clerkenwell 0255 and 3940. Tradonli, Finsquare, London.

Radio Wholesalers' Federation, Bloomsbury Mansions, 26, Hart Street, W.C.1. Holborn 2488. Radmofax, Westcent, London.

Rawson (Sheffield and London), Ltd., H. C., 100, London Road, Sheffield. Sheffield 26006. Hardware, Sheffield. 37-9, Clyde Place, Glasgow, C.5. South 1289. 22, St. Mary's Parsonage, Manchester. Blackfriars 4229. 44-6, High Bridge, Newcastle, 1. Newcastle 23868.

Regent Fittings Co., 120, Old Street, London, E.C.1. Clerkenwell 2923.

Renshaw Radio Manufacturing Co., 55, Renshaw Street, Liverpool. Royal 1880.

Richardsons (R.M.L.), Ltd., 24, Park Lane, Liverpool. Bank 5443/4. Trutone, Liverpool. 24, St. John Street, Deansgate, Manchester. Blackfriars 6477-8. Trutone, Manchester.

Riche, H. A., 20A, Queen's Arcade, Leeds. Leeds 24928.

Riddiough and Son, F., Simes Street, Westgate, Bradford, Yorks. Bradford 8777-8. Challenger, Bradford. 31, Eastfield Road, Peterborough. Peterborough 971. 23, Park Avenue, Shelton, Stoke-on-Trent. Hanley 48131.

Roberts, J., 1-3, Bridgwater Viaduct, Knott Mill, Manchester. Blackfriars 1837-8. 14, Wellington Road South, Stockport. Stockport 3761.

Robertson, J., 95, West Nile Street, Glasgow. Douglas 4040. Exhaust, Glasgow.

Robinson and Son, Ltd., George, River Plate House, South Place, London, E.C.2. Metropolitan 5886-8. Ancomac, Ave, London.

Robinson and Hands Electric Co., Ltd., 54-6, Barwick Street, Birmingham. Branches: Lincoln, Stoke and Taunton. Central 8131/3. Rewind, Birmingham.

Rose and Son, Ltd., T. A., 25, Milton Street, London, E.C.2. Metropolitan 6368-9.

Rose, Morris and Co., Ltd., 57, City Road, London, E.C.1. Clerkenwell 5377.

Ross and Adam, 68, Gordon Street, Glasgow. Central 543. Hedros, Glasgow.

Runwell Cycle Co. (Birmingham), Ltd., Lawson Street, Birmingham, 4. Aston Cross 0752. Runwell. 16, Great Eastern Street, London, E.C.2. Bishopsgate 1320. Cycorunel, London. Camp Street, Deansgate, Manchester. Blackfriars 8352-3. Runwell, Manchester. 48, Duke Street, Liverpool. Royal 4725. Runwell, Liverpool. 101, Temple Street, Bristol. Bristol 21695. Runwell, Bristol. 5, Carver Street, Sheffield. Sheffield 23995. Runwell, Sheffield. Rose Lane Works, Norwich. Norwich 2042. Runwell, Norwich.

Ryley, J. A., 3/5, Newmarket Street, Birmingham. Central 4354/5. Plugs, Birmingham.

S

St. Mary's Motor Co., St. Mary's Road, Market Harborough. Market Harborough 6. "St. Mary's Garage," Market Harborough.

Santon, Ltd., Newport, Mon. Newport 4211. Santon, Newport, Mon.

Scott and Co., Ltd., A. G., 39, City Road, Manchester. City 9235. Cromalon, Manchester.

Sellers of Leeds, Ltd., Standard Bldgs., City Square, Leeds. Leeds 25319 and 24246. Orion.

Sheffield Radio and Electric Co., 39, Eyre Street, Sheffield 1.

Shemelds, Ltd., 51-53, Berry Street, Belfast, N. Ireland. Belfast 2336.

Siemens-Schuckert (Great Britain), Ltd., 30-34, New Bridge Street, London, E.C.4. Central 8461-3. Elefes, Lud, London.

Silcocks Bros., 30, Bridge Street, Bristol. Bristol 25263-4. Silcocks Bristol 25263.

Sinclair J. Corston and Co. (Newcastle), Ltd., 3, St. Nicholas Buildings, Newcastle-on-Tyne. Newcastle 22515-6. Rucelpag, Newcastle-on-Tyne.

Sloan Electrical Co., Ltd., 8-12, Golden Lane, E.C.1. National 2040. Slonetric, Barb. 16, Jackson's Row, Deansgate, Manchester. Slonetric. 79, Hanover Street, Edinburgh. Central 30041. Slonetric, 143, St. Vincent Street, Glasgow. Central 7874. 44, Victoria Street, Bristol. Bristol 23426. 10, Gandy Street, Exeter. Exeter 2783.

Smethurst, Lincoln, 17, Hanover Bldgs., Southampton. Southampton 6091-2.

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Solomon and Peres, 79, Donegall Street, Belfast. Belfast 8050-1. Apparatus, Belfast.

Solway Factoring Co., 128, Queensberry Street, Dumfries. Dumfries 102. Solway.

South Wales Wireless Installation Co., Ltd., 21-22, Edward Terrace, Cardiff. Cardiff 2636-7. Electron.

Southern Factors, Ltd., Cornfield Road, Eastbourne. Eastbourne 2222. Factors, Eastbourne. 48, Victoria Street, Bristol. Bristol 22118. Factormac, Bristol. Avenue Lane, The Square, Bournemouth. Bournemouth 4737. Factors, Bournemouth.

Sterno Manufacturing Co., Ltd., 19, City Road, E.C.1. National 5886. Sternoec, Finsquare, London. Sternoec, London.

Stockall, Marples and Co., Ltd., 6-10, Clerkenwell Road, London, E.C.1. Clerkenwell 2781 (4 lines). 64, Bridge Street, Deansgate, Manchester.

Storey, F. M., 367, Hylton Road, Sunderland.

Strad Radio, 2, Brecknock Road, London, N.W.1. North 3263.

Stubbs, C. A., 69a, Mansfield Road, Nottingham. Nottingham 2903. Stubbs 2903. Nottingham.

Sun Electrical Co., Ltd., 118-20, Charing Cross Road, W.C.2. Temple Bar 3500. Secabilis, Westcent, London. 45-50, Park Place, Leeds, Leeds 28511-2. Secabilis, Leeds. 112, Pilgrim Street, Newcastle-on-Tyne. Newcastle-on-Tyne 20525. Secabilis, Newcastle-on-Tyne.

Superlamp, Ltd., 92-94, Paul Street, London, E.C.2. Bishopsgate 4868. 24A, High Street, Charing Cross Road, W.C.2. Temple Bar 2504. 223, Hammersmith Road, London, W.6. Riverside 2254. 143, New Cross Road, London, S.E.14. New Cross 3677. 5, Shrubbery Road, Streatham, London, S.W. Streatham 3073. 805, High Road, Leyton, London, E. Leytonstone 2202. 62, Turnpike Lane, Hornsey, London, N. Mountview 1317. 38, Gloucester Road, Brighton. Brighton 4904. 11-3, Union Street, Maidstone. Maidstone 3033. 47, Marine Place, Worthing. Worthing 735.

T

Taylor, F., 57, Studley Road, Stockwell, London, S.W.4.

Taylor, H. S., Roper Street, Whitehaven, Whitehaven 162. Taylor, Factor, Whitehaven.

Taylor and Co., J. H., Macaulay Street, Huddersfield. Huddersfield 341. Thorough, Huddersfield.

Taylor, Paul, Radio House, 24, Rockingham Road, Kettering. Kettering 476.

Thompson, Diamond and Butcher, 34, Farringdon Road, E.C.1. Clerkenwell 5492 (6 lines). Thomdibu, London. Factory at 78, St. John Street, London, E.C.1.

Thomson and Brown Brothers, Ltd. See Brown Bros., Ltd.

Tideman, C. G., 111, Renfrew Street, Glasgow, C.3. Douglas 3782.

Tower Radio Supplies, 5, High Street, Shoreditch, London, E.C.1. Bishopsgate 3684-5.

U

Universal Electric Supply Co., Ltd., 4-8, Brown Street, Manchester. City 3409. Uniselco, Manchester.

V

Van Raden and Co., Ltd., Coventry. Coventry 8644. Vanraden.

W

Wall and Attwooll, 47-49, Craswell Street, Portsmouth. Portsmouth 2031. Wanda, Portsmouth.

Watson's, 10, High Bridge, Newcastle-on-Tyne. Newcastle-on-Tyne 25225.

Whiteley, S. (Manchester), Ltd., Gartside Street, Deansgate, Manchester. Blackfriars 7773. Retreads, Manchester. Carlton Road, Colwyn Bay. Colwyn Bay 2802.

Wholesale Radio Supplies Co., 126, High Road, Leyton, London, E.15. Leytonstone 1396. Leytonex, Leyton.

Wildbores, 68, Yorkshire Street, Oldham, Lancs. Oldham Main 4939.

Wilkinson, L., 8, City Road, Finsbury Square, London, E.C.1. Metropolitan 7359.

Wilrose Co. (Birmingham), Ltd., Atmos House, 47, Cornwall Street, Birmingham. Central 3813.

Wireless-Electric (Wholesale), Ltd., 23-24, North Street, Bristol. Bristol 24505. 77, Holdenhurst Road, Bournemouth, Bournemouth 2882.

Wood, E. A., 100, Aston Road, Birmingham. Aston Cross 2595-6. 105-7, John Bright Street, Birmingham. Midland 4334-5. Crutches, Birmingham. 80, Belgrave Gate, Leicester. Leicester 21511. Wood, Leicester 21511. 77, Gallowgate, near Glasgow Cross. Glasgow Bell 2304.

Wood, L. R., 41, Merchant Street, Cork, I.F.S. Cork 1413. 116B, St. Stephen's Green, Dublin. Dublin 51397.

Wood, R. C., Pertrix House, 18-19, Hills Terrace, Cardiff. Cardiff 641. Wood, 641, Cardiff. Pertrix House, 22, Park Street, Swansea. Swansea 3385. Wood 3385, Swansea.

Wood and Cairns, Ltd., Argyll House, 11, Queen Street, Edinburgh. Edinburgh 25237-8-9. Hillwood. 41, Albert Square, Dundee. 30, Cadogan Street, Glasgow, C.2.

Y

Yevrah Electric Co. (Y.E.C.), 37, Union Street, London, S.E.1. Hop 6708-9.

Young and Son, Thos. D. 127-9, Wollaton Street, Nottingham. Nottingham 3155.

Young and Wildsmith, Ltd., 35, Little Russell Street, W.C.1. Museum 7057 (4 lines). 17, The Oracle, Minster Street, Reading. Reading 2072.

Z

Zeitlin and Sons, Ltd., V., 54, Lamb's Conduit Street, W.C.1. Hol. 6455. Veezed, Holb., London.

Zelco, Ltd., 53, Farringdon Road, London, E.C.1. Holborn 2053.

Z. Electric Lamp and Supplies Co., Ltd., 21, Newman Street, London, W.1. Museum, 4650-1-2. Zedellam, Phone, London. 65, Barwick Street, Birmingham. Central 7977-8. 62, Dingwall Road, Croydon. Fairfield 6378. 50, Wellington Street, Glasgow. Central 3858. Orme Bldgs., Parsonage, Manchester. Blackfriars 0915-6. 15, Lisle Street, Northumberland Street, Newcastle-on-Tyne. Newcastle 26789. 43, Friar Lane, Nottingham. Nottingham 42413.

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Altham Radio Co.
Baxendale & Co., Ltd.
Beardsall & Co., Ltd., W. E.
Brown Bros., Ltd.
B. N. B. Wireless, Ltd.
Chorlton Metal Co., Ltd.
Downes & Davies.
Drake & Gorham, Wholesale, Ltd.
Dulcetto-Polyphon, Ltd.
Franks (Wholesale) Ltd.
Greatrex, Junr., & Bro., Ltd.
Hirst, Ibbetson & Taylor, Ltd.
Hobday Bros., Ltd.
Houghtons The Wholesalers.
Moores & Co., J.
Northern Steel & Hardware Co., Ltd.
O'Brien & Hulme.
Olympia Radio, Ltd.
Provincial Incandescent Fittings Co., Ltd.
Rawson (Sheffield & London) Ltd.
Richardsons (R.M.L.) Ltd.
Riddiough & Son, F.
Roberts, J.
Runwell Cycle Co. (Birmingham) Ltd.
Scott & Co., Ltd., A. G.
Sloan Electrical Co., Ltd.
Stockall, Marples & Co., Ltd.
Universal Electric Supply Co., Ltd.
Whiteley, S. (Manchester) Ltd.
Z. Electric Lamp & Supplies Co., Ltd.

MARKET HARBOROUGH.
St. Mary's Motor Co.

NEWCASTLE-ON-TYNE.
Appletons (Leeds), Ltd.
Brown Bros., Ltd.
Dulcetto-Polyphon, Ltd.
E. G. S. Co., Ltd.
Gilbert & Co., Ltd., C.
Gledson & Co., Ltd., J.
Murdoch Trading Co.
North British Engineering Equipment Co.
Payne & Hornsby, Ltd.
Rawson (Sheffield & London) Ltd.
Sinclair, J., Corston & Co. (Newcastle) Ltd.
Sun Electrical Co., Ltd.
Thompson & Brown Bros., Ltd.
Watson's.
Z. Electric Lamp & Supplies Co., Ltd.

NEWPORT (Mon.).
Santon, Ltd.

NORTHAMPTON.
London Radio Co. (Leeds), Ltd.

NORWICH.
Flinders (Wholesale) Ltd.
Flitton Bros.
Runwell Cycle Co. (Birmingham), Ltd.

NOTTINGHAM.
Beadle & Co., Ltd., T.
Furse (Wholesale), Ltd.
Houghtons, The Wholesalers.
Nottingham Radio Supplies, Ltd.
Pearson Bros.
Priestley & Ford.
Stubbs, C. A.
Young & Son, Thos. D.
Z. Electric Lamp & Supplies Co., Ltd.

NUNEATON.
Electric Lamp Factors, Ltd.

OLDHAM.
Hirst Bros. & Co., Ltd.
Wildbores.

OXFORD.
Ecco Radio, Ltd.
Factors (Oxford), Ltd.

PETERBOROUGH.
Churchmans, Ltd.
Riddiough & Sons, F.

PLYMOUTH.
Brand, T.
Lean, Taylor & Co.

PORTSMOUTH.
Eastick & Sons, J. J.
Electric Lamp Factors, Ltd.
Flinders (Wholesale), Ltd.
Itonia, Ltd.
Wall & Attwooll.

PRESTON.
Electric Lamp Factors, Ltd.
Ellis & Mort, Ltd.

READING.
Harris & Russell, Ltd.
Young & Wildsmith, Ltd.

SHEFFIELD.
Denner & Co., E. G.
East London Rubber Co.
Gilbert & Co., Ltd., C.
Hallamshire Electric Co., Ltd.
Morton, W. A.
Needham & Brother, Ltd., C. E.
Rawson (Sheffield & London), Ltd.
Runwell Cycle Co. (Birmingham), Ltd.
Sheffield Radio & Electric Co.

SOUTHAMPTON.
Brown Bros., Ltd.
Dibben & Sons, Ltd., W.
Dulcetto Polyphon, Ltd.
Houghtons, The Wholesalers.
Smethurst, Lincoln.

SOUTHPORT.
Electric Lamp Factors, Ltd.

STOCKPORT.
Hollingdrake & Son, Ltd.
Roberts, J.

STOKE-ON-TRENT.
Entley Co.
Gilbert & Co., Ltd., C.
Riddiough & Sons, F.
Robinson & Hands Electric Co., Ltd.

SUNDERLAND
Storey, F. M.

SWANSEA.
Eastick & Sons, J. J.
Electrical & Radio Supplies Co.
Houghtons, The Wholesalers.
Wood, R. C.

TAMWORTH (Staffs.).
Lawrence, P. H.

TAUNTON.
Robinson & Hands Electric Co., Ltd.

WHOLESALERS' SECTION

TREALAW (Glam.).
Lever (Trix), Ltd., Eric J.

TREHERBERT (Glam.).
Harveyson & Co., E. R.

TUNBRIDGE WELLS.
Henderson Wireless & Electrical Service.

WALSALL.
Burton, C. F. & H.

WARRINGTON.
Electric Lamp Factors, Ltd.

WEST BROMWICH.
Gripton & Co.

WESTON-SUPER-MARE
Craftease.

WHITCHURCH (Salop).
Entley Co.

WHITEHAVEN.
Taylor, H. S.

WIGAN.
Ormrod & Co., Ltd.

WOLVERHAMPTON.
Attwoods (Factors), Ltd.
Hobday Bros., Ltd.

WORTHING.
Henderson Wireless & Electric Service.

SCOTLAND.

ABERDEEN.
Thompson & Brown Bros., Ltd.

DUNDEE.
Accessories (Birmingham), Ltd.
Irvine & Co., Ltd.
Thompson & Brown Bros., Ltd.

DUMFRIES.
Solway Manufacturing Co.

EDINBURGH.
Accessories (Edinburgh), Ltd.
Ashton & Co., G.
Baxendale & Co., Ltd.
Edinburgh Rubber Co.
Michael Black, Ltd.
Sloan Electrical Co., Ltd.
Thompson & Brown Bros., Ltd.
Wood & Cairns, Ltd.

GLASGOW.
Cohen, S. W.
Cuthbertson & Co., Ltd.
Drake & Gorham (Wholesale), Ltd.
Dulcetto-Polyphon, Ltd.
Electrical Ohms, Ltd.
Houghtons, The Wholesalers.
Lever (Trix), Ltd., Eric J.
Michael Black, Ltd.
Rawson (Sheffield & London), Ltd.
Robertson, J.
Ross & Adam.
Sloan Electrical Co., Ltd.
Thompson & Brown Bros., Ltd.
Tideman, C. G.
Wood, E. A.
Young's (Glasgow), Ltd.
Z. Electric Lamp & Supplies Co., Ltd.

NORTHERN IRELAND.

BELFAST.
Belfast Radio & Electric Co., Ltd.
Brown Bros., Ltd.
B.N.B. Wireless, Ltd.
Eirco, Ltd.
Shemelds, Ltd.
Solomon & Peres.

IRISH FREE STATE.

CORK.
Wood, L. R.

DUBLIN.
Baxendale & Co., Ltd.
Brown Bros. (Ireland), Ltd.
B.N.B. Wireless, Ltd.
Celtic Electric Co.
Drake & Gorham (Wholesale), Ltd.
Wood, L. R.

CHANNEL ISLANDS.

JERSEY.
Eastick & Sons, J. J.

TRADE NAMES DIRECTORY

Inclusion of a trade name in this section of the directory does not necessarily mean the name is registered.

A

Abbey.—Abbey Engineering Works. Steel tubular masts and aerial accessories.
Absorbos.—Stratton and Co., Ltd. Rubber cushions.
Academy.—Johnson Talking Machine Co., Ltd. Gramophones and radio gramophones.
Ace.—American Hard Rubber Co. (Britain), Ltd. Insulating material.
Ace.—Calmont, King and Co., Ltd. Accumulators and batteries.
Ace.—John E. Dallas and Sons, Ltd. Gramophone.
Ace.—Telsen Electric Co., Ltd. L.F. transformer.
Acfil.—E. M. Francis, Ltd., Acid pump for accumulators.
Acme.—Acme Album Service. Record album and carrying case.
Acme.—McLeod and McLeod. Instrument wire, insulating cloth and paper.
Aconemeter.—Leslie Dixon Switchgear Co. Voltmeter.
Acton.—C. A. Vandervell, Ltd. Accumulator.
Acuston.—L. R. Wood, Loudspeakers, units and pick-ups.
Acuston.—Unity Lamps and Accessories, Ltd. Pick-up and tone-arm.
Ad-a-Gram.—Ad-a-Grams. General trade mark.
Adapta.—Edison Bell, Ltd. Pick-up.
Adaptable.—Frank Sandler. Batteries.
Adaptagram.—Peto Scott Co., Ltd. Radiogram cabinet complete to take kit sets.
Adelec.—Nuvolion Electrics, Ltd. Transformer laminations.
Adey.—Adey Portable Radio. General trade mark.
Adico.—Adic and Co., Ltd. Batteries, components, accessories and brass work.
Aedl.—A. Ed. Lallemand. Components.
Aerialite.—Aerialite, Ltd. General trade mark.
Aermonic.—Jas. Christie and Sons, Ltd. Components.
Aerodyne.—Hustler, Simpson and Webb, Ltd. General trade mark.
Aero Loop.—Claude Lyons, Ltd. Frame aerials.
Aga.—Aladdin Gramophone and Accessories Co. Mainsprings.
Airmax.—J. Dyson and Co. (Wks.), Ltd. Plug-in and 6-pin coils.
Airweight.—J. H. Taylor and Co. Headphones.
Ajusta.—Danipad Rubber Co., Ltd. Coil-holder.
Akk-eMmak.—Automatic Rectifying Plants, Ltd. Battery charger and safety indicator.
Akoostex.—Ashton and Co. (Est. 1787), Ltd., Silk gauze.
Akross.—Ward and Goldstone, Ltd. Circular flex and black adhesive tape.
Aladdin.—Aladdin Gramophone and Accessories Co. Sound boxes, automatic brakes, valves and portable gramophone.
Aladdinite.—Electrocolor Products, Ltd. Record lubricant.
Aladdinite.—Keith, Prowse and Co., Ltd. Record cleaning pad.
Alba.—A. J. Balcombe, Ltd. General trade mark.
Albemarle.—H. B. Hicking. Speakers.
Aldergate.—P. H. Lawrence. Receivers.
Alembic.—J. Millet. Crystal, meter, switch, headphones and speaker.
Alert.—K. E. Beswick, Ltd. Fuses.
Alklum.—Alklum Storage Batteries, Ltd. Batteries and accumulators.
Allhall.—L. Kremner. Speaker.
Alliance.—Alliance Radio, Ltd. Receivers.
Alligator.—Guillaume and Sons, Ltd. Gramophone needles.
Allscott.—James Scott and Co. Receivers and radio-gramophones.
Allwave-Beatall.—S. W. Scott and Co. Tuner.
Alpha.—Edison Bell, Ltd. Soundboxes.
Always.—Abingdon Wireless Supplies. Grid leaks, anode resistances, spaghetti resistances, potential dividers.
Amaphone.—Amalgamated Manufacturers. Components and sets.
Ambassador.—Ambassador Talking Machine Co., Ltd. Gramophones.
Ambassador.—Carrington Manufacturing Co., Ltd. Cabinet.
Amplion.—Amplion (1932), Ltd. General trade mark for speakers, receivers, portables and transportables.
Ancalite.—Callender's Cable and Construction Co., Ltd. Electric cable.
Ankaflex.—Callender's Cable and Construction Co., Ltd. Unkinkable flexible cord.
Anodex.—S. Smith and Sons (M.A.), Ltd. Dry batteries.
Anotuna.—Tonex Co. H.F. tuner.
Ansil.—Gresley Radio, Ltd. Components.
Antifroth.—Cowlishaw Bros. Accumulator anti-frothing solution.
Anti-Mobo.—Varley. Anti-motor boating device.
Antimobo R.C.C.—Varley. R.C. coupler incorporating Anti-Mobo device.
Antinodal.—Radio Instruments, Ltd. Short wave adaptor.
Anti-Sulphuric.—Griffiths Bros. and Co., London, Ltd. Enamel.
Antoria.—J. T. Coppock. Gramophones.
Antorid.—J. T. Coppock. Gramophones.
Apex.—J. Bennett Heyde and Co. Turntable discs (cork).
Apollo.—Accles and Pollock, Ltd. Steel telescopic aerial masts and tubular box spanners.
Apollo.—Apollo Gramophone Co., Ltd. Radiograms, pick-ups, and gramophones.
Archer.—Thos. A. Rose and Son, Ltd. Inscribed terminals, wander plugs, hydrometers and electric clocks.
Ardenne.—W. Edwards and Co. Cathode ray oscillographs.
Ardwick.—Runbaken Magneto Co., Ltd. Battery chargers.
Arega Radio.—Precision Electric, Ltd. Receivers.
Aresco.—Radio Service Co. Receivers, eliminators, radio-gramophones and loudspeakers.
Aristocrat.—Claude Lyons, Ltd. Electric Gramophone motor (induction pattern).

TRADE NAMES SECTION

Armacell.—Griffiths Bros. and Co., London, Ltd. Insulating varnish.
Armour.—Griffiths Bros. and Co., London, Ltd., Crystallising varnish.
Arrow.—Claude Lyons, Ltd. QMB mains switches.
Art et Technique.—M. Benoit. Condensers, crystals, dials, tools, etc.
Artavian.—The Barnstaple Loud Speaker Co., Loudspeaker.
Artavian Trouton.—Shapland and Petter. Speaker.
Artic.—Artic Fuse and Electrical Manufacturing Co., Ltd. Valve holder and fuses.
Artiste.—Pohlmann and Son, Ltd. Gramophone record cabinets, etc.
Ashdown.—H. E. Ashdown (Birmingham), Ltd. Bakelite mouldings.
Ashleigh.—Alliance Radio, Ltd. Receivers.
Ashley-Ledward.—Ashley Wireless Telephone Co. (1925), Ltd. Resistance.
Ashley Radio.—Ashley Wireless Telephone Co. (1925), Ltd. Sets, amplifiers and components.
Ashton.—Ashton's Wireless Depot. General trade mark.
Aslett.—V. Zeitlin and Sons, Ltd. Coils.
Astoria.—E. P. Whetton and L. Gold. General trade mark.
Astoria.—Aladdin Gramophone and Accessories Co. Tone arms and fittings.
Astoria.—Wholesale Radio Supplies Co. Receiver.
Astra.—Emkabe Radio Co., Ltd. Dials and condensers.
Astra.—S. Kalisky (Aldgate), Ltd. Dial, condensers and transformers.
Atalanta.—Atalanta, Ltd. Tools.
Atheo.—A. T. Harrison and Co. Resistors and grid leaks.
Atlas.—Atlas Carbon and Battery Co. Batteries.
Atlas.—H. Clarke and Co. (Manchester), Ltd. General trade mark.
Audak.—Claude Lyons, Ltd. Electromagnetic pick-ups.
Audion.—Graham-Farish, Ltd. Resistance capacity unit.
Aureola.—T. H. Wathes and Co., Ltd., Set and amplifier.
Austin.—Austin, Mills and Co. General trade mark.
Auto-Bat.—Climax Radio Electric, Ltd. Mains supply units and components.
Autocel.—Primus Manufacturing Co., Ltd. H.T. batteries.
Autoceptor.—A. W. Hambling, Ltd. Programme selector.
Autocrat.—Itonia, Ltd. Portable receiver.
Auto-Dial.—Pearson Bros. Automatically controlled receiving sets and public address apparatus.
Autokoil.—A. W. Hambling, Ltd. Tuner.
Automatic.—Clarith Reproducers, Ltd. Gramophone and moving-coil speakers.
Automatic Tension.—J. G. Beddoes, Ltd. Automatic safety lock.
Aveco.—Willmott, Son and Phillips, Ltd. Insulating tape and fibre.
Avecolite.—Willmott, Son and Phillips, Ltd. Bakelite sheets, rods and tubes.
Avometer.—Automatic Coil Winder and Electrical Equipment Co., Ltd. Combination measuring instrument.
Avon.—Avon India Rubber Co., Ltd. Battery accessories and insulating material, acid, resisting rubber washers, etc., gasket tubing for sound boxes.
Aylesbury-Trouton.—Loudspeaker Engineering Co., Ltd. Speaker.
A.A.—A. W. Beuttell, Ltd. Earth clip.
A.B.C.—Allwood Blackband and Co. Gramophone needles.
A.C.C.O.—Alpha Coil and Component Co. Components.
A.C. Co.—Alpha Coil and Component Co. Components.
A.E.F.—A.E.F. Manufacturing Co. Accumulators.
A.E.G.—A.E.G. Electric Co., Ltd. General trade mark.
A.J.D.—A. J. Dew and Co., Ltd. Products.
A.J.H.—A. J. Hewitt, Ltd. General trade mark.
A.J.W.—A. J. Wright, Ltd. Speakers, receivers, and coils.
A.P.—Aneloy Radio. Four-electrode valves.

B

Baby.—Clarith Reproducers, Ltd. Radio gramophone, moving-coil speaker.
Baby Grand.—Brownie, Wireless Co. Receivers.
Bairn.—Kenwell Radio, Ltd. Receiver.
Bakelite.—Bakelite, Ltd. Insulating materials.
Bakelized.—R. O. Bridger and Co. Paper cones.
Bakfin.—Baker and Finnemore, Ltd. Products.
Ballsok.—Lionel Robinson and Co. Insulators.
Bantam.—Union Radio Co., Ltd. Receivers.
Bantam.—Reproducers and Amplifiers, Ltd. Speaker.
Barrier.—Junction Engineering Co., Ltd. Aerial insulator.
Barto.—J. G. Coates, Ltd. Products.
Baty.—E. J. Baty. Receivers, speakers, and mains units.
Beanco.—Baxendale and Co., Ltd. Accumulators and gramophones.
Beasal.—Beardsall and Co., Ltd. Speakers and sets.
Beatall.—S. W. Scott and Co. Tuners.
Bebe.—Sydney S. Bird and Sons, Ltd. Variable condensers.
Bebelog.—Sydney S. Bird and Sons, Ltd. Baby logarithmetic condensers.
Becol.—British Ebonite Co., Ltd. Ebonite.
Becolate.—British Ebonite Co., Ltd. Insulating compound.
Beethoven.—Montague Radio Inventions and Development Co., Ltd. Portable radio receivers.
Belco.—Nobel Chemical Finishes, Ltd. Wood finishes for cabinets.
Belden.—Standard Insulator Co., Ltd. Aerials, frame aerial wire, terminals and rosin core solder.
Beldenamel.—Standard Insulator Co., Ltd. Enamelled copper instrument wire.
Belgrave.—Electrical and Radio Products (1931), Ltd. Radiogram.
Belgravia.—Hyde and Telford. Speaker.
Belgravia.—Celebrity Gramophones, Ltd. Gramophones.
Bell.—J. and J. Laker and Co., Ltd. Aerial insulators.
Bellerite.—Barrett and Elers, Ltd. Insulators.
Belleroid.—Barrett and Elers, Ltd. Insulating material.
Belling Lee.—Belling and Lee, Ltd. General trade mark.
Beltona.—Murdoch Trading Co. General trade mark.
Benchrack.—B. Thomas. Storage trays for small parts.
Benhyco.—G. Bennett, Heyde and Co. Colloidal graphite grease.
Benjamin.—Benjamin Electric Ltd. Components.
Benwood Linze.—The Rothermel Corporation, Ltd. Dry rectifiers.
Berclif.—Berclif, Ltd. Sets and components.
Berco.—British Electric Resistance Co., Ltd. Fixed and variable resistances, rheostats and resistance wire.
Berrage-Moulton.—Berrage-Moulton Speaker, Ltd. General trade mark.
Beteco.—Spalton Electrical Stores, Ltd. Speakers, units and pick-ups.
Bi-Duplex.—Varley. Resistances.
Biflecca.—Aladdin Gramophone and Accessories Co. Amplifier.
Big Ben.—Stockall, Marples and Co., Ltd. Radiograms, gramophones and sound boxes.
Bimp.—Murdoch Trading Co. H.T. batteries.

Biogram.—Edison-Bell, Ltd. Portable gramophone with alternative pick-up.
Birmite.—E. Elliott. Synthetic resin mouldings.
Biscar.—Cleveleys Engineering Co. Cone aerial.
Bisolac.—Bakelite, Ltd. Lacquer.
Bivolt.—Beaver Electrical Supply Co. Accumulators.
Blackfriars.—Spicers, Ltd. Black adhesive tape and sleeving.
Blackley.—Connollys (Blackley), Ltd. Insulating tape.
Bligh.—S. W. Bligh. Set and accessories.
Blue Circle Radio.—H. J. Fletcher and Co., Ltd. Sets and radiograms.
Blue Comet.—Blue Comet, Ltd. General trade mark.
Blue Flyer.—The Rothermel Corporation, Ltd. Gramophone motors.
Blue Spot.—British Blue Spot Co., Ltd. General trade mark.
Boco.—Aladdin Gramophone and Accessories Co. Pick-up and tone-arm.
Boley.—S. Wolf and Co., Ltd. Precision machine tools.
Bowerman's.—George Bowerman, Ltd. Headphones, speakers and cone units.
Brassoline.—Fredk. Crane Chemical Co., Ltd. Cold cellulose lacquer.
Break-Not.—F. J. Gordon and Co., Ltd. Hydrometer.
Brexton.—Brexton, Ltd. Portable set cases.
Bridge Megger.—Evershed and Vignoles, Ltd. Testing instruments.
Brilliant.—Columbia Graphophone Co., Ltd. Radio-gramophones.
Bristol Star.—Electrolines, Ltd. General trade mark.
Britannia.—Britannia Lathe and Oil Engine Co., Ltd. Lathe and tools.
Britannia.—Britannia Reproducers, Ltd. Moving-coil speaker.
Britannia.—Britannia Rubber and Kamptulicon Co., Ltd. Ebonite.
Britannic.—Ever Ready Co. (Great Britain), Ltd. Dry cell.
Briticent.—British Central Electrical Co., Ltd. Crystals and switches.
Britinol.—Bi-Metals. Soldering outfit, cored wire and paste solders.
British.—British Battery Co., Ltd. Batteries.
British General.—British General Manufacturing Co., Ltd. General trade mark.
British Hydra.—Telephone Mfg. Co., Ltd. Condensers.
British Radiogram.—British Radio Gramophone Co., Ltd. Portable.
Britkam.—Britannia Rubber and Kamptulicon Co., Ltd. Ebonite and all rubber goods made by the company.
Broadcast.—Crystalate Gramophone Record Manufacturing Co., Ltd. Gramophone records.
Broadcaster.—J. and A. Margolin. Gramophones.
Broadcasting House.—Weedon Power Link Radio Co. Speaker baffle.
Broadway.—Rose, Morris and Co. General trade mark.
Brosse-Wave.—B. and J. Wireless Co. Coils.
Browne and Sharpe.—Buck and Hickman, Ltd. Fine tools.
Brownie.—Brownie Wireless Co. of Great Britain, Ltd. Sets and components.
Brunswick.—Warner Brunswick, Ltd. General trade mark.
Buckman.—Buck and Hickman, Ltd. Precision gauges.
Bulgin.—A. F. Bulgin and Co., Ltd. General trade mark.
Bull.—British Ropes, Ltd. Wire.
Bull-Dog.—Pomona Rubber Co. Insulating tapes.
Bull-Dog.—Ward and Goldstone, Ltd. Spring connectors.
Bulwark.—Redfern's Rubber Works, Ltd. Ebonite, panels, sheets and coil formers.
Bur-Bri.—Fred Burris and Sons, Ltd. General trade mark.
Bureaugram.—Lawson and Raphael. Radiogram unit.
Burgoyne.—Burgoyne Wireless (1930), Ltd. Sets.
Burmese Colour Needles.—Keith Prowse and Co., Ltd. Gramophone needles (fibre).
Burndept.—Burndept, Ltd. General trade mark.
Bur-Ton.—C. F. and H. Burton. General trade mark.
Busco.—Busby and Co., Ltd. Lightning arrester, terminal tags and push-pull switches.
Bush.—Bush Radio, Ltd. General trade mark.
Bygrave.—W. Bygrave and Sons. L.F. transformer and moving-coil speaker parts.
Byldurone.—J. J. Eastick and Sons. Cabinets.
B.A.A.—F. W. Berk and Co., Ltd. Accumulator acid.
B.A.T.—Claude Lyons, Ltd. Components, amplifiers and receivers.
B.B.—George Bowerman, Ltd. Duralumin headbands.
B.B.Co.—British Battery Co., Ltd. Dry battery.
B.I.—British Insulated Cables, Ltd. General trade mark.
B. and J.—B. and J. Wireless, Ltd. General trade mark.
B.N.B.—B.N.B. Wireless, Ltd. Sets and components.
B.P.—Birmingham Products, Ltd. Terminals and headphone pads.
B.S.R.—Bakers Selhurst Radio. Speaker.
B.S.R. — Birmingham Sound Reproducers. General trade mark.
B.T.-H.—British Thomson-Houston Co., Ltd. Set components, accessories, amplifiers, valves, speakers and headphones.
B.W.—L. R. Wood. Aerial wire.

C

Cabinet Cone.—Goodmans. Cone speaker.
Caddie.—Acmē Album Service. Record cases.
Cadet.—Columbia Graphophone Co., Ltd. Portable gramophone.
Cadison.—R. Cadisch and Sons. Accumulator carriers, battery switches, earth tubes, valve holders, etc.
Caeparil.—Aston and Mander, Ltd. Aerial.
Callender.—Callender's Cable and Construction Co., Ltd. General trade mark.
Cambridge.—Cambridge Instrument Co., Ltd. Instruments.
Cambridge.—G. J. Pooley. General trade mark.
Cameo.—Carrington Manufacturing Co., Ltd. Cabinets, panels and brackets.
Capehart.—Giffens (London), Ltd. Automatic record changer.
Capehart.—Sun Electrical Co., Ltd. Automatic record changer.
Capitol.—Hobday Bros., Ltd. Components and accessories.
Carborundum.—Carborundum Co., Ltd. Components.
Carillon.—Earnshaw Brothers and Booth. Gramophones, sets and cabinets.
Carl Lindstrom.—Parlophone Co., Ltd. Gramophones, motors, etc.
Carlton.—Fred Bulmer. General trade mark.
Carlton.—Vinces Dry Batteries, Ltd. H.T. and grid bias batteries.
Carlton.—Carrington Manufacturing Co., Ltd. Cabinet.
Carnival.—General Electric Co., Ltd. Radiogram.
Carvanite.—F. M. Carson. Insulator.
Castaphone.—G. Castagnoli. Public address outfits, valve sets, amplifiers and components.
Castle.—Dundas Fox, Ltd. Batteries.
Castle.—Watson, Saville and Co., Ltd. High-speed steels.
Castlewood.—Majestic Electric Co., Ltd. Receivers.
Cathode.—Lithanode Co., Ltd. Battery.
Caxton.—Smith's Cabinets, Ltd. Cabinets.
Cecil.—Wm. Jones and Sons, Ltd. Aerial accessories.
Cecil.—Mansell and Ogan, Ltd. Components and accessories.

TRADE NAMES SECTION

Cecilian.—L. R. Wood. Receivers, radiograms, amplifiers, gramophones and gramophone accessories.

Celastine.—British Celanese, Ltd. Sheets, rods and moulding powder.

Celastoid.—British Celanese, Ltd. Non-flam. celluloid sheets.

Celec.—Curtis Manufacturing Co., Ltd. Resistances.

Celestion.—Celestion, Ltd. General trade mark.

Celestrola.—Celestion, Ltd. Loud speakers.

Cellbest.—Cellgrave Co. Engraved dials, labels and scales.

Cellotone.—Runwell Cycle Co. (Birmingham), Ltd. Gramophones, sound boxes and needles.

Cellwell.—Cellgrave Co. Engraved dials, labels and scales.

Centralab.—Rothermel Corporation, Ltd. Volume controls and resistances.

Centrex.—Goodmans. Moving coil speaker.

Centroid.—Neophone Engineering Co. Condensers and dials.

Centurian.—Saxon Radio Co. Insulated aerial wire.

Century.—Pegasus, Ltd. Receivers.

Certex.—Certex Products. General trade mark.

Chakophone.—Eagle Engineering Co., Ltd. Sets and components.

Chakotrope.—Eagle Engineering Co., Ltd. Amplifiers.

Chalgrove and Chalkley.—C. G. Chalkley. Sets, components, speakers and accessories.

Champion.—Champion Accumulator Co. Accumulators.

Champion.—Hobday Bros., Ltd. Portable receiver.

Chaslyn.—J. H. Collie and Co. Hydrometer.

Chassikit.—Six-Sixty Radio Co., Ltd. Kit receiver, battery and mains.

Chassiset. Six-Sixty Radio Co., Ltd. Receiver.

Chebros.—Chester Bros. Mains transformers and chokes.

Chelsea.—Celebrity Gramophones, Ltd. Gramophone and receivers.

Chester-Super.—Smith's Cabinets, Ltd. Cabinets.

Chiltern-Trouton.—Loudspeaker Engineering Co., Ltd. Speakers.

Chippendale.—Halford Radio, Ltd. Receivers and radiograms.

Choice of Critics.—A. F. Bulgin and Co., Ltd. General trade mark.

Chorister.—H. J. Fletcher and Co., Ltd. Sets, radiograms, needles, soundboxes, pick-ups and arms.

Chromel.—M. Coquantin. Resistance wire.

Chromic.—Edison-Bell, Ltd. Needles.

Chromogram.—Micro-Perophone and Chromogram. Gramophones.

Chromoy.—Climax Radio Electric, Ltd. Earth tubes.

Chubby.—W. J. Charlesworth. Plugs and sockets and wander plugs.

Cifel.—Cifel Products, Ltd. General trade mark.

Cine.—Clarith Reproducers, Ltd. Turntables and amplifier.

Cinema.—Edison Bell, Ltd. Pick-up.

Cirsclale.—Record Electrical Co., Ltd. Electrical measuring instruments.

Claremont.—Electrical and Radio Products (1931), Ltd. Receiver.

Clarion.—British Clarion Co., Ltd. Sets.

Clarion.—Octron, Ltd. Radio valves.

Clarion.—Clarion Radio Valve Co. Valves.

Claristal.—Ward and Goldstone, Ltd. Aerial set.

Claritone.—Ashley Wireless Telephone Co. (1925), Ltd. Headphones, components and speakers.

Clarostat.—Claude Lyons, Ltd. Controls, grid-leaks.

Clarowax.—Bakelite, Ltd. Insulating materials.

Classic.—Goodmans. Moving coil speaker.

Classic.—Smith's Cabinets, Ltd. Table cabinet.

Classic.—A. E. Shearing, Ltd. Components.

Clayton.—Clayton (Rubber Sales), Ltd. Ebonite.

Clearer-Tone.—Benjamin Electric, Ltd. Valve holder.

Clearertone.—Benjamin Electric, Ltd. Anti-microphonic valveholders.

Clifton.—Hobday Bros., Ltd. Switches.

Climax.—Climax Radio Electric, Ltd. General trade mark.

Clix.—Lectro Linx, Ltd. Terminals.

Clutch.—A. H. Hunt, Ltd. Insulating tape.

Coaguline.—Kay Bros., Ltd. Transparent cement.

Cobena.—Baxendale and Co. Dry battery.

Colassion.—W. L. Colassi. Speakers and pick-ups.

Collaro.—Collaro, Ltd. General trade mark.

Collett.—S. H. Collett Manufacturing Co. Aerial pulley and components.

Colossus.—Lissen, Ltd. Receivers.

Coltags.—S. H. Collett Manufacturing Co. Battery cord tags.

Columbia.—J. R. Morris. H.T. battery.

Columbia Graphophone.—Columbia Graphophone Co., Ltd. Radio-gramophones and electric reproducing gramophones.

Columbia Radio.—Columbia Graphophone Co., Ltd. Radio receivers, gramophones and power units. Speakers.

Colverdynes.—Colvern, Ltd. Band-pass intermediates for super het. receivers.

Colvern.—Colvern, Ltd. Coils.

Colverstats.—Colvern, Ltd.—Fixed and variable resistances.

Combenola.—E. J. Lever (Trix), Ltd. Radio gramophones.

Comet.—London Commercial Electrical Stores, Ltd. Switch.

Commercial.—Rigby and Woolfenden. Metal cabinets.

Compax.—Wingrove and Rogers, Ltd. Variable condensers.

Competa.—A. F. Bulgin and Co., Ltd. Components.

Competition.—Lissen, Ltd. Portable.

Compton.—Aston and Mander (1917), Ltd. Cabinets and components.

Concord.—Concordia Electric Wire Co., Ltd. Extension flexibles and cables.

Concordin.—Concordia Electric Wire Co., Ltd. Resistance wire.

Condensite.—Bakelite, Ltd. Insulating materials.

Connectite.—Concordia Electric Wire Co., Ltd. Connecting wire.

Connexit.—Saxon Radio Co. Insulated wire.

Connode.—C. E. Needham and Bro., Ltd. Condensers and coil holders.

Connoisseur.—A. F. Bulgin and Co., Ltd. Transformer.

Consolette.—S. M. T. Gramophone Co., Ltd. Gramophone.

Constantan.—Concordia Electric Wire Co., Ltd. Resistance wire.

Contax.—Contal Radio, Ltd. General trade mark.

Copex.—Peto Scott and Co., Ltd. Coils and coil screens.

Copparite.—Altham Radio Co. Insulated copper aerial wire.

Cordesia.—Cordesia Batteries Ltd. General trade mark.

Cordo.—Cordo Electrical Products, Ltd. General trade mark.

Corner Cabinet.—Jonathan Fallowfield Ltd. Cabinet-set.

Corona.—Beaver Electrical Supply Co. Speakers.

Cortabs.—Money Hicks, Ltd. Tags for marking connecting wires.

Cossor.—A. C. Cossor, Ltd. General trade mark.

Cossor-Utah.—A. C. Cossor, Ltd. Moving coil speaker.

Cotenamel.—Standard Insulator Co., Ltd. Enamelled and S.C.C. copper wire.

Cottage.—Celebrity Gramophones, Ltd. Gramophone.

Crabtree.—J. A. Crabtree and Co., Ltd. General trade mark.

Craftease.—Craftease. Cabinets.

Craigwell.—British Radio-Gramophone Co., Ltd. Receivers and radio-gramophones.

Cranco.—Fredk. Crane Chemical Co., Ltd. Cold cellulose lacquer.
Crawford.—Harmo Products. Jacks.
Crawford.—Romac Motor Accessories, Ltd. Jacks.
Cressall.—Cressall Manufacturing Co. Asbestos resistance nets and rheostats.
Crisptone.—R. O. Bridger and Co. Super-paper cones.
Critic.—Franklin and Freeman, Ltd. Components.
Cromwell.—W. Dibben and Sons, Ltd. Receivers.
Crown.—J. Leibovici. Gramophones.
Cruiser.—British Lumophon, Ltd. Kits.
Crypto.—Lancashire Dynamo and Crypto Co., Ltd. Rotary and valve rectifiers for L.T. and H.T. charging.
Cryptoverter.—Lancashire Dynamo and Crypto Co., Ltd. Rotary converter for radiograms.
Crystacel.—Siemens Electric Lamps and Supplies, Ltd. L.T. accumulators.
Crystalate.—Crystalate Gramophone Record Manufacturing Co., Ltd. Mouldings.
Crystophone.—Garnett's. Components.
Cub.—Ward and Goldstone, Ltd. Wave trap.
Curry.—Curry's Ltd. Receivers and L.F. transformer.
Cyldon.—Sydney S. Bird and Sons, Ltd. Variable condensers.
C.A.C.—City Accumulator Co. General trade mark.
C.A.V.—C. A. Vandervell, Ltd. H.T., L.T. accumulators and dry batteries.
C.R.—Clayton Rubber Sales, Ltd. Ebonite.
C.R.L.—Rothermel Corporation, Ltd. Rheostat, potentiometer and modulator.
C.T.S.—St. Helen's Cable and Rubber Co., Ltd. Electric cable.
C.W.—Jeb Trading Co. Battery links.

D

D'accord.—Burwood's Wireless. General trademark.
Dagenite.—National Accumulator Co., Ltd. Accumulator.
Dagenite Tell Tale.—National Accumulator Co., Ltd. Accumulator.
Daly.—H. C. Daly. Tubular fixed condensers, Mansbridge fixed condensers. L.F. transformers, L.F. chokes, wirewound resistances, smoothing chokes.
Damarda.—Bakelite, Ltd. Lacquer.
Danco.—Danipad Rubber Co., Ltd.
Dania.—Atlas Carbon and Battery Co., Ltd. Battery.
Daptacon.—British Ideal Patents, Ltd. General trade mark.
Dario.—Impex Electrical Ltd. General trade mark.
Davenset.—Partridge, Wilson and Co. General trade mark.
Davent.—Midland Electrical Co. H.T. and grid bias batteries.
Dayzite.—Dayzite, Ltd. General trade mark.
Decko.—A. F. Bulgin and Co., Ltd. Accessories.
Deckorem.—A. F. Bulgin and Co., Ltd. General trade mark.
Dekkor.—Adam Hilger, Ltd. Optical devices for engineers.
De Luxe.—Columbia Graphophone Co., Ltd. Needles.
De Luxe.—Edison Bell Ltd. Speakers.
De Luxe.—M.P.A. Wireless (1930), Ltd. Plaque speaker.
De Luxe.—Rigby and Woolfenden Metal cabinets.
Dellart.—Winscombe Cabinet Works. Cabinets.
Dema.—Tekade Radio and Electric Ltd. Variable condensers.
Detex.—Detex (1931), Ltd. General trade mark.
Deucalion.—Yorkshire Radio Co. Coil and valve set.
Dexolin.—Danipad Rubber Co., Ltd. Bakelised tubing.
Dial.—Plowden and Thompson, Ltd. Glass tubing, laboratory apparatus, etc.
Dialite.—A. F. Bulgin and Co., Ltd. Panel mounting light.
Diamine.—T. Webster and Co., Ltd. General trade mark.
Diamond.—Edison-Bell, Ltd. L.F. transformer.
Diamond-F.—Diamond Fibre Co., Ltd. Fibre sheets, rods and tubes and components.
Diana.—Atlas Carbon and Battery Co., Ltd. Battery.
Dido.—Kay Bros., Ltd. Cement for celluloid ebonite, etc.
Diehl.—Claude Lyons, Ltd. Electric motors and rotary converters.
Dilecto.—Diamond Fibre Co., Ltd. Panel and components.
Dimic.—L. McMichael, Ltd. Coil.
Discol.—Gent and Co., Ltd. High-frequency transformer.
Disque.—Disque Cabinet Co., Ltd. Cabinets.
Distavox. — Distavox, Ltd. General trade mark.
Dix Charger.—Leslie Dixon Switchgear Co. Battery chargers.
Dix-Ohmeter.—Leslie Dixon Switchgear Co. Resistance meter.
Dix-Onemeter.—Leslie Dixon Switchgear Co. Universal tester.
Dix-Wattmeter.—Leslie Dixon Switchgear Co. Power meter.
Doelcam.—McLeod and McLeod. Sleeving (Varnished insulating).
Dolla.—Frank Sandler. Batteries.
Dominion.—Brownie Wireless Co. of Gt. Britain, Ltd. Sets and components.
Domino.—Thos. R. Ellin (Footprint Works). Ltd. Tools.
Donaphone.—Abingdon Wireless Supplies. Five Valve Portable Receivers. Three Valve Table Model Receivers.
Donophone.—Donophone. General trade mark.
Doric.—T. O'Brien, Ltd. Cabinets.
Double Pentagon.—Woodhams, Dade and Co. Shellacs.
Douglas.—Automatic Coil Winder and Electrical Equipment Co., Ltd. Automatic coil winders, both hand and power.
Dr. Nesper.—Dr. Nesper, Ltd. General trade mark.
Dragon.—Amplion (1932) Ltd. Speaker.
Dreadnaut.—R. O. Bridger and Co. Paper cones.
Dreadnought.—Goodmans. Moving coil speakers, chassis and cabinet models.
Drydex.—Chloride Electrical Storage Co., Ltd. Dry Battery.
Dual.—Dual Motors, Ltd. Electric motors.
Dual Astatic.—Radio Instruments, Ltd. H.F. chokes.
Dualcone.—Goodmans. Double cone chassis.
Dual-Finish.—Ripaults, Ltd. Ebonite.
Dubilier.—Dubilier Condenser Co. (1925), Ltd. General trade mark.
Duco.—Brown Brothers, Ltd. Components.
Ducon.—Dubilier Condenser Co. (1925), Ltd. Plug to use lighting circuit as aerial.
Dulcetto.—Dulcetto Polyphon, Ltd. General trade mark.
Dulcetto-Symphonion.—Dulcetto Polyphon, Ltd. Gramophone.
Dumolite.—Dew and Co., Ltd., A. J. Accumulators and battery tester.
Duomains.—Duomains Radio Ltd. General trade mark.
Duplex.—L. McMichael, Ltd. Receivers.
Duragold.—Columbia Graphophone Co., Ltd. Needles.
Duray.—Duray. H.T. eliminators, tone purifiers, H.T. economisers and aerials.
Dux.—Radio Instruments Ltd. L.F. transformer.
Dwarf.—Everett, Edgcumbe and Co., Ltd. Ammeters and voltmeters.
Dynamotone.—Murdoch Trading Co. Talkie needles.
Dynatron.—H. Hacker and Sons. Radiograms and receivers.

TRADE NAMES SECTION

D.C.—Buck and Hickman, Ltd. Screw placers.
D.E.U.—McLeod and McLeod. Bobbins, boxes, etc., for batteries, etc., in papier mache.
D.R.C.—Danipad Rubber Co., Ltd. Ebonite.
D.X.—D.X. Coils, Ltd. General trade mark.

E

Eagle.—Eagle Engineering Co., Ltd. H.T. dry batteries.
Eagle.—John Riley and Sons, Ltd. Accumulator acid.
Eagtranco.—Eagle Transfer, Ltd. Transfers.
Earl.—Electriclocks and Radio, Ltd. Receivers and speakers.
Earlswood.—Majestic Electric Co., Ltd. Receiver.
Easifil.—S. Ginterman and Co. Distilled water carrier.
Easiflx.—Ward and Goldstone, Ltd. Combined H.T. and L.T. battery cords.
Easistrip.—Ward and Goldstone, Ltd. Connecting wire.
Ebonart.—Redfern's Rubber Works, Ltd. Ebonite panels, sheets and coil formers.
Ebonestos.—Ebonestos Insulators, Ltd. Moulded plastic, bakelite and other synthetic materials.
Ebonex.—Money Hicks, Ltd. Engraved labels.
Ebonoid.—Clayton Rubber Sales, Ltd. Mouldings.
Eccleston.—Hyde and Telford. Speaker.
Ecco.—Ecco Battery Co., Ltd. Wireless batteries.
Eccoradio.—Ecco Radio, Ltd. Receivers.
Eckersley-Trouton.—Loudspeaker Engineering Co., Ltd. Speaker.
Eclipse.—Frys (London), Ltd. Lathes, grinding and drilling machines.
Eclipse.—James Neill and Co. (Sheffield), Ltd. Permanent magnets.
Economy 3.—Formo Co. Kit Set.
Eddystone.—Stratton and Co., Ltd. Short wave sets and components, and transmitting coils.
Edina.—Bruntons. Resistance wire.
Edison Bell.—Edison Bell, Ltd. General Trade Mark.
Ediswan.—Edison Swan Electric Co., Ltd. General trade mark.
Edna.—J. W. Bramley. Receiver and water motors.
Edwards.—Rowland Edwards and Co., Ltd. Non-spillable accumulators.
Eedee.—Edward Doherty and Sons. Radio cabinets in wood and leather.
Eel.—Invicta Spring Co. General trade mark.
Eelex.—J. J. Eastick and Sons. Components and accessories.
Efesca.—Falk, Stadelmann and Co., Ltd. Components and accessories.
Efescaphone.—Falk, Stadelmann and Co., Ltd. Set.
Ekco.—E. K. Cole, Ltd. General trade mark.
Electone.—F. J. Gordon and Co., Ltd. Automatic programme selector.
Electravox.—Amplion (1932) Ltd. Gramophone pick-up.
Electriclocks.—Electriclocks and Radio Ltd. General trade mark.
Electrit.—The Rothermel Corporation, Ltd. Resistances and potentiometers.
Electrocets.—Electrocet Radio Co. General trade mark.
Electrocolor.—Electrocolor Products, Ltd. Non-metallic needles and repointers.
Electro Dynamic.—Electro-Dynamic Construction Co., Ltd. General trade mark.
Electro-Graphophone.—Columbia Graphophone Co., Ltd. Electric reproducing gramophone.
Electron.—New London Electron Works, Ltd. Aerial wire, earth and insulator pins.
Electron.—Edison Bell, Ltd. Records and gramophones.
Electrotone.—Edison Bell, Ltd. Soundboxes.
Elephant.—Elephant Chemical Co., Ltd., Genera trade mark.
Elima.—A. Hartley & Co. Eliminators and components.
Elimeter.—Sifam Electrical Instrument Co., Ltd. Measuring instruments and transformers.
Elion.—Geo. Robinson and Co., Ltd. Speakers and units.
Elite.—Accumulators Elite. Accumulators.
Elite.—Beaver Electrical Supply Co. Coils.
Elite.—Vinces Dry Batteries, Ltd. H.T. and grid bias batteries.
Ella.—Lionel Robinson and Co., Ltd. Converter, voltmeter and ammeter.
Ella Flex.—Lionel Robinson and Co., Ltd. Insulating sleeving.
Ellancee.—Ellancee Radio, Ltd. Valve receiving sets and tuners.
Ella-Varic.—Lionel Robinson and Co., Ltd. Components.
Ellis.—The Rothermel Corporation, Ltd. Microphones.
Ellmar.—Ellmar Mouldings Co. Mouldings, insulated fittings, etc.
Elo.—Birkbys, Ltd. Mouldings, powders, varnishes, cements.
Eltic.—E. A. Wood. Batteries and components.
Embassy.—British Needle Co., Ltd. Gramophone needles.
Embassy.—Carrington Manufacturing Co., Ltd. Cabinet.
Emkabe.—Emkabe Radio Co., Ltd. General trade mark.
Emo.—George Emmott (Pawsons), Ltd. Mainsprings for gramophone motors.
Empire.—Carrington Manufacturing Co., Ltd. Cabinet.
Empire.—Manufacturers' Accessories Co. (1928), Ltd. Battery.
Empire Sixty.—Efandem Co., Ltd. H.T. battery.
Empyream.—Halford Radio, Ltd. Receivers and radiogram.
Enameloid.—Fredk. Crane Chemical Co., Ltd. Cold cellulose lacquer.
Endura.—Neophone Engineering Co. Vulcanite cone diaphragms and magnetic units.
Endy.—Michelson Bros. Dry batteries.
Energex.—Saxon Radio Co. H.T. batteries, L.T. accumulators, mains transformers and L.F. chokes.
Enfield.—Enfield Cable Works, Ltd. Wires and cables.
Enhansa.—Ward and Goldstone, Ltd. Indoor aerial.
Enox.—Frys (London), Ltd. Metal and ebonite cutting saws.
Ento.—J. Hyatt and Co., Ltd. Cabinet and battery box.
Eon.—Eon Vacuum Wireless Co. General trade mark.
Epoch.—Epoch Radio Mfg. Co., Ltd. General trade mark.
Erie.—Erie Resistor, Ltd. Resistances.
Erinoid.—Erinoid, Ltd. Insulating material.
Erl.—Ecco Radio, Ltd. Coils.
Erlite.—Ecco Radio, Ltd. Condensers.
Erzophon.—E. Oppenheim and Co., Ltd. Speakers.
Essell.—Spicers, Ltd. Fibre and leatheroid.
Essemco.—Standard Mfg. Co. General trade mark.
Essex.—Essex Accumulator Co., Ltd. Accumulators.
Eta.—Eta Tool Co. Tools and coil winding machine.
Ethatrope.—M.P.A. Wireless (1930), Ltd. Radiogramophone.
Etheron.—St. Helens Cable and Rubber Co., Ltd. Ebonite panel.
Ethita.—Bright Co. Crystal, wave trap and crystal sets.
Ethophone.—Burndept, Ltd. Receivers.
Eureka.—London Electric Wire Co. and Smiths, Ltd. Resistance wire.
Eureka.—L. Person and Son. General trade mark.

European.—Bell Piano Co., Ltd.—Sets and radiograms.
Evargyb.—W. Bygrave and Sons. Filament rheostat.
Everlock.—McLeod and McLeod. Washers.
Ever Ready.—Ever Ready Co. (Gt. Britain), Ltd. Primary and secondary batteries, H.T., L.T. and G.B.
Everyman Four.—Jonathan Fallowfield, Ltd. Set.
Ewebec.—Evington Electrical Mfg. Co. Coil former.
Exact.—Exact Manufacturing Co. Aerial and anode tuners.
Excalibur.—Walker, Fuller and Ellis, Ltd. Receivers.
Excel.—S. H. Collett Manufacturing Co. Terminal tags and fuses.
Excelsior.—Ward and Goldstone, Ltd. Resistance wire.
Exide.—Chloride Electrical Storage Co., Ltd. Accumulator.
Expression.—J. W. Bowley. Metal horns and gramophones.
Extralife.—Edison Swan Electric Co., Ltd. L.T. accumulators.
Eze-tite.—S. H. Collett Manufacturing Co. Phone adaptors.
Eze-Way.—S. H. Collett Manufacturing Co. Pulleys.
E.A.W.—E. A. Wood. Components and accessories.
E.D.L.—Electric Depot, Ltd. Accumulator charging equipment.
E.R.P.—Electrical and Radio Products (1931), Ltd. General trade mark.
E.S.—Edison Swan Electric Co., Ltd. Dry batteries, accumulators and valves.
E.S.C.—English Steel Corporation. Permanent magnets.
E.T.A.—Electrical Trading Association, Ltd., The. Valves.

F

Facile.—Ross Courtney and Co., Ltd. Terminals.
Fada Radio.—Howard Thomas and Co., Ltd. All-mains receivers and radiograms.
Faeritone.—Mechanical Utilities Co., Ltd. Crystal and accessories.
Falco.—George Bowerman, Ltd.
Falcon.—Associated Radio Productions, Ltd. Products.
Fallowflex.—Jonathan Fallowfield, Ltd. Crystal-valve set.
Faneeka.—Michael Black, Ltd. H.T. batteries.
Faraday.—Faraday Radio Gramophones. A.C. and D.C. radiograms.
Faradex.—Rooke Bros., Ltd. Components.
Feet o' Felt.—Mc Leod and McLeod. Felt feet for cabinets.
Ferno.—Bruntons. Resistance wire.
Ferranti.—Ferranti, Ltd. General trade mark.
Fitzall.—Peto Scott Co., Ltd. Cabinets.
File-Grip.—Tonex Co. Valve holder.
Filt.—Graham Farish, Ltd. Percolative earth.
Fireside Five.—Detex (1931), Ltd. Five-valve transportable set.
Flag.—Ever Ready Co. (Great Britain), Ltd. Dry cell.
Flatta.—Barrow, Hepburn and Gale, Ltd. Handles for portable cases.
Flex.—Daws, Clarke and Co. Speaker diaphragms for gramophones.
Flexicleen.—Record Auto Brush Co. Record cleaners.
Fluxite.—Fluxite, Ltd. Soldering paste and soldering set.
Fluxpaste.—Elephant Chemical Co., Ltd. Soldering paste.
Fonatex.—Ashton and Co. (Est. 1787), Ltd. Gauze for speakers and gramophones.
Footprint.—Thos. R. Ellin (Footprint Works), Ltd. Tools.
Formapex.—Ioco Rubber and Waterproofing Co., Ltd. Bakelite type micarta and varnish.
Formica.—Willmott, Son and Phillips, Ltd. Laminated bakelite sheets, rods and tubes.
Formite.—Bakelite, Ltd. Insulating materials.
Formo.—Formo Co. Components.
Formo Densor.—Formo Co. Pre-set condenser.
Fors.—Erith Battery Co., Ltd. Accumulator.
Fotos.—Concerton Radio and Electrical Co., Ltd. General trade mark.
Franklin.—Franklin Electric Co., Ltd. General trade mark.
Fulgor.—J. Toubkin. Batteries.
Fuller.—Fuller Accumulator Co. (1926), Ltd. Dry batteries and radio accumulators.
Full O' Power.—Siemens Electric Lamps and Supplies, Ltd. Dry batteries.
Fur.—E. Enderlein. Coil winding machines.
Futura 6.—Wates Radio, Ltd. Receiver.
Futurist.—Wholesale Radio Supplies Co. Receiver.
Fybros.—Willmott, Son and Phillips, Ltd. Homogeneous vulcanised fibre rods.
F.A.V.—F. Brown, Ltd. Valve holder.
F.M.C.—Fairfield Mfg. Co. Receiver.
F.N.C.—Bruntons. Resistance wire.

G

Gaede.—W. Edwards and Co. All-steel diffusion and rotary oil vacuum pumps.
Gainsborough.—Electrical and Radio Products (1931), Ltd. Set and radiogram.
Gala.—General Electric Co., Ltd. Receiver.
Galakerite.—F. R. Freed. Casein products.
Galloway.—J. and L. Galloway, Ltd. Superhet. portable set.
Galloy.—Climax Radio Electric, Ltd. Earth tubes.
Galvanic.—Gresley Radio, Ltd. Earth tube.
Galvorite.—London Commercial Electrical Stores, Ltd. Crystal, batteries and meters.

TRADE NAMES SECTION

Gam-brell.—Gambrell Radio, Ltd. All-electric receivers and radiograms.
Gambrell.—Halford Radio, Ltd. Receivers and radiograms.
Gard.—Graham Farish, Ltd. Lightning arrester.
Gardner.—Sheffield Magnet Co. Moving coil speaker.
Garrard.—Garrard Engineering and Mfg. Co., Ltd. Gramophone motors.
Garrard.—J. Moores and Co. Gramophone motors.
Gas-ohm.—Rotor Electric, Ltd. Grid leaks and resistances.
G. Burri.—McLeod and McLeod. Instrument wire.
Gecophone.—General Electric Co., Ltd. Sets, components and accessories.
Geisha.—C. Gilbert and Co., Ltd. Pedestal and portable gramophones, sound boxes and needles.
Gel-Cel.—Chloride Electrical Storage Co., Ltd. Jelly acid accumulator.
Gero.—W. Hewett and Co. Grid leaks, resistances.
Gilbert.—C. Gilbert and Co., Ltd. General trade mark.
Givrite.—Le Carbone, Ltd. Carbon resistances.
Gladitz.—W. Edwards and Co. Valve making machinery.
Glazite.—London Electric Wire Co. and Smith's, Ltd. Insulated instrument wire.
Globac.—British Resistor Co., Ltd. Resistances.
Gloria.—British G.W.Z. Battery Co., Ltd. Dry batteries.
Gloster.—T. R. Francis. General trade mark.
Glyda.—Danipad Rubber Co., Ltd. Coil-holder.
Gnome.—Rees Mace Manufacturing Co., Ltd. Portable and cabinet receivers.
Gnome Superhet.—Rees Mace Manufacturing Co., Ltd. Portable.
Godwinex.—J. Dyson and Co. (Wks.), Ltd. Receivers, eliminators and components.
Golden.—S. Lilley and Son, Ltd. Switches, terminals and wander plugs.
Golden Arrow.—J. Toubkin. Loudspeaker and mains units.
Golden Disc.—Edison Swan Electric Co., Ltd. Electric gramophone motor.
Golden Domes.—J. and A. Margolin. Gramophones.
Golden Eagle.—Associated Radio Productions, Ltd. Products.
Golden Flame.—S. Kalisky (Aldgate), Ltd. Batteries.
Golden Pyramid.—British Needle Co., Ltd. Gramophone needles.
Golden Pyramid Radiogram.—British Needle Co., Ltd. Needles for electric pick-ups.
Goldring.—British Goldring Products, Ltd. General trade mark.
Goltone.—Ward and Goldstone, Ltd. General trade mark.
Goodwun.—Goodwin Radio, Ltd. Valve receivers, cabinet speakers, portables and trans-portables.
Gordon.—F. J. Gordon and Co., Ltd. Hydrometers and battery repairing tools.
Gordon-Ajax.—F. J. Gordon and Co., Ltd. Re-magnetisers and growlers.
Gothic.—M.P.A. Wireless (1930), Ltd. Cone speakers.
Grafonola.—Columbia Graphophone Co., Ltd. Gramophones.
Graham Farish.—Graham Farish, Ltd. Components.
Grampian.—Grampian Reproducers. Speaker units.
Grantona.—R. O. Bridger and Co. Speakers, cones, etc.
Grawor.—H. Joseph. Speakers.
Grayson.—Grayson and Co. Tools.
Greatrex.—R. G. Greatrex and Co. Receivers.
Greatrex, R.G.—R. G. Greatrex and Co. Speaker.
Green Flyer.—The Rothermel Corporation, Ltd. Gramophone motors.
Grelco.—Grafton Elec. Co. Multi plug adaptors.
Gresley.—Gresley Radio, Ltd. General trade mark.
Grippall.—J. Rigaut. Automatic sockets, coils, H.F. chokes, battery cords and sets.
Grippleshell.—Partridge, Wilson and Co. Aerial insulator.
Gripso.—Gripso Co. Earthing clips, terminals, spade-ends, push-pull indicating switches, labels, plugs and sockets, named tag ends, grid battery clips, etc.
Grosvenor.—Carrington Mfg. Co., Ltd. Cabinet.
Grosvenor.—Grosvenor Electric Batteries, Ltd. Dry batteries.
Guidor.—J. H. Collie and Co. Hydrometers.
G.—Pye Radio, Ltd. Set.
G.E.C.—General Electric Co., Ltd. General trade mark.
G.F. Radio.—Graham Farish, Ltd. General trade mark.
G. & H.—Halford Radio, Ltd. Superhet chassis.
G.H.—Gould, Harper and Co. Lightning arrester.
G.R.—Claude Lyons, Ltd. Laboratory apparatus.
G.W.Z.—British G.W.Z. Battery Co., Ltd. Dry batteries.

H

Hall.—Daws Clarke & Co. Round shank fibre needles.
Halso.—Queen's Engineering Co. Battery chargers.
Hammarlund.—The Rothermel Corporation, Ltd. Short wave coils and condensers.
Hammond.—The Rothermel Corporation, Ltd. Electric clocks.
Handy.—Lehmann, Archer and Co., Ltd. Carded tools.
Hanscot.—Hanson Scott and Co., Ltd. Aerial cord.
Harbros.—Hart Bros. Electrical Mfg. Co., Ltd. General trade mark.
Hardicol.—A. F. Harding and Co., Ltd. Insulating varnish and cement.
Harlie.—Harlie Ltd. Components and accessories.
Harmo.—Harmo Products. Crystals and components.
Harmonic.—Harmonic Radio Co. General trade mark.
Havenwood.—Majestic Electric Co., Ltd. Receiver.
Haynes.—Haynes Radio. General trade mark.
Heart.—A. Knopf. Battery, speaker and accumulator.
Heayberd.—F. C. Heayberd and Co. General trade mark.
Hegra.—J. Millet. Cone unit, speakers, lightning arresters and grid-leak clips.
Heliogen.—E. Enderlein. Aerial accessories.
Hellesen.—Hellesens, Ltd. General trade mark.
Henley.—Smiths Cabinets Ltd. Cabinets.
Herculacker.—Concordia Elec. Wire Co., Ltd. Lacquered wires and cables.
Hercules.—Boynton and Co., Ltd. General trade mark.
Hercules.—Ever Ready Co. (Gt. Britain), Ltd. Low tension battery.
Hercus.—Hercus Manufacturing Co. General trade mark.
Heron.—Henry Righton and Co., Ltd. Non-ferrous metals.
Hesco.—Octron Ltd. Valves.
Heussen.—Blitz Bros. Valves.
Hexa.—F. C. Hill and Co. General trade mark.
His Master's Voice.—Gramophone Co., Ltd. General trade mark.
Hivoltsit.—Standard Insulator Co., Ltd. Insulating material, silk, linen, etc.
Hobart.—F. J. Gordon and Co., Ltd. Battery charger.
Hoetanic.—L.P.S. Electrical Co., Ltd. Resistance wire.
Holbro.—Holmes Bros. (London), Ltd. Cabinets.

Holdtite.—S. H. Collett Mfg. Co. Battery clips.
Honesty.—Sheffield Magnet Co. Unit.
Howe.—F. McNeill and Co. General trade mark.
Hoyt.—F. J. Gordon and Co., Ltd. Testing instruments.
Huber.—McLeod and McLeod. Wire (silk-covered).
Hum-dinger.—Claude Lyons, Ltd. Variable resistances for mains apparatus.
Hunt's, H.A.H.—A. H. Hunt, Ltd. General trade mark.
Hymax.—E. Allen and Co., Ltd. Magnet.
Hymeg.—Edison Swan Electric Co., Ltd. H.T. accumulator.
Hypercore.—Radio Instruments, Ltd. L.F. smoothing and filter output choke.
Hypermite.—Radio Instruments, Ltd. L.F. transformer.
Hypermu.—Radio Instruments, Ltd. L.F. transformer.
Hyvac.—W. Edwards and Co. Rotary vacuum pumps.
H.B.—Cookson and Co. Syphon hydrometers.
H.B.—Hobday Bros., Ltd. Components and accessories.
H.C.H.—H.C.H. Co., The. General trade mark.
H.E.K.—H. E. Kettle, Ltd. Valve set.
H. and H.—Hildick and Hildick. Telescopic masts.
H.L.C.—Havenhand, Lewis and Co, Accumulator.
H.M.V.—Gramophone Co. Ltd. General trade mark.
H.S.—Adam Hilger, Ltd. Trade mark for spectroscopically standardised substances.
H.S.P.—H.S.P. Wireless Co. General trade mark.
H.T.C.—H.T.C. Electrical Co., Ltd. Sets, components, stampings and turned parts.

I

Icall.—I. Calvete, Ltd. Small fractional horse power electric motors.
Ideal.—Columbia Graphophone Co., Ltd. Needles.
Ideal.—Danipad Rubber Co., Ltd. Coil-holder.
Ideal.—J. S. Millar and Son. Mast and tower.
Ideal.—Wingrove and Rogers, Ltd. Variable condensers.
Igranic.—Igranic Electric Co., Ltd. General trade mark and super-het kit.
Igranite.—Igranic Electric Co., Ltd. Insulating varnish.
Igranovox.—Igranic Electric Co., Ltd. Pick-up.
Impedance Matching.—Varley. Output transformers.
Imperi.—Hobday Bros., Ltd. Components and accessories.
Imperial.—E. Allen and Co., Ltd. Magnet.
Imperial.—Imp Radio Co. General trade mark.
Imperial.—Crystalate Gramophone Record Mfg. Co., Ltd. Gramophone records.
Imperial.—Ward and Goldstone, Ltd. Dry battery.
Imperial.—Watmel Wireless Co., Ltd. Components.
Indigraph.—Igranic Electric Co., Ltd. Recording tuning dial.
Indispenso.—Ward and Goldstone, Ltd. Charging set.
Inductor.—H. Joseph. Speaker.
Indurite.—Indurite Agency, Ltd. Mouldings.
Industria.—E. Oppenheim and Co., Ltd. Horns.
Inkwell.—Everett, Edgcumbe and Co., Ltd. Recording ammeters, voltmeters and wattmeters.
Innephone.—D. and G. Innes. Receivers and radio-gramophones.
Insol.—Louis Holzman, Ltd. Insulated sleeving.
Insulderm.—Griffiths Bros. and Co., London, Ltd. Enamel for earthing conductors and resistance spools.
Insulex.—F. L. Losingham. Screened and Insulated wires and sleeving.
Invincible.—Goodmans. Moving coil speaker.
Ionic.—Ionic Alkaline Batteries, Ltd. Battery.
Isithere.—Thos. A. Rose and Son, Ltd.—Mains adaptor and accessories display.
Iso.—F. J. Ashton, Ltd. Components.
Itonaphone.—H. J. Goulden, Ltd. Valve sets.
Itonia.—Itonia Ltd. Radiograms and radio and gramophone products.
Ivalek.—Ivory Electric Ltd. General trade mark.
Ivorex.—Money Hicks, Ltd. Engraved labels.

J

Jacelite.—J. A. Crabtree and Co., Ltd. Moulded B.E.S.A. gauge, plugs and sockets, tumbler switches.
Jacid.—Rowland Edwards & Co., Ltd. (Jelly acid) accumulators.
Jacobean.—Halford Radio, Ltd. Receivers and radiograms.
Janette.—The Rothermel Corporation, Ltd. Rotary converters.
Jarvis.—M. H. Jarvis and Co. Mains silencer.
Jedson.—John E. Dallas and Sons, Ltd. Gramophones.
Jelectro.—Jelectro Laboratories. Jelly acid accumulators.
Jetel.—J. Thibouville-Lamy and Co. Gramophones.
Jiffilinx.—Ready Radio Ltd. Connection wire.
Jockey.—Connollys (Blackley), Ltd. Adhesive tape.
Joyster.—F. M. Storey. H. T. batteries.
Juneeco.—Junction Engineering Co., Ltd. Eliminators, power transformers and chokes.
Junior Baby.—Clarith Reproducers Ltd. Screened grid, detector radio gramophone and cone speaker.
Junit. Junit Mfg. Co., Ltd. General trade mark.
Jussrite.—Murdoch Trading Co. Record filling cabinets.
J. and A.—Claude Lyons, Ltd. Laboratory apparatus.
J.B.—Jackson Brothers. Variable condensers.
J.M.—J. Millet. Condensers.

K

Kabi.—A. Brodersen. General trade mark.
Kabilok.—W. and T. Lock, Ltd. Wireless cabinets.
Kalanite.—Callender's Cable and Construction Co. Ltd. Insulating material.
Kaleeco.—Callender's Cable and Construction Co., Ltd. Electric Cable.
Kalibond.—Callender's Cable and Construction Co., Ltd. Electric cable.
Karna.—Appletons (Leeds) Ltd. Gramophones and speakers.
Kayvee.—Kemps Vulcanising Co., Ltd. Accumulators.
Kelsey.—Peto Scott Co., Ltd. Shortwave adaptor.
Ken.—E. Kerridge and Co. Indoor aerial.
Kenneth.—Smith's Cabinets, Ltd. Cabinets.
Kenwell.—Kenwell Radio Ltd. Speaker and power pack.
Kestra.—G. Castagnoli. Radio-gramophone outfits, valve sets, amplifiers and components.
Kestrel.—Associated Radio Productions, Ltd. Products.
Kestrolian.—Pearson Bros. Amplifiers, public address equipment and receiving sets.
Keystone.—Peto Scott Co., Ltd. Condensers and H.F. chokes.
King-Eton.—Calmont, King and Co., Ltd. Accumulators and batteries.
Kingston Home Recorders.—Kingstophone Co., Ltd. Apparatus for making gramophone records at home.
Kingswood.—Majestic Electric Co., Ltd. Receiver.
Kinva.—Postlethwaite Bros. General trade mark.
Kitten.—Kolster Brandes, Ltd. Receiver.
Kleenit.—Record Auto Brush Co. Record cleaner.
Klinx.—Kay Bros., Ltd. Heat-proof cement.

TRADE NAMES SECTION

Klock.—Baker's Selhurst Radio. Moving-coil speaker incorporating synchronous clock.
Knightswood.—Majestic Electric Co., Ltd. Receiver.
Kobra.—Kolster Brandes, Ltd. Receiver.
Kohinor.—British Central Electrical Co., Ltd. Insulating tapes.
Koh-i-Noor.—Primus Manufacturing Co. H.T. batteries.
Kolstar.—Kolster-Brandes, Ltd. Super Het receiver.
Konekap.—Graham Farish, Ltd. Grid leak.
Konductite.—City Accumulator Co. Metallic screening paper.
Kukoo.—Sheffield Magnet Co. Unit.
Kusha.—R. H. Glasscoe. Pick-up arms.
Kushette.—R. H. Glasscoe. Pick-up arm.
K.—Pye Radio Ltd. Receiver.
K.-B.—Kolster-Brandes, Ltd. Receivers and speakers.
K.C.—Dubilier Condenser Co. (1925). Ltd. Variable air condenser, kilocycle tuning.
K.V.—Kemps Vulcanising Co., Ltd. Accumulators, ebonite, etc.

L

Lacoline.—Ward and Goldstone, Ltd. Coloured connecting wire.
Laker.—J. and J. Laker Co., Ltd. Masts and aerial equipment.
Laminic.—Magnetic and Electrical Alloys, Ltd. Nickel iron cores.
Laminol.—Ellison Insulations, Ltd. Sheet insulating material.
Langmore.—Miscellaneous Trading Co., Ltd. Cabinets.
Lassophone.—East Ham Wireless Supplies. Sets, components and accessories.
Layerbilt.—J. R. Morris. H.T. battery.
Leatheroid.—Willmott, Son and Phillips, Ltd. Fibre.
Lebakite.—Spicers, Ltd. Bakelite sheets, panels, tubes, formers and rods.
Lecodyne.—London Electrical Co. H.T. eliminators and radiograms.
Leconite.—London Electrical Co. Panels.
Lec-o-phone.—London Electrical Co. Set.
Lectaerial.—S. Kalisky (Aldgate), Ltd. Wires.
Leesona.—Universal Winding Co. Coil winding machinery.
Lektrik.—A. P. Lundberg and Sons, Ltd. Switches and plug connectors.
Lektrite.—Ward and Goldstone, Ltd. Waterproof insulated aerial wire.
Lewcos.—London Electric Wire Co. and Smiths, Ltd. Radio products.
Leytonia.—Wholesale Radio Supplies Co. Receivers.
Lighthouse.—Dundas Fon, Ltd. Batteries.
Limit.—Limit Engineering Co., Ltd., General trade mark for gramophone components.
Limit.—Limit Radio, Ltd. Pick-ups and arms.
Limpet.—Connollys (Blackley), Ltd. Adhesive tape.
Linapex.—Ioco Rubber and Waterproofing Co., Ltd. Insulating cloth, silk and tapes.
Linco.—F. Lime and Co. Tools.
Lincoln.—Carrington Manufacturing Co., Ltd. Cabinet.
Lindex.—Parlophone Co., Ltd. Sound boxes.
Linwood.—Dent and Co. and Johnson, Ltd. Speaker.
Lion.—Amplion (1932), Ltd. Cone speaker.
Lion.—North London Valve and Burts, Ltd. Valves.
Lisenin.—Lisenin Wireless Co. General trade mark.
Lissen.—Lissen, Ltd. Components.
Lissenagon.—Lissen, Ltd. Coil.
Lissenceptor.—Lissen, Ltd. Wavetrap.
Lissenola.—Lissen, Ltd. Radio-gramophones, receiving sets, gramophones, speakers, etc.
Lissenstat.—Lissen, Ltd. Rheostat.
Lithanode.—Lithanode Co., Ltd. Batteries.
Litholite.—Litholite Insulators, Ltd. Battery accessories, coil plugs and sockets, insulating compounds and mouldings.
Litlos.—Graham Farish, Ltd. Variable condensers.
Little Wonder.—S. W. Scott and Co. Dual range coil.
Lively "O".—Oldham and Son, Ltd. Accumulators, L.T. and H.T.
Loewe Radio.—Loewe Radio Co., Ltd. General trade mark.
Lokvane.—Igranic Electric Co., Ltd. Variable condenser.
Long-Life.—Pearson Bros. and Co. Batteries and accumulators.
Longlife.—Runwell Cycle Co. (Birmingham), Ltd. Batteries and accumulators.
Londona.—Londona, Ltd., P.M. M.C. speakers.
Longton.—H. Longton and Co. General trade mark.
Loradsa.—A. Smith (Radio), Ltd. General trade mark.
Loriostat.—Advance Components, Ltd. General trade mark.
Lorival.—Lorival Manufacturing Co. (1921), Ltd. Insulating materials.
Loten.—Edison Swan Electric Co., Ltd. L.T. Accumulators.
Lothian.—S. W. Scott and Co. Screened grid dual range coils.
Lotus.—Lotus Radio, Ltd. General trade mark.
Lowrah.—Harwol Specialities Co. Slow motion dials and H.T. batteries.
Lunmet.—London Metal Warehouses, Ltd. Insulated terminals.
Lustrolux.—Lustrolux, Ltd. Valves.
Luxophone.—Contal Radio, Ltd. All mains receivers.
Luxus.—British Goldring Products, Ltd. Goldring sound boxes.
Lyricon.—J. and L. Galloway, Ltd. Screened H.F. and pentode sets, mains set, kinema apparatus, power amplifiers, and mains radio-gramophone.
L.E.M.—McLeod and McLeod. Wound bobbins.
L.E.S.—L.E.S. Distributors, Ltd. Earth tubes.
L.E.W.—London Electric Wire Co., and Smiths, Ltd. General trade mark.
L.P.S.—L.P.S. Electrical Co., Ltd. Wire.

M

Macadie.—Automatic Coil Winder and Electrical Equipment Co., Ltd. Coil winder.
Maco.—Manufacturers Accessories Co. (1928), Ltd. Cabinets and accumulators.
Maconite.—Macintosh Cable Co., Ltd. Insulated cables.
Madrigal.—Radio Instruments, Ltd. All mains receiver.
Magna-flux.—Watson, Saville and Co., Ltd. Magnet steel, cobalt and tungsten magnets.
Magnafilter.—Burne-Jones and Co., Ltd. Wave trap.
Magnagram.—Burne-Jones and Co., Ltd. Radio-gramophones.
Magnavox.—Magnavox (Gt. Britain), Ltd. Moving-coil loudspeakers, mains energised and permanent magnet.
Magnet.—General Electric Co., Ltd. Batteries accumulators and battery chargers.
Magnetic.—J. and J. Laker Co., Ltd. Earth tube.
Magnum.—Burne-Jones and Co., Ltd. Receivers, components and accessories.
Mahoganite.—American Hard Rubber Co. (Britain), Ltd. Insulating material.
Mainten.—London Radio-Electric Co. Eliminators.
Majestic.—L. Kremner. Speaker.
Majestic.—Majestic Electric Co., Ltd. All-electric receivers and radio-gramophones.

[*Continued on page* 260.]

LORADSA

Better than the Best !

The LORADSA range of receivers represent the finest value and give the best reproduction and selectivity that is possible in Radio Science to-day. They are the outcome of an extensive study of Radio, and we confidently offer you Loradsa Receivers as being **BETTER THAN THE BEST!**

The LORADSA MARLBOROUGH

PRICE 29 GNS.

SPECIFICATION

This LORADSA Radiogram is an example of craftsmanship having the resultant quantity of reasonable price. The Circuit is a Band Pass Input using a Variable Mu. Screen Grid Valve, Power Grid Detection and Tone Corrected Pentode, thus ensuring absolute Selectivity and quality of reproduction. Energised Moving Coil Speaker, Induction Gramophone Motor, and Containers for Records at the side of Cabinet. Beautifully finished Walnut and hand French polished London-made Cabinet. Volume control combines Mains Switch. Gramophone Switch and Volume Control are mounted upon the Motor Board.

The LORADSA DUO-MAINS 3

PRICE 16 GNS.

SPECIFICATION

Circuit—For operation on D.C. or A.C. of any frequency without alteration. 3 valves, variable Mu., Det. and Pentode (Marconi and Osram), 2 watts output.
Loudspeaker—Mains energised moving coil.
Single dial tuning—3 tuned circuits.
Westinghouse rectifier.
Consumption 60 watts.
Provision for Gramo. Pick-up.

ARTHUR SMITH (RADIO), LTD.,

HAZEL WORKS,
56, HAZEL ROAD, KENSAL RISE, LONDON, N.W.10.
Telephone: Willesden 1342.

TRADE NAMES SECTION.

[*Continued from page* 258.]

Maklodone.—McLeod and McLeod. Bakelite mouldings and knobs.
Mall.—The Mall Radio and Electric, Ltd. General trade mark.
Mandek.—McLeod and McLeod. Choke, headphone, loudspeaker, and transformer bobbins.
Mandem.—McLeod and McLeod. General trade mark.
Mandemite.—McLeod and McLeod. Connecting wire.
Manens.—Claude Lyons, Ltd. Midget condensers.
Marathon.—Vince's Dry Batteries, Ltd. H.T. and grid bias batteries.
Marbalite.—Clayton (Rubber Sales), Ltd. Ebonite sheets and panels.
Marconi.—Marconiphone Co., Ltd. Valves.
Marconiphone.—Marconiphone Co., Ltd. Sets, speakers.
Marlborough.—Electrical and Radio Products (1931), Ltd. Receiver and radiogram.
Marlborough.—Marlborough Radio Co., Ltd. Receivers and eliminators.
Marquis.—Rooke Bros., Ltd. Transformers, receivers.
Marquis.—C. Swain. Receivers.
Massicore.—W. B. Savage. Mains components.
Mastertone.—John E. Dallas and Sons, Ltd. Gramophone.
Mastiff.—Ward and Goldstone, Ltd. Sprung connectors.
Matched Tone.—Kolster-Brandes, Ltd. Headphones.
Matchless.—T. D. Young and Son. Rheostats, coil holders, etc.
Mavox.—Mavox All Electric Radio. Mains receivers.
Max.—Lawrie and Co. Portables.
Mayfair.—Electrical and Radio Products (1931), Ltd. Radiogram.
Mazda.—Edison Swan Electric Co., Ltd. Valves.
McQuality.—Kenwell Radio, Ltd. Receiver.
Megavac.—W. Edwards and Co. Rotary Vacuum pumps.
Megger.—Evershed and Vignoles, Ltd. Testing instruments.
Megite.—Graham-Farish, Ltd. General trade mark.
Megohmax.—J. Moores and Co. Insulation.
Megohmior.—J. Moores and Co. Ebonite panels.
Megostat.—Igranic Electric Co., Ltd. Volume control.
Mellow Tone.—The Mellow Tone Co., Ltd. Needles.
Melo.—Gould, Harper and Co. Sets.
Melodee.—Carrington Manufacturing Co., Ltd. Cabinet.
Melody Maker.—A. C. Cossor, Ltd. Melody Maker kits, battery and all-electric.
Mephisto.—T. Winston. H.T. and grid bias batteries.
Mercure.—Ward and Goldstone, Ltd. Charging plant.
Mercury.—Grosvenor Electric Batteries, Ltd. H.T. battery.
Meridian Three.—Meridian Electric Co. Receiver.
Meritone.—Thompson, Diamond and Butcher. Gramophones.
Merrybright.—J. and A. Margolin. Gramophones.
Merrymaker.—Burndept, Ltd. Wireless receivers.
Mershon.—Magnavox (Gt. Britain), Ltd. Electrolytic condensers.
Merton.—Smiths Cabinets, Ltd. Cabinets.
Mertonia.—Frank Sandler. Batteries.
Metcraft.—Mark and Son, S. General trade mark.
Meteor III.—Ready Radio Ltd. Kit set.
Metrohm.—Everett, Edgecumbe and Co., Ltd. Insulation and resistance testing sets.
Metropolis.—Economic Electric, Ltd. Portable receivers.
Mettallamax.—Dux Chemical Solutions Co., Ltd. Cone paper.
Met-Vick.—Edison Swan Electric Co., Ltd. General trade mark.
Meyer.—E. Oppenheim and Co., Ltd. Turntables.
Micaylor.—Taylor and Petters, Ltd. Diaphragms for sound-boxes.
Microfuse.—Microfuses, Ltd. Fuses.
Micromesh.—Standard Telephones and Cables, Ltd. Valves.
Microtune.—J. Dyson and Co., Ltd. Radio instruments.
Midget.—Danipad Rubber Co., Ltd. Micro-geared coil-holders.
Midget IV.—Spencer Radio, Ltd. Portable receiver.
Mika-Densor.—Formo Co. Mica fixed condensers.
Millgate.—Chorlton Metal Co., Ltd. General trade mark.
Milnes.—Henry Milnes and Son. High-tension from low-tension accumulator
Milnes.—Milnes Radio Co. H.T. supply unit from L.T. accumulator.
Milton.—Calmont, King and Co., Ltd. Accumulators and batteries.
Minivo.—Formo Co. Battery eliminators.
Minor.—Wholesale Radio Supplies Co. Receivers.
Minster.—Appletons. Gramophones and speakers.
Moda.—Michelson Bros. Dry batteries.
Model 99.—Pegasus, Ltd. Sets.
Model 999.—Pegasus, Ltd. Sets.
Monarch.—W. Dibben and Sons, Ltd. Receivers and loudspeakers.
Mivoice.—Speakeasie Home Recorders. Home recording apparatus.
Monix.—Money Hicks, Ltd. Components.
Monolt.—Tudor Accumulator Co., Ltd. L.T. accumulator.
Mononob.—Formo Co. Ganged condenser.
Monos.—W. Hewett and Co. Speaker.
Monosonic.—Primus Manufacturing Co. Sets.
Morlat.—R.L.M. Co. Mouldings.
Motor.—Tekade Radio Electric, Ltd. General trade mark.
Mouldensite.—Bakelite, Ltd. Insulating materials.
Mozart.—Bradnam and Co. Radio-gramophones.
Mullard.—Mullard Wireless Service Co., Ltd. General trade mark.
Multi-Cellular.—Varley. H.F. chokes.
Multi-Coil.—A. F. Bulgin and Co., Ltd. Patent dual range tuner.
Multi-Programme Automatic.—M.P.A. Wireless (1930) Ltd. Set and radiogram.
Multistat.—Six-Sixty Radio, Ltd. Combined on/off switch and radio and gramophone volume control.
Multitest.—Gambrell Radio, Ltd. Combined voltmeter, milliameter and ammeter.
Multitone.—Multitone Electric Co., Ltd. General trade mark.
Multivo.—Formo Co. Battery eliminators.
Multi-Volt.—Varley. Power transformers.
Mumax.—Climax Radio Electric Ltd. L.F. transformer.
Music Magnet.—General Electric Co., Ltd. Kit receiver.
Musola.—Tyrela Gramophones, Ltd. Gramophones.
M.A.C.—Manufacturers' Accessories Co. (1928), Ltd. General trade mark.
M.H.—L. McMichael, Ltd. Set, amplifier and components.
M.L.—M.L. Rotax, Ltd. General trade mark.
M.M.—Pye Radio, Ltd. Midget set.
M. and M.—McLeod and McLeod. General trade mark.
M.U.C.L.—Mechanical Utilities Co., Ltd. H.T. battery.

N

Nakvo.—R. O. Bridger and Co. Waterproof compo. cones.
Nassak.—Nassak Mfg. Co., Ltd. General trade mark.
National.—Rothermel Corporation, Ltd. Vernier dials.
National Band.—Thompson, Diamond and Butcher. General trade mark.
Necol.—Nobel Chemical Finishes, Ltd. Enamels for metal parts, speakers, etc.
Negra.—R. O. Bridger and Co. Paper cones.

Negrolac.—Ward and Goldstone, Ltd. Indoor and outdoor aerials.
Neptune.—Danipad Rubber Co., Ltd. Receiver.
Nesthill.—Ernest H. Hill, Ltd. Accessories.
Neta.—E. A. Wood. Receivers and components.
Netaglass.—E. A. Wood. Valve-holders.
Netavox.—E. A. Wood. Receivers and cone assemblies.
Netax.—E. A. Wood. Valve and coil-holders.
Neutron.—Neutron (1927), Ltd. Crystals, components and valves.
Neutrosonic.—Igranic Electric Co., Ltd. Portable receiver.
Neutrovernia.—Gambrell Radio, Ltd. Neutrodyne and balancing condenser.
Neverbreak.—S. Guiterman and Co., Ltd. Hydrometer.
New Hertford.—Smiths Cabinets, Ltd. Table cabinet.
New Mascot.—Churchmans, Ltd. General trade mark.
Newton.—Newtons of Taunton, Ltd. Battery chargers and valve rectifiers.
Nichoke.—Varley. L.F. choke.
Niclet.—Varley. L.F. intervalve transformer.
Nicore I. and II.—Varley. L.F. intervalve transformers.
Ni-fe.—Batteries, Ltd. Battery.
Nigen.—Formo Co. Nickel alloy transformer.
Nilos.—Snap Switches, Ltd. Variable condensers.
Nine Lives.—Boynton and Co., Ltd. Batteries.
Nivex.—Runbaken Magneto Co., Ltd. Meters.
Nobeline.—Sicaloid, Ltd. Phenol synthetic resin.
Nomad.—General Electric, Ltd. Set.
No-Mast.—"No-Mast" Plate Aerial Co. Special mastless outdoor (or indoor) aerial.
Non-Jam.—J. and J. Laker Co., Ltd. Aerial pulley.
Norbex.—R. F. Graham and Co. Crystal detectors, valve sockets and plugs.
Norman.—Smiths Cabinets, Ltd. Cabinets.
Noroco.—Wilrose Co. (Birmingham) Ltd. Non-rotary D.C.-A.C. converter.
Nosco.—Northern Steel and Hardware Co., Ltd. Batteries and accumulators.
Noshok.—E. W. Bonson. Sockets and couplers.
Novaphonic.—Taylors (Huddersfield), Ltd. Gramophone and tone arm.
Novavox.—Taylors (Huddersfield), Ltd. Gramophone and tone arm.
Novodyne.—R. Waldo Emerson. Testing equipment.
Novotone.—Gambrell Radio, Ltd. Tone compensator for electrical reproduction of records.
Nutone.—Carrington Mfg. Co., Ltd. Cabinet.
Nuvolion.—Nuvolion Electrics, Ltd. Speaker.
N.C.—Bruntons. Resistance wire.
N.P.—Nash Products, Ltd. General trade mark.

O

Oasis.—General Chemical and Pharmaceutical Co. Ltd. General trade mark.
Obo.—A. E. Andrews and Co. General trade mark.
Octopus.—Edmonds, Ltd., G. Grip terminals.
Octroda.—M.P.A. Wireless (1930), Ltd. Radio gramophone.
Octron.—Octron, Ltd. Valves.
Odeon.—Parlophone Co., Ltd. Records.
Ohmaline.—Griffiths Bros. and Co. (London), Ltd. Insulating varnish for aerial insulation and transformers.
Ohmic.—Kimber Allen and Co. Transformers.
Ohmite.—Graham Farish, Ltd. Anode and Spaghetti resistances.
Oldham.—Oldham and Son, Ltd. Batteries.
Olympic.—Stadium, Ltd. Hydrometers.
Omega.—Gt. Western Radio Co. General trade mark.
Omega.—H. Joseph. Soldering irons.
Orchestrion.—Thompson, Diamond and Butcher. General trade mark.
Organola.—Gresley Radio, Ltd. Radio-gramophone.
Orgola.—Mullard Wireless Service Co., Ltd. General trade mark.
Original.—Lehmann, Archer and Co., Ltd. Tools. taps and dies.
Orizone.—Harrison and Norris. Sets, coil and lightning arrester.
Ormond.—Ormond Engineering Co., Ltd. Components.
Orphean.—London Radio Manufacturing Co., Ltd. Speaker.
Orpheum.—Spiers and Browne. General trade mark.
Orthotone.—Watmel Wireless Co., Ltd. Components.
Osborn.—C. A. Osborn. Cabinets.
Osram.—General Electric Co., Ltd. Valves.
Osram Music Magnet.—General Electric Co., Ltd. Home constructor's set.
Ostar-Ganz.—Eugen Forbat. Valves.
Overnight.—F. C. Heayberd and Co. Battery charger.
Overseas.—Overseas Receivers, Ltd. General trade mark.
O.K.—J. Toubkin. Chokes, batteries, speakers. etc.
O.K. Presspahn.—Willmott, Son and Phillips, Ltd.

P

Pakawa.—Barrow, Hepburn and Gale, Ltd. Handles for portable cases.
Pam.—Claude Lyons, Ltd. D.C. and A.C. operated amplifiers.
Panachord.—Warner-Brunswick, Ltd. Records.
Panadyne.—E. V. Mackintosh and Co. Loudspeakers.
Panalite.—Clayton Rubber Sales, Ltd., Ebonite panels and sheets.
Panatrope.—Warner-Brunswick, Ltd. Radio-gramophone.
Pandona.—Pandona, Ltd. Portables, L.F. transformers and speaker units.
Panswitch.—Gent and Co., Ltd. Switches.
Pantophone.—Parlophone Co., Ltd. Records, needles and pick-ups.
Parafeed.—Radio Instruments, Ltd. L.F. transformer.
Paragon.—Clarkes (Redditch) Ltd. Terminals.
Paragon.—H. J. Fletcher and Co., Ltd. Needles and record-filing cabinets.
Paralos.—Snap Switches, Ltd. Variable condensers.
Parex.—E. Paroussi. Components, accessories and receivers.
Parfait.—H. B. Potter and Co., Ltd. Ebonite.
Parlophone.—Parlophone Co., Ltd. Records and needles.
Parmeko.—Partridge and Mee, Ltd. Mains components and eliminators.
Parvo.—Igranic Electric Co., Ltd. Parallel feed transformer.
Passport.—Hart Collins, Ltd. Receivers.
Pattonite.—David J. Patton, Ltd. Insulating material.
Paulette.—Paul's Wireless Stores. General trade mark.
Pawlite.—Aston and Mander (1917), Ltd. Mouldings and switches.
Paxolin.—Micanite and Insulators Co., Ltd. Insulating material.
Peace Products.—Henry Peace, Ltd. General trade mark.
Peer.—Pearson Bros. and Co. Components.
Peerless.—Bedford Electrical and Radio Co., Ltd. Rheostat and condenser.
Peerlex.—Clarke Bros. (Leicester), Ltd. H.T. batteries.
Pegasus.—Pegasus, Ltd. General trade mark.
Pentamu.—Radio Instruments, Ltd. Pentode output transformer.
Pentomite.—Radio Instruments, Ltd. L.F. smoothing and filter output choke.
Pentode Two.—Mains Power Radio, Ltd. Receiver.
Pentone.—Mullard Wireless Service, Co., Ltd. Valves.
Pentrovol.—Igranic Electric Co., Ltd. Microphone.

TRADE NAMES SECTION.

Perco.—Gre-Solvent Co. Iron cement.
Perfect.—Octron, Ltd. Valves.
Perfecta.—E. W. Bonson. Plugs.
Perfex.—Wireless Apparatus, Ltd. Aerial.
Permadyne.—Goodmans. Moving-coil speaker.
Permalloy.—Standard Telephones and Cables, Ltd. High magnetic alloy for cores.
Permatector.—Brownie Wireless Co. of Gt. Britain, Ltd. Permanent detector.
Permcol.—British Hard Rubber Co., Ltd. Non-discolouring ebonite.
Perpetuum.—Alladin Gramophone and Accessories Co. Gramophone motors.
Pertinax.—G. L. Scott and Co., Ltd. Insulation and wire.
Pertrix.—Britannia Batteries, Ltd. Dry batteries and accumulators.
Peter Grassman.—Rotor Electric, Ltd. Moving-coil speaker.
Petmecky.—Murdoch Trading Co. Gramophone needles.
Philco.—Philco Radio and Television Corp. (of G.B.), Ltd. General trade mark.
Philips.—Philips Industrial Ltd. General trade mark.
Philips.—Philips Lamps, Ltd. Sets, rectifying valves, components and accessories.
Philite.—Philips Industrial Ltd. Synthetic resin moulding.
Philomel.—Philomel and Radio Equipment. General trade mark.
Phœnix.—H K. Hunter and Co. General trade mark.
Phœnix.—Thos. A. Rose and Son, Ltd. Dry batteries.
Pifco.—Provincial Incandescent Fittings Co., Ltd. General trade mark.
Pilot.—Peto-Scott Co., Ltd. Kits, sets.
Pioneer.—Pioneer Manufacturing Co. General trade mark.
Pirouette.—A. W. Chapman, Ltd. Turntables, loud speakers, frame aerials, etc.
Pivaspring.—Park Royal Engineering Co., Ltd. Instruments rendering instruments immune from the effects of shock and vibration.
Pix.—British Pix Co., Ltd. General trade mark.
Pix-Crossley.—British Pix Co., Ltd. Receivers.
Plastine.—Sicaloid Ltd. Acetate moulding powder.
Plus Four.—Paul Taylor. H.T. dry battery.
Polar.—Wingrove and Rogers, Ltd. Set, components and accessories.
Polar Star.—Wingrove and Rogers, Ltd. Variable condensers.
Polymet.—A. H. Hunt, Ltd. Fixed mica and paper condensers.
Popular.—Baker's Selhurst Radio. Speakers.
Popular.—Carrington Manufacturing Co., Ltd. Cabinet.
Popular.—Danipad Rubber Co., Ltd. Coil-holder and receiver.
Popular.—Ever-Ready Co. (Great Britain), Ltd. Special H. T. batteries.
Popular.—M.P.A. Wireless (1930), Ltd. Plaque speaker.
Portadyne.—Portadyne Radio, Ltd. Sets.
Portland.—Curry's Ltd. Sets.
Positive Grip.—Lisenin Wireless Co. Plugs, sockets, spade ends, pin ends, wander plugs, mains sockets and plugs.
Powa-Pac.—Brown Brothers, Ltd. H.T. and grid bias batteries.
Powertone.—Powertone Products. General trade mark.
Precision Radio.—Precision Radio and Mfg. Co., Ltd. General trade mark.
Preh.—Preh Manufacturing Co., Ltd. Components.
Premier.—Premier Radio Co. L.F. Transformer.
Premier.—Vinces Dry Batteries, Ltd. H.T. and grid bias batteries.
Premierphone.—Lisenin Wireless Co. Sets.
Pressland.—Pressland Products, Ltd. General trade mark.
Prima Donna.—Aladdin Gramophone and Accessories Co. Sound boxes.
Primus.—Primus Manufacturing Co. Cone units and speakers.
Primus-Autocel.—Primus Manufacturing Co. H.T. batteries.
Primustatic.—Primus Manufacturing Co. Loud-speaker.
Princewood.—Majestic Electric Co. Receiver.
Prisma.—Mica Mfg. Co., Ltd. Mouldings.
Psychon.—Psychon, Ltd. General trade mark.
Protograph.—Siemens Schukert (Gt. Britain), Ltd. Record cutting apparatus.
Pup.—Kolster-Brandes, Ltd. Receiver.
Puravox.—Falk, Stadelmann and Co., Ltd. Speaker
Puratone.—Rubon, Ltd. Valves.
Puretone.—Pearson Bros and Co. Baffles.
Puretone.—J. and H. Walter, Ltd. Loudspeaker units.
Pyaneer.—Brown Brothers, Ltd. Pocket Lamp batteries.
Pyrex.—J. A. Jobling and Co., Ltd. Insulators.
Pye.—Pye Radio, Ltd. General trade mark.
P.B.—McLeod and McLeod. Tapes (varnished)
P.B.C.—Pearson Bros. and Co. Components.
P.D.—Automobile Accessories (Bristol), Ltd. Valve set and components.
P.M.—Mullard Wireless Service Co., Ltd. General trade mark.
P.P.M.—Celestion Ltd. Speakers.
P.O.—Gould, Harper and Co. Sets.

Q

Quad-Astatic.—Radio Instruments, Ltd. H.F choke.
Quaker.—McLeod and McLeod. Processing oils.
Queen Anne.—Halford Radio, Ltd. Receivers and radiograms.
Quick-fix.—Eagle Transfer, Ltd. Transfers.
Quick-Grip.—Ward and Goldstone, Ltd. Connector.
Quickwyre.—A. F. Bulgin and Co., Ltd. Slip covered connecting wire.
Quixo.—Runbaken Magneto Co., Ltd. Battery testers.
Q.—Pye Radio Ltd. Portable.
Q.—Wholesale Radio Supplies Co. Receiver.
Q.C.C.—Quartz Crystal Co. Crystals and transmitting apparatus.
Q.J.—Wingrove and Rogers, Ltd. Variable condenser.

R

Rabco.—Record Auto-Brush Co. Record cleaners and soundboxes.
Radio.—Edison Bell, Ltd. Records.
Radiocraft.—Radiocraft Supplies, Ltd. Components and accessories.
Radiogrand.—Telsen Electric Co., Ltd. L.F. transformer.
Radio-Graphophone.—Columbia Graphophone Co., Ltd. Radio-gramophones.
Radiola.—Richardsons (R.M.L.), Ltd. Gramophones.
Radiomatic.—Gent and Co., Ltd. Valve set.
Radio-Micro.—Impex Electrical, Ltd. Valves.
Radiomonic.—Radiomonic Ltd. General trade mark.
Radion.—American Hard Rubber Co. (Britain), Ltd. Insulating material.
Radion.—Green's Wireless Stores. Cradle frames.
Radionite.—British Radio Mfg. Co. (Liverpool) Ltd. Synthetic crystal rectifiers.
Radiopak.—British Radiophone, Ltd. Band pass and super het units.
Radiopath.—British Radiostat Corporation, Ltd. Radio-gramophone and receiver.
Radiostenode.—British Radiostat Corporation, Ltd. Radio-gramophone and receiver.

Radiostenostat.—British Radiostat Corporation, Ltd. Radio-gramophone and receiver.
Radiotrope.—Thompson Diamond and Butcher. Gramophone to radio conversion unit.
RadiOwire.—David Green and Son, Aerial wire.
Radio XXX.—M. Feldman. Accumulators.
Radvaco.—Blitz Bros. Valves.
Raleigh.—Shapland and Petter. Cabinets.
Ranger.—J. F. Smith (Birmingham), Ltd. L.T., H.T. and grid bias batteries.
Ravald.—J. Moores and Co. Cabinets and components.
Raytheon.—Rothermel Corporation, Ltd. Rectifying valves.
Reacto.—Gent and Co., Ltd. Reaction coils.
Reactone.—Sylvex, Ltd. Coils.
Ready Radio.—Ready Radio, Ltd. Screens, coils and variable condensers.
Realistic.—Realistic Speakers. Wood flare diaphragm.
Recepticon.—Concordia Electric Wire Co., Ltd. Insulated aerial wire.
Record.—Danipad Rubber Co., Ltd. Geared coil-holder.
Record.—Record Electrical Co., Ltd. Tester.
Record.—Ward and Goldstone, Ltd. Dry Battery.
Red-Diamond.—Jewel Pen Co., Ltd. Components.
Red-ditch.—Clarkes (Redditch) Ltd. Gramophone needles.
Red House.—Mains Conversion Co. Receivers and eliminators.
Red Kap.—S. Kalisky (Aldgate), Ltd. Transformers and speaker units.
Red Lion.—R. Cadisch and Sons. General trade mark.
Redmanol.—Bakelite, Ltd. Insulating materials.
Red Star.—Red Star Radio, Ltd. Receivers.
Red Triangle.—Peto Scott Co., Ltd. Ebonite panels.
Refty.—Davis and Timmins, Ltd. Terminals.
Regal.—Columbia Graphophone Co., Ltd. Records.
Regal.—Spicers, Ltd. Ebonite.
Regent.—M.P.A. Wireless (1930), Ltd. Cone speaker.
Regentone.—Regentone, Ltd. Mains units, mains receivers and mains components.
Regis.—E. W. Bonson. Plugs.
Reliability.—J. H. Taylor and Co. Batteries, variable and fixed condensers, and ebonite.
Reliance.—A. Diggle and Co. Charging plant.
Reliance.—Emarec, Ltd. General trade mark.
Reliance.—Reliance (Nameplates), Ltd. General trade mark.
Reliomac.—Manufacturers' Accessories Co. (1928), Ltd. H.T. battery, dual range coil and P.W. coil.
Remy.—W. F. Dennis and Co. Permanent magnets.
Renown.—Goodmans. P.M. M.O. speaker.
Renown.—Mile End Radio Co. Components and accessories.
Resicon.—Thorp, Roderick, Ltd. Components.
Resistite.—Pearson Bros. and Co. Carbon, fixed and variable resistors.
Resiston.—American Hard Rubber Co. (Britain), Ltd. Insulating material.
Resonic.—Thorp, Roderick, Ltd. Components.
Revlec.—A. W. Green. Home talkies.
Rex.—Rex Gramophone Co., Ltd. Portable gramophones.
Rexola.—Rex Gramophone Co., Ltd. Radio-gramophone.
Rhapsody.—The Rhapsody Co. Radio-gramophone.
Rheoswitch.—A. F. Bulgin and Co., Ltd. Combined H.T. and L.T. switch.
Richtone.—London Radio Co. (Leeds), Ltd. Valves, speakers, accumulators and H.T. batteries.
Richtone.—H. A. Riche. General trade mark.
Ring.—George Bowerman, Ltd. H.T. battery.
Ripaults.—Ripaults, Ltd. Components and accessories.
Ripper.—C. G. Johnstone. Cones.
Ritho.—Ritherden and Co., Ltd. Steel products.
Rival.—Hobday Bros., Ltd. Components and accessories.
Robins.—Robins, Ltd. Components, lightning arrester, and lead-in tubes.
Roebuck.—Buck and Hickman, Ltd. Belting, pulleys and tools.
Rola.—A British Rola Co., Ltd. Moving coil speakers.
Rondo.—Rondo Co., Ltd. Gramophone and storing cabinets.
Rosomil.—Thos. A. Rose and Son, Ltd. Electrical signs and radio specialised products, bakelite, accessories and voltmeters.
Ross, Courtney.—Ross, Courtney and Co., Ltd. Terminals.
Rotodisc.—A. D. Models. Electric motor.
Rotor.—Rotor Electric, Ltd. Cone speaker.
Rotormidget.—Rotor Electric, Ltd. Dynamics and Sphagetti resistances.
Rotor-Ohms.—Rotor Electric, Ltd. Variable resistances.
"Rover 2."—Goodwin Radio, Ltd. Set.
"Rover 3."—Goodwin Radio, Ltd. Set.
Royal Cullinan.—Commercial Engineering Co. Sets built in plate glass.
Royal Prince.—Commercial Engineering Co. Mains transformers, chokes and speakers.
Royalty.—Rothermel Corporation, Ltd. Wire-wound grid-leak, resistance and modulator.
Rozinal.—Gre-Solvent Co. Soldering paste.
Rubyphone.—F. Cholerton. Receiver.
R. and A.—Reproducers and Amplifiers, Ltd. Amplifiers and speakers.
R.B.—Rigby Bros. Portable.
R.C.—R. C. Radio-electric, Ltd. Aerials, cones, cone speaker kits, cone units and portable sets.
R.G.D.—Radio-gramophone Development Co. Radio-gramophones, speaker, pick-ups and arms.
R.G.S.—Robert Galt and Sons. Valve Set.
R.K.—British Thomson-Houston Co., Ltd. Coil-driven speaker and amplifiers.
R.L.—R. Cadisch and Sons. Switches and plugs.
R. for M.V.3.—United Radio Manufacturers, Ltd. Kit set.
R.M.A.C. Four.—Rees Mace Manufacturing Co., Ltd. A.C. table model sets.
R.M.R.—R.M. Radio, Ltd. Complete receivers.
R.U.R.—C. Campart. Speed regulators.

S

Salopian.—Groves Bros. General trade mark.
Sampson.—Ward and Goldstone, Ltd. Accumulators and accumulator carriers.
Samson.—Claude Lyons, Ltd. Laboratory apparatus.
Sandringham.—Goodmans. Cone speaker.
Saturn-Electric.—British Goldring Products, Ltd. Sound boxes.
Savage.—W. B. Savage. Fixed condensers.
Savana.—Rose, Morris and Co., Ltd. General trade mark.
Saveit.—Hellesens Ltd. Safety fuse wander plug.
Saxon.—Saxon Radio Co. Components and aerial wire.
Saxonia.—Saxonia Electrical Wire Co., Ltd. General trade mark.
Sbik.—Willmott, Son and Phillips, Ltd. Lightning arresters.
Sch.—Thomas A. Rose and Son, Ltd. Batteries, wet cells, etc.
Scientific.—Stratton and Co., Ltd. Short wave apparatus and receivers.
Scott Sessions.—G. Scott—Sessions and Co. General trade mark.
Scoville.—The Rothermel Corporation, Ltd. Tung tuning condensers.
Seaford.—Rooke Bros., Ltd. Components.
Seamark.—C. E. Needham and Brother, Ltd. Coil.
Sectordyne.—H. Joseph. Speaker.
Sectotar.—H. Joseph. Speaker.
Secura.—Brasse, Ltd. Insulated sleeving.
Securite.—Brasse, Ltd. Connecting wire.
Segic.—S. Guiterman and Co., Ltd. Battery charging clips.

TRADE NAMES SECTION.

Selecta.—Selecta Gramophones, Ltd. Radiogram.

Selectanet.—Spong and Co., Ltd. Indoor and outdoor aerials and earth mat.

Selectatune.—C. G. Chalkley. Tuning unit.

Self Regenerative.—Ripaults, Ltd. H.T. dry batteries.

Senator.—A. F. Bulgin and Co., Ltd. Transformers.

Sensitite.—Wholesale Wireless Co. Sets and components.

Seradex.—T. Pepper. General trade mark.

Serenada.—Zeitlin and Sons, Ltd. General trade mark.

Setaw.—S. Kalisky (Aldgate), Ltd. Meters.

Shalless.—Shalless and Evans. General trade mark.

Shearex.—A. E. Shearing, Ltd. Components.

Sicalite.—Sicaloid, Ltd. Casein products.

Sicaloid.—Sicaloid, Ltd. General trade mark.

Sicoid.—Sicaloid, Ltd. Non-flam. celluloid.

Siemens.—Siemens Electric Lamps and Supplies Ltd. Batteries.

Siemens and Halske.—Siemens Schuckert (Gt. Britain), Ltd. General trade mark.

Sieverts.—J. McMillan and Co. Enamelled copper wire.

Silkenamel.—Standard Insulator Co., Ltd. Enamelled and S.S.C. covered wire.

Silverdome.—Octron Ltd. Valves.

Silver Ghost.—S. A. Lamplugh, Ltd. Speakers.

Silver-Knight.—India Rubber, Gutta Percha and Telegraph Works, Ltd. H.T. and G.B. batteries.

Silvert.—Contal Radio, Ltd. General trade mark.

Simpla.—Gould, Harper and Co. Tuners.

Simple-strip.—New London Electron Works, Ltd. Perforated instrument wire.

Simplicity.—S. Guiterman and Co., Ltd. Acid pump.

Simplicon.—Williams and Moffat, Ltd. Components.

Simpson's Electric Turntable.—Simpsons Electricals, Ltd. Electric gramophone motor.

Sinew.—Clarkes (Redditch), Ltd. Steel springs.

Single Dial.—S. W. Scott and Co. Dual coils.

Sinlos.—Snap Switches, Ltd. Variable condensers.

Sinus.—E. A. Wood. Speakers.

Sistoflex.—Spicers, Ltd. Insulating sleeving and materials.

Six-Sixty.—Six-Sixty Radio Co., Ltd. General trade mark.

Skater.—Clarith Reproducers, Ltd. Radiogramophone.

Skylark.—Sheffield Magnet Co. Unit.

Skyscraper 3.—Lissen Ltd. Set.

Slektun.—Slektun Products, Ltd. Sets and components.

Smith.—W. Smith and Son. Receiver.

Snap.—Graham Farish, Ltd. H.F. chokes.

Solderflux.—Elephant Chemical Co., Ltd. Non-corrosive solder and soldering paste.

Soldometa.—Elmesan (London), Ltd. Pocket soldering outfit.

Solex.—Wilrose Co. (Birmingham), Ltd. Sets, speakers and batteries.

Soludra.—F. L. Lesingham. Insulating sleeving and connecting wires.

Somondo.—J. Hemelik. General trade mark.

Songster.—J. Stead and Co., Ltd. Gramophone needles and sound-box.

Sonochorde.—Sonochorde Reproducers, Ltd. General trade mark.

Sopranist.—S. Kalisky (Aldgate), Ltd. Batteries, components and hydrometers.

Sorbo.—Sorbo Rubber Sponge Products, Ltd. General trade mark.

Sovereign.—Atlas Carbon and Battery Co., Ltd. Batteries.

Sovereign.—Sovereign Products, Ltd. Components.

Sparta.—Fuller Accumulator Co. (1926), Ltd. Dry batteries.

Sparta.—C. Haddon, Poupard and Co. Horn and cone type speakers, intervalve transformers and tuning units.

Spartan.—Pearson Bros. and Co. Batteries and accumulators.

Speakeasie.—Speakeasie Home Recorders, Ltd. Home recorder.

Spedding-Super.—A. Spedding. Valve sets.

Spekker.—Adam Hilger, Ltd. Trade mark for specialised spectroscope, spectrophotometer.etc.

Spencer Superhet.—Spencer Radio, Ltd. Portable set.

Spirohm.—Dubilier Condenser Co. (1925), Ltd. Wire-wound resistors.

Spot.—Danipad Rubber Co., Ltd. Coil-holder.

Spotter.—Yorkshire Radio Co. Valve and crystal sets.

Sprague.—The Rothermel Corporation, Ltd. Electrolytic condensers.

Springflat.—J. G. Beddoes, Ltd. Collapsible spring handle.

Springmore.—Igranic Electric Co., Ltd. Wander plug.

Square Peak.—Varley. Tuning coils.

Squiregram.—Frederick Squire, Ltd. Portable gramophone attachment with pick-up.

Stabyl.—C.I.V.A.R.E., Ltd. Products.

Stadion.—J. Fabian, Ltd. H.T. batteries.

Stadionette.—J. Fabian, Ltd. Portable set.

Stadium.—Stadium, Ltd. Hydrometers, voltmeters and ammeters.

Stalloy.—Joseph Sankey and Sons, Ltd. General trade mark.

Standard.—Graham Farish, Ltd. Grid leak.

Standard.—Rigby and Woolfenden. Metal cabinets.

Standard.—Standard Battery Co. Batteries.

Standard-de-Luxe.—Commercial Engineering Co. All mains short wave sets.

Standard Radio.—Standard Telephones and Cables, Ltd. General trade mark.

Standard Red.—Edison Swan Electric Co., Ltd. Universal electric gramophone motor.

Standynis.—Geo. L. Scott and Co., Ltd. Dynamo and transformer sheets and stampings.

Stantranis.—Geo. L. Scott and Co., Ltd. Dynamo and transformer sheets and stampings.

Staric.—George Bowerman, Ltd. Condensers, transformers, switches and flex.

Steed.—Amalgamated Manufacturers. Coil winder.

Stenode.—British Radiostat Corporation, Ltd. Radio-gramophone and receiver.

Stenodyne.—British Radiostat Corporation, Ltd. Radio-gramophone and receiver.

Stenolith.—British Radiostat Corporation, Ltd. Radio-gramophone and receiver.

Stenophone.—British Radiostat Corporation, Ltd. Radio-gramophone and receiver.

Stenostat.—British Radiostat Corporation, Ltd. Radio-gramophone and receiver.

Sterling.—Sterling Varnish Co. Insulating varnishes and compounds.

Sterno.—British Homophone Co., Ltd. Records.

St. Ivel.—British General Radio Co., Ltd. General trade mark.

Stokmar.—Stockall Marples and Co., Ltd. Synchronous clocks.

Storan.—Storey Bros. and Co. General trade mark.

Storch.—F. L. Lesingham. Two-pin plugs and sockets.

Stornovox.—Goodmans. Chassis.

Stradivox.—Yates Sutton, Ltd. Receivers, radio-gramophones and cone speakers.

Stremlin.—Aladdin Gramophone and Accessories Co. Tone arm.

Sunbeam.—Sunbeam Electric Ltd. General trade mark.

Sunco.—Sun Electric Co., Ltd. General trade mark.

Supanik.—Concordia Electric Wire Co., Ltd. Insulated connecting wire.

Super 1.—Ever-Ready Co. (Gt. Britain), Ltd. H.T. battery.

Super Artiste.—Pohlman and Son, Ltd. Radiogram.

Superb.—Commercial Engineering Co. Mains eliminators, A.C. and D.C.

Superbe.—Columbia Graphophone Co., Ltd. Needles.
Supercell.—Runwell Cycle Co. (Birmingham), Ltd. Accumulators.
Supercision.—F. C. Heayberd and Co. Measuring instruments.
Superdyne.—British Radio Manufacturing Co. (Liverpool), Ltd. Super-heterodyne apparatus and accessories.
Superial.—New London Electron Works, Ltd. Insulated aerial wire.
Superscale.—Everett, Edgcumbe and Co., Ltd. Moving iron and moving coil ammeters and voltmeters.
Supertone.—Supertone Pianos, Ltd. Radio piano.
Supertone.—Supertone Radio Mfg. Co. Speakers, units and pick-up.
Supremus.—Supremus Specialities, Ltd. General trade mark.
Supronic.—L.P.S. Electrical Co., Ltd. Resistance alloys.
Sutra.—George Bowerman, Ltd. Transformers, voltmeters, valve holders, coil holders, mains supply units, etc.
Sutra.—C.I.V.A.R.E., Ltd. Components.
Swan-Neck.—Amplion (1932), Ltd. Speaker.
Sylphone.—Frederick Squire, Ltd. Moving coil speaker.
Sylvania.—Claude Lyons, Ltd. Valves.
Sylverex.—Sylvex, Ltd. Cone material, cone washers and tinsel fabric for speakers.
Sylver Fox.—Dundas Fox, Ltd. Batteries.
Sylvox.—B. and S. Electrical Co., Ltd. Superhet chassis and gramophone motor.
Symphonion.—Dulcetto Polyphon, Ltd. Gramophones.
Symphony.—J. Toubkin. Headphones and transformers.
Synchratune.—Sydney S. Bird and Sons, Ltd. Ganged variable condensers with individual adjustment.
Synchrono-Blue.—Edison Swan Electric Co., Ltd. A.C. electric gramophone motor.
Synchronomains.—Synchronome Co., Ltd. Synchronous clocks.
Synchronome.—Synchronome Co., Ltd. Electric clocks.
Synclock.—Everett Edgcumbe and Co., Ltd. Synchronous clocks.
Syphona.—S. Guiterman and Co. Acid pump.
Sytifik.—Pearson Bros. and Co. Resistors and coils.
S.—Pye Radio Ltd. Superhet.
S.A.—McLeod and Mcleod. Sheet ebonite.
S.A.W. Co.—S. Arnull Watt and Co. Battery hydrometers.
S. and C.—Spears and Co. Capstan and auto repetition work and small pressings.
S.D.L.—S. Dagnall, Ltd. Receiver.
S.I.W.—Scott Insulated Wire Co., Ltd. Wire.
S.L.—Spicers, Ltd. Ebonite.
S.O.S.—Wembley Scintific Laboratories, Ltd. Soundbox.
S.R.S.—Stonehouse Radio Supplies. Ultra short wave unit, receivers, coils and screen grid converters.

T

Tachy.—Acme Album Service. Record carrying case.
Talkatome.—British Talkatome Co., Ltd. Home talkies.
Talkie.—Columbia Graphophone Co., Ltd. Needles for cinema use.
Tangent.—Gent and Co., Ltd. Components and accessories, mains transformers and chokes.
Tannoy.—Tannoy Products. General trade mark.
Tapa.—W. J. Charlesworth. Accessories.
Taylex.—F. Taylor. General trade mark.
Tecalemit.—Tecalemit Radio Co. Sets.
Tefag.—Dr. Nesper, Ltd. Tongue-type four-pole unit.
Telenduron.—Thos. De-la-Rue and Co., Ltd. Bakelite, insulating compounds and mouldings.
Televisor.—Bair Television, Ltd. Television receiving apparatus.
Telexor.—Telsen Electric Co., Ltd. Tuning control.
Telford.—Hyde and Telford. Transportable set.
Telornor.—Telsen Electric Ltd. Panel assembly and escutcheon.
Telsen.—Telsen Electric Co., Ltd. General trade mark.
Tenasitine.—Kay Bros., Ltd. Adhesive cement.
Termytabs.—Money Hicks, Ltd. Terminal labels.
Terralto.—R. Custerton. Speakers, cones and receiving sets.
Terravivor.—Eric J. Lever (Trix), Ltd. Earthing chemical.
The New M.P.—McWhirr, Paterson and Co. General trade mark.
Theorem.—McWhirr, Paterson and Co. Variable condensers.
"The Perfect."—Aladdin Gramophone and Accessories Co. Sound boxes.
Thermion.—C. Haddon Poupard and Co., Ltd. General trade mark.
Thermo-Breaknot.—S. Guiterman and Co., Ltd. Hydrometer.
Thor.—Goodman Instrument Co. Lightning arresters.
Thordarson.—The Rothermel Corporation, Ltd. L.F. transformers and chokes.
Three-in-One.—Wates Radio Ltd. Volt-amp-test set.
Three Star.—Sunlight Mfg. Co., Ltd. Dry batteries.
Three Star.—Three Star Accumulators, Ltd. Accumulators.
Thunderbolt.—Buck and Hickman, Ltd. High speed steel, insulated pliers (non-chip).
Thuringia.—E. H. Maisner and Co., Ltd. H.T. battery.
Tiltrack.—B. Thomas. Storage trays for small parts.
Tinol.—Tutills, Ltd. Set, components and accessories.
Titian.—H. J. Fletcher and Co., Ltd. Spring motors.
Toga.—Buck and Hickman, Ltd. Small tools and bar iron.
Ton-A-Kap.—Snap Switches, Ltd. Variable condensers.
Tonatuna.—Tonex Co. Universal tuner.
Tonax.—Garratt Stores. Cone adaptors.
Tone Selector.—Harlie, Ltd. Components and accessories.
Tonex.—Tonex Co. Components.
Touchstone.—Gent and Co., Ltd. Speaker.
Tourist.—Hart Collins, Ltd. Portable and transportable sets.
Tournaphone.—Murdoch Trading Co. Gramophones.
Tower.—Tower Radio Supplies. General trade mark.
Trafcand.—Junction Engineering Co., Ltd. Speaker toner.
Transadyne.—Neutron (1927), Ltd. Receiver.
Transfeeda.—Benjamin Electric, Ltd. Parallel feed transformer.
Tretoil.—Bakelite, Ltd. Laminated sheet.
Trelleborgs.—Trelleborgs Ebonite Works, Ltd. Ebonite and bakelite.
Trentradio.—Cowlishaw Bros. Set and tuner.
Triad Grand.—Union Radio Co., Ltd. Receivers.
Trier.—Buck and Hickman, Ltd. Grindstone dressers and safety rests.
Triotron.—Triotron Radio Co., Ltd. General trade mark.
Triparte.—Ward and Goldstone, Ltd. Terminals.
Triple Wave Three.—Formo Co. Kit set.
Triptex.—R. O. Bridger and Co. Fabric cones.
Trix.—Eric J. Lever (Trix), Ltd. Sets, components, accessories, mains transformers and power amplifiers.
Truescrews.—True Screws, Ltd. General trade mark.
Truevibro.—R. O. Bridger and Co. Cones, etc.

TRADE NAMES SECTION

Trump.—Ardea Vulcanizer Syn., Ltd. Electric soldering irons.
Trutest.—S. Guiterman and Co. Hydrometers.
Trutone.—Carrington Mfg. Co., Ltd. Cabinet.
Trutone.—Richardsons (R.M.L.), Ltd. Gramophones and components.
Truvolt.—The Rothermel Corporation, Ltd. Resistance.
Tube Wire.—J. Moores and Co. Connecting wire.
Tudor.—Tudor Accumulator Co., Ltd. Accumulator.
Tufnol.—Ellison Insulations, Ltd. Insulating material, tube sheet and panel.
Tuftest.—Willmott, Son and Phillips, Ltd. Fibre.
Tuftex.—Williamson and Phillips, Ltd. Leatheroid substitute.
Tunewell.—Tunewell Radio Co., Ltd. General trade mark.
Tungar.—British Thomson-Houston Co., Ltd. Battery charger.
Tungstalite.—Tungstalite, Ltd. Crystal and crystal detector..
Tungstyle.—Gramophone Co., Ltd. Semi-permanent needles.
Tungsram.—Tungsram Electric Lamp Works (Great Britain), Ltd. Valves.
Tungstone.—Tungstone Accumulator Co., Ltd. Accumulators.
Twinbox.—Tonex Co. Components.
Twin-cone.—Green and Faulconbridge, Ltd. Speakers.
Twin-Fuse.—Gambrell Radio, Ltd. Safety fuses.
Twingrip.—J. G. Beddoes, Ltd. Automatic safety lock.
Twin-mag.—Goodmans. Loudspeaker unit.
Twintriple.—Pye Radio, Ltd. Portables.
Twoside.—Redferns Rubber Works, Ltd. Ebonite panels.
Tylaphonic.—Tyrela Gramophones, Ltd. Gramophones and radiograms.
Tyrela.—Tyrela Gamophones, Ltd. Gramophones.
T.C.C.—Telegraph Condensor Co., Ltd. Fixed condenser.
T.E.C.—Efandem Co., Ltd. Dry cell and accumulator.

U

Ultra.—Ultra Electric, Ltd.—General trade mark.
Umello.—Umello, Ltd. General trade mark.
Undy.—J. Hemelik. Speakers and units.
Unibox.—Tonex Co. Screens and screened grid coils.
Unic.—Richardsons (R.M.L.), Ltd. Components and gramophones.
Uniflex.—Liverpool Radio Supplies. Sets.
Unigrad.—Radio Instruments, Ltd. Volume controls.
Uni-Knob.—Wingrove and Rogers, Ltd. Variable condensers.
Unipivot.—Cambridge Instrument Co., Ltd. Galvanometers.
Unirad.—Union Radio Co., Ltd. General trade mark.
Unit.—Electric Gramophones, Ltd. Electric gramophone drive, automatic stop and pick-up.
Unitron.—Service Equipment Co., Ltd. Battery chargers.
Universal.—E. J. Francois. Terminals, wanderplugs and switches.
Universal.—Universal Electric Co., Ltd. Components.
Univolt.—Univolt Elec. Ltd. Radiogram units.
Utility.—Wilkins and Wright Ltd. General trade mark.
Utix.—Ripaults, Ltd. H.T. dry batteries and loudspeakers.

V

Valunda.—F. Francke. Switches and accumulator carriers.
Van Raden.—Van Raden and Co., Ltd. H.T. and L.T. accumulators.
Vari-a-fixed.—Franklin and Freeman, Ltd. Compression type fixed condensers.
Varicap.—Radio Instruments, Ltd. Preset condenser.
Varistor.—Thorp Roderick, Ltd. Variable resistance.
Varoto.—W. Bird and Sons. Set and amplifier.
Varsity.—Frost Radio Co. Chokes and receivers.
Varsity.—Guillaume and Sons, Ltd. Gramophone needles.
Vatea.—Abbey Radio. Valves.
Vee Cee.—Vee Cee Dry Cell Co. (1927), Ltd. H.T. dry cell batteries.
Vee Cee Bee.—V. C. Bond and Sons, Ltd. Cabinets.
Venauto.—Venner Time Switches, Ltd. Automatic programme selector.
Veravox.—Eta Tool Co. Speaker units (coil drive).
Verona.—Jabez, Bate and Co., Ltd. General trade mark.
Vibranti.—Vibranti Products Co. Speaker cabinets and baffle boards.
Vibro.—Burne Jones and Co., Ltd. Valve-holder.
Vibrolder.—Benjamin Electric, Ltd. Anti-microphonic valve holders.
Victoria.—Hyde and Telford. Speaker.
Victor Three.—Telsen Electric Co., Ltd. Kit set.
Viking.—General Electric Co., Ltd. Receiver.
Violina.—Leslie Dixon Switchgear Co. Cabinet speaker.
Violute.—E. A. Wood. Speakers.
Viophone.—E. A Wood. Speakers.
Visitron.—Claude Lyons, Ltd. Photo cells.
Viva-Radio.—Columbia Graphophone Co., Ltd. Dry batteries.
Viva-Tonal.—Columbia Graphophone Co., Ltd. Portable gramophone.
Vivavox.—Amplion (1932), Ltd. Gramophone pick-up.
Volex.—Ward and Goldstone, Ltd. Batteries.
Vol-Peek.—R. D. Storey. Metallic cement.
Volso.—Volso Radio Co. Permanent detector.
Voltex.—Formo Co. Battery eliminators.
Volustat.—Harlie, Ltd. Components and accessories.
Voluvernia.—Gambrell Radio, Ltd. Volume control.
Vono.—Buck and Hickman, Ltd. Vises.
Vox-veritas.—Morogoro Trading Corporation, Ltd. Moving coil speakers and corner baffle boards.
Vulcan.—J. Stead and Co., Ltd. Gramophone mainsprings.
Vulco.—Vulco Dry Battery Co., Ltd. Dry batteries.

W

Wallnut.—G. Churley Cann, Ltd. Lead-in switch.
Wanderfuse.—Belling and Lee, Ltd. Wanderplug with fuse.
Watcoben.—Bush Engineering Co., Ltd. General trade mark.
Wates.—Wates Radio, Ltd. Speaker unit.
Watmel.—Watmel Wireless Co., Ltd. Components and valve receivers.
Wavemaster.—Webb Condenser Co., Ltd. Variable condenser.
Waveola.—Aladdin Gramophone and Accessories Co. Amplifiers.
Waverley.—Carrington Mfg. Co., Ltd. Cabinet.
Wearite.—Wright and Weaire, Ltd. Components and accessories.
Webber.—R. A. Webber, Ltd. Moving coil loudspeakers and P.A. equipment.

Webson.—Star Engineering. Sets, components and accessories.

Webster.—The Rothermel Coporation, Ltd. Power amplifiers.

Wego.—Wego Condenser Co., Ltd. Condensers.

Weilo.—S. W. Lewis and Co., Ltd. Components.

Wellington.—L. E. Jaccard. Gramophone and wireless apparatus and components.

Westbury-ware.—Reliance Mfg. Co. (Southwark), Ltd. Mouldings.

Westinghouse.—The Rothermel Corporation, Ltd. Receivers.

Westinghouse.—Westinghouse Brake and Saxby Signal Co., Ltd. General trade mark.

Westminster.—Carrington Mfg. Co., Ltd. Cabinet.

Westminster.—Curry's, Ltd. Sets.

Weston.—Horstmann Gear Co., Ltd. Folding accumulator carriers.

Weston.—Weston Electrical Instrument Co., Ltd. Measuring instruments.

Wilco.—L. Wilkinson. Adhesive tape, insulated staples, milliammeters, tinsel for speakers and electrical measuring instruments.

Wilson.—E. Wilson. Aerial pulley.

Windsor.—Carrington Mfg. Co., Ltd. Cabinet.

Wing-Nut.—Thos. R. Ellin (Footprint Works). Ltd. Tools.

Winner.—Edison Bell, Ltd.. Gramophone records.

Winner.—Ever-Ready Co. (Gt. Britain), Ltd. H.T. and G.B. dry batteries.

Wolf.—S. Wolf and Co., Ltd. Electrical soldering iron and portable electric tools.

World-Wide Four.—General Electric Co., Ltd. Four-valve receiver.

Wo-Tan.—Frys (London), Ltd. Reamers and end mills.

Wright-de-Costa.—The Rothermel Corporation, Ltd. Dynamic speakers.

Wufa.—S. Kalisky (Aldgate), Ltd. Speakers, units and chassis.

Wufa.—M. Lichtenberg. Loud speakers.

Wumu.—Aladdin Gramophone and Accessories Co. Electric motors.

Wunsch and Marcranda.—T. A. Rose and Son. Ltd. Electric motors.

Wyephone.—W. Butcher and Sons (Ross), Ltd. Receiver.

W.B.—Walter Balmford. General trade mark.

W.B.—Whiteley Electrical Radio Co., Ltd. General trade mark.

W. and W., Ltd.—Wright and Weaire, Ltd. Components.

X

Xaltona.—G. F. Baker and Co., Ltd. Gramophones and portable radio.

Xzit.—Weedon Power Link Radio Co. Aerial eliminator.

XL-ALL.—Standard Mfg. Co. Aerial.

X.L.N.T.—W. G. West. Cabinets and accumulator crates.

Y

Yagerphone.—Yagerphone Ltd. General trade mark.

Yaxley.—The Rothermel Corporation, Ltd. Rheostats and switches.

Yeldon.—Yeldon (Radio), Ltd. Receivers and mains units.

Young.—Young Accumulator Co. (1929), Ltd. General trade mark.

Z

Zampa.—Mic Wireless Co. Components.

Zapon.—Fredk. Crane Chemical Co., Ltd. Cold cellulose lacquer.

Zaza.—Metropolitan Lighting Co., Ltd. Dry battery.

Zenite.—Zenith Electric Co., Ltd. Vitreous wire-wound resistance unit.

Zenith.—Zenith Electric Co., Ltd. General trade mark.

Zetavox.—Zetavox Radio and Television Co., Ltd. General trade mark.

Zeva.—Automatic Coil Winder and Electrical Equipment Co., Ltd. Electric soldering iron.

Zonophone.—British Zonophone Co., Ltd. Kit sets, receivers, gramophone pick-ups, accumulators, batteries, records and needles.

Zwietusch.—Siemens Schuckert (Gt. Britain), Ltd. Condensers and factory conveyors.

MISCELLANEOUS.

3 E.—Claude Lyons, Ltd. Rheostat.

49.—G. and G. Laker Co., Ltd. Enamelled aerial wire.

303.—Ready Radio, Ltd. Kit.

The BROADCASTER & WIRELESS RETAILER

CLASSIFIED ADVERTISEMENTS

These advertisements (which must be prepaid) are published in a Special Section at the end of *The Broadcaster*—flanked on either side by small miscellaneous displayed announcements. They are used with excellent results by the leading manufacturers and dealers throughout the country

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RADIO PRODUCTS SUPPLIED SECTION

ACCUMULATORS L.T. LEAD.

A.E.F. Manufacturing Co.
Blue Comet, Ltd.
Boynton & Co., Ltd.
Britannia Batteries, Ltd.
British Zonophone Co., Ltd.
Cadisch & Sons, R.
Calmont, King & Co., Ltd.
Chorlton Metal Co., Ltd.
Chloride Electrical Storage Co., Ltd.
Cossor, Ltd.
Dawkins Trading Co.
Edison Storage Battery Distributors, Ltd.
Edison Swan Electric Co., Ltd.
Edwards & Co., Ltd., R.
Erith Battery Co., Ltd.
Essex Accumulator Co., Ltd.
Feldman, M.
Fuller Accumulator Co. (1926), Ltd.
General Electric Co., Ltd.
Havenand, Lewis & Co.
Hewitt, Ltd., A. J.
Knopf, A.
Kolster-Brandes, Ltd.
Lissen, Ltd.
Lithanode Co., Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
National Accumulator Co., Ltd.
Northern Steel & Hardware Co., Ltd.
Oldham & Son, Ltd.
Pearson Bros. & Co.
Richardsons (R. M. L.), Ltd.
Runwell Cycle Co. (Birmingham), Ltd.
Saxon Radio Co.
Siemens Elec. Lamps and Supplies, Ltd.
Smith & Son (M. A.), Ltd.
Sovereign Products, Ltd.
Three Star Accumulators, Ltd.
Tudor Accumulator Co., Ltd.
Tungstone, Ltd.
Van Raden & Co., Ltd.
Vandervell, Ltd., C. A.
Young Accumulator Co. (1929), Ltd.

ACCUMULATORS L.T. LEAD (Unspillable).

A.E.F. Manufacturing Co.
Blue Comet, Ltd.
Boynton & Co., Ltd.
Chloride Electrical Storage Co., Ltd.
Edison Storage Battery Distributors, Ltd.
Edwards & Co., Ltd., R.
Erith Battery Co., Ltd.
Fuller Accumulator Co. (1926), Ltd.
General Electric Co., Ltd.
Jelectro Laboratories.
Knopf, A.
Kolster-Brandes, Ltd.
Lissen, Ltd.
Lithanode Co., Ltd.
National Accumulator Co., Ltd.
Northern Steel & Hardware Co., Ltd.
Oldham & Son, Ltd.
Pearson Bros. & Co.
Pye Radio, Ltd.
Smith & Sons (M. A.), Ltd.
Sovereign Products, Ltd.
Three Star Accumulators, Ltd.
Tudor Accumulator Co., Ltd.
Vandervell, Ltd., C. A.
Young Accumulator Co. (1929), Ltd.

ACCUMULATORS L.T. (Other Types).

Alklum Storage Batteries, Ltd.
A.E.F. Manufacturing Co.
Blue Comet, Ltd.
Boynton & Co., Ltd.
Edison Storage Battery Distributors, Ltd.
Edwards & Co., Ltd., R.
Erith Battery Co., Ltd.
Fuller Accumulator Co. (1926), Ltd.
General Electric Co., Ltd.
Knopf, A.
Lissen, Ltd.
Lithanode Co., Ltd.
Millet, J.
National Accumulator Co., Ltd.
Oldham & Son, Ltd.
Smith & Sons (M. A.), Ltd.
Tudor Accumulator Co., Ltd.

ACCUMULATORS H.T.

Alklum Storage Batteries, Ltd.
A.E.F. Mfg. Co.
Blue Comet, Ltd.
Chloride Electrical Storage Co., Ltd.
Erith Battery Co., Ltd.
Fuller Accumulator Co. (1926), Ltd.
Jelectro Laboratories.
Kolster-Brandes, Ltd.
Lissen, Ltd.
Millet. J.
Milnes Radio, Ltd.
National Accumulator Co., Ltd.
Oldham & Son, Ltd.
Pearson Bros. & Co.
Smith & Sons (M. A.), Ltd.
Three Star Accumulators, Ltd.
Tudor Accumulator Co., Ltd.
Van Raden & Co., Ltd.
Vandervell, Ltd., C. A.
Young Accumulator Co. (1929), Ltd.

ACCUMULATOR BOXES.

Automobile Accessories (Bristol), Ltd.
A.E.F. Manufacturing Co.
Bond & Sons, Ltd., V. C.
Cookson & Co.
Custerson, R.
Elliott Radio Mfg., Co., Ltd.
Fuller Accumulator Co (1926), Ltd.
Holmes Bros. (London), Ltd.
Lathwood, J.
Lock, Ltd., W. & T.
Longley Radio Mfg. Co.
Lorival Mfg. Co. (1921), Ltd.
Pearson Bros. & Co.
Redfern's Rubber Works, Ltd.
St. Helens Cable & Rubber Co., Ltd.
United Ebonite Manufacturers, Ltd.

ACCUMULATOR CARRIERS.

A.E.F. Manufacturing Co.
Boynton & Co., Ltd.
Cadisch & Sons, R.
Custerson, R.
Elliott Radio Mfg. Co., Ltd.
Francke, F.
Fuller Accumulator Co. (1926), Ltd.
Hill, Ltd., E. H.
Horstmann Gear Co., Ltd.

PRODUCTS SUPPLIED

Imp Radio Co.
Line & Co., Ltd., F.
Lithanode Co., Ltd.
Lock, Ltd., W. & T.
McWhirr, Paterson & Co.
Longley Radio Mfg. Co.
Skeldings, Ltd.
Smith & Sons (M. A.), Ltd.
Ward & Goldstone, Ltd.
West, W. G.

ACCUMULATOR PARTS AND ACCESSORIES.

Anglo Swiss Screw Co., Ltd.
Avon-India Rubber Co., Ltd.
A.E.F. Manufacturing Co.
Blue Comet, Ltd.
British Hard Rubber Co., Ltd.
Celluloid Printers, Ltd.
Cookson & Co.
Crystalate Gramophone Record Mfg. Co., Ltd.
Custerson, R.
Fuller Accumulator Co., Ltd.
Lectro Linx, Ltd.
Lithanode Co., Ltd.
Lorival Radio Mfg. Co. (1921), Ltd.
McLeod & McLeod.
Merrington Bros., Ltd.
National Accumulator Co., Ltd.
Oldham & Son, Ltd.
Plowden & Thompson, Ltd.
Redfern's Rubber Works, Ltd.
Richardsons (R. L. M.), Ltd.
Spears & Co.
Three Star Accumulators, Ltd.
United Ebonite Manufacturers, Ltd.
Ward & Goldstone, Ltd.
Young Accumulator Co. (1929), Ltd.

ACCUMULATOR ACID.

Berk & Co., Ltd., F. W.
Cruickshank, Ltd., R.
Custerson, R.
Elephant Chemical Co., Ltd.
Elliott Radio Mfg. Co., Ltd.
General Chemical & Pharmaceutical Co., Ltd.
Imperial Chemical Industries, Ltd.,
Lithanode Co., Ltd.
Riley & Sons, Ltd., J.

ACCUMULATOR ACID PUMPS.

Francis, Ltd., E. M.
Guiterman & Co., Ltd., S.

ACCUMULATOR CHARGERS A.C.

Alpha Coil & Component Co.
Automatic Rectifying Plants, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Custerson, R.
Eagle Engineering Co., Ltd.
Elliott Radio Mfg. Co., Ltd.
Ferranti, Ltd.
General Electric Co., Ltd.
Gordon & Co., F. J.
Heayberd & Co., F. C.
Higgs Motors.
H.C.H. Co.
Junction Engineering Co., Ltd.
Lancashire Dynamo & Crypto, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electrical Co.
London Radio Electric Co.
Longton & Co., H.
Mile End Radio Co.
Nash Products, Ltd.
Newtons of Taunton, Ltd.
Partridge, Wilson & Co.
Philips Industrial.
Poupard & Co., Ltd., C. Haddon.
Pye Radio, Ltd.
Queen's Engineering Co.
Rectifiers, Ltd.
Regentone, Ltd.
Robinson & Co., Lionel.
Rotax, Ltd.
Runbaken Magneto Co., Ltd.
Service Equipment Co., Ltd.
Tannoy Products, Ltd.
Toubkin, J.
Westinghouse Brake & Saxby Signal Co., Ltd.

ACCUMULATOR CHARGERS D.C.

British Radio Mfg. Co. (Liverpool), Ltd.
Custerson, R.
Electric Depot, Ltd.
Elliott Radio Mfg. Co., Ltd.
General Electric Co., Ltd.
Gordon & Co., F. J.
Higgs Motors.
Lancashire Dynamo & Crypto, Ltd.
Lever (Trix), Ltd., Eric J.
London Electrical Co.
London Radio Electric Co.
Longton & Co., H.
Mansell & Ogan, Ltd.
Mile End Radio Co.
Nash Products, Ltd.
Newtons of Taunton, Ltd.
Partridge, Wilson & Co.
Philips Industrial.
Poupard & Co., Ltd., C. Haddon.
Queen's Engineering Co.
Robinson & Co., Lionel.
Rotax, Ltd.
Service Equipment Co., Ltd.
Tannoy Products, Ltd.

ACCUMULATOR CHARGING PLANT.

A.E.F. Manufacturing Co.
Custerson, R.
Diggle & Co., A.
Dixon & Co., L.
Elliott Radio Mfg. Co., Ltd.
General Electric Co., Ltd.
Gordon & Co., F. J.
Lever (Trix), Ltd., Eric J.
London Electrical Co.
Longton & Co., H.
Mansell & Ogan, Ltd.
Nash Products, Ltd.
Newtons of Taunton, Ltd.
Oldham & Son, Ltd.
Partridge, Wilson & Co.
Philips Industrial.
Queen's Engineering Co.
Tannoy Products.
Westinghouse Brake and Saxby Signal Co., Ltd.

AERIAL AND EARTH ACCESSORIES

(Excluding frame and portable aerials, earth tubes and clips, insulators, lightning arresters, masts and wire).

Abbey Engineering Works.
Aerialite, Ltd.
Ashley Wireless Telephone Co. (1925), Ltd.
A. B. Compton Cabinet Co., Ltd.
British Aluminium Co., Ltd.
British Hard Rubber Co., Ltd.
British Ropes, Ltd.
Bulgin & Co., Ltd., A. F.
Bullers, Ltd.
Cann, Ltd., J. Churly.
Chorlton Metal Co., Ltd.
Christie & Sons. Ltd., Jas.
Climax Radio Electric, Ltd.
Danipad Rubber Co., Ltd.
Duray.
Ellmar Mouldings Co.
Enderlein, E.
General Electric Co., Ltd.
Graham Farish, Ltd.
Hart Bros., Electrical Mfg. Co., Ltd.

Hildick and Hildick.
Hill, Ltd., E. H.
Ivory Electric, Ltd.
Laker Co., Ltd., J. & J.
Lever (Trix), Ltd., Eric J.
London Electric Wire Co. & Smiths, Ltd.
L.E.S. Distributors, Ltd.
McWhirr, Paterson & Co.
Millar & Son, J. S.
New London Electron Works, Ltd.
Olympia Radio Co., Ltd.
Partridge, Wilson & Co.
Pioneer Mfg., Co.
Pressland Products, Ltd.
Purdy, B. N.
Robins, Ltd.
Shearing, Ltd., A. E.
Spears & Co.
Spong & Co., Ltd.
Star Engineering.
Toubkin, J.
Trelleborgs Ebonite Works, Ltd.
Ward & Goldstone, Ltd.
Wilson, E.
Yeldon (Radio), Ltd.

AERIALS (frame).

Ashton's Wireless Depot.
Bird & Sons, W.
Blundell-Curtis, Ltd.
Bond & Sons, Ltd., V. C.
British Radio Mfg. Co. (Liverpool), Ltd.
Castagnoli, G.
Custerson, R.
Eagle Engineering Co., Ltd.
Eastick & Sons, J. J.
Enderlein, E.
Eon Vacuum Wireless Co.
Holmes Bros. (London), Ltd.
Lever (Trix), Ltd., Eric J.
London Electric Wire Co. & Smiths, Ltd.
London Electrical Co.
Lyons, Ltd., Claude.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Midland Mag-Radio Co.
Peto Scott Co., Ltd.
Philomel Radio Co.,
Plessey Co., Ltd.
Smith Radio Ltd., A.
Sovereign Products, Ltd.
Wireless Apparatus, Ltd.
Wright & Weaire, Ltd.

AERIALS (indoor and portable).

Aerialite Ltd.
Altham Radio Co.
Ashton's Wireless Depot.
British Pix Co., Ltd.
Castagnoli, G.
Chorlton Metal Co., Ltd.
Cleveley Engineering Co.
Colvern Ltd.
Custerson, R.
Danipad Rubber Co., Ltd.
Eagle Engineering Co., Ltd.
Eckersley, John P.
Enderlein, E.
Eon Vacuum Wireless Co.
Formo Co.
Hart Bros., Electrical Mfg. Co., Ltd.
Hewitt, Ltd., A. J.
Hercus Mfg. Co.
Ivory Electric Ltd.
Kerridge & Co., E.
Lessingham, F. L.
Lever (Trix), Ltd., Eric J.
London Electric Wire Co & Smiths Ltd.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
No-Mast Plate Aerial Co.
Olympia Radio Co., Ltd.
O.V. Aerial Co. (1931).
Plessey Co., Ltd.
R.C. Radio Electric, Ltd.
Richardsons (R.M.L.) Ltd.
Shearing, Ltd., A. E.
Spong & Co., Ltd.
Standard Mfg. (Wireless) Co. Ltd.
Toubkin, J.
Ward & Goldstone, Ltd.
Wright & Weaire, Ltd.

ALUMINIUM (sheet and panel)

Andrews & Co., A. E.
British Aluminium Co., Ltd.
Burne Jones & Co., Ltd.
City Accumulator Co.
Colvern, Ltd.
Francis, T. R.
Goodmans.
Hounslow & Co., C.
H. & B. Radio, Co.
Jackson Bros. (London), Ltd.
Junit Mfg. Co., Ltd.
Lever (Trix), Ltd., Eric J.
London Electrical Co.
Longton & Co., H.
Marks & Son, S.
Mic. Wireless Co.
Paroussi, E.
Philomel Radio Co.
Shearing, Ltd., A. E.
Standard Mfg. (Wireless) Co., Ltd.
White Bros. & Jacob, Ltd.
Wright & Weaire, Ltd.

AMMETERS.

Anglo-Swiss Electrical Co., Ltd.
Benoit. M.
Ernest Turner Electrical Instruments, Ltd.
Everett Edgecumbe & Co., Ltd.
Bulgin & Co., Ltd., A. F.
Ferranti, Ltd.
General Electric Co., Ltd.
Howard Butler, Ltd.
Johnson & Phillips, Ltd.
Lyons Ltd., Claude.
McMillan & Co.
Millet. J.
Park Royal Engineering Co., Ltd.
Service Equipment Co., Ltd.
Siemens Schuckert (Gt. Britain), Ltd.
Sifam Electrical Instrument Co., Ltd.
Stadium, Ltd.
Weston Electrical Instruments, Ltd.
Wilkinson, L.

AMPLIFIERS.

Automobile Accessories (Bristol), Ltd.
Baty, E. J.
Bird & Sons, W.
Birmingham Sound Reproducers.
Bligh, S. W.
British Lumophon, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
British Talkatome, Ltd.,
Burne, Jones & Co., Ltd.
Castagnoli, G.
Chester Bros.
City Accumulator Co.
Coates, Ltd., J. G.
Colassi, W. L.
Custerson, R.
Donophone.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Electrocet Radio Co.
Electrolines, Ltd.
Elliott Radio Mfg. Co., Ltd.
Emerson, R.
Fallowfield, Ltd., Jonathan.
Fel-Electric Radio.
Ferranti, Ltd.
Film Industries, Ltd.
General Electric Co., Ltd.
Gent & Co., Ltd.
Godfrey (Radio), Ltd., F. E.
Hacker & Sons, H.
Hill & Co., F. C.
H. & B. Radio Co.
H.C.H. Co.
Igranic Electric Co., Ltd.
Johnson & Phillips, Ltd.
Lanchester Laboratories, Ltd.

PRODUCTS SUPPLIED

Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Liverpool Radio Supplies.
London Electrical Co.
Londona, Ltd.
Lyons, Ltd., Claude.
L. S. Units.
Maestrophone Radio Gramophone & Wireless Co.
Mains Radio Gramophones, Ltd.
Mains Radio Mfg. Co.
Mic Wireless Co.
Midgley Leighton, Ltd.
M.P.A. Wireless (1930), Ltd.
Partridge & Mee, Ltd.
Pearson Bros.
Philips Industrial.
Philomel Radio Co.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pye Radio, Ltd.
Radio Instruments, Ltd.
Reproducers & Amplifiers, Ltd.
Rolls Radio, Ltd.
Rothermel Corporation, Ltd.
Savage, W. B.
Scott, Sessions & Co., G.
Siemens Schuckert (Gt. Britain), Ltd.
Smith (Radio), Ltd., A.
Smurthwaite, F. W.
Spiers & Brown.
Standard Telephones & Cables, Ltd.
Tannoy Products.
Tarrys.
Union Radio Co.
Wathes & Co., Ltd., T. H.
Webber, Ltd., R. A.
Zimba Radio Co.

ANODE RESISTANCES.

Alpha Coil & Component Co.
Ashley Wireless Telephone Co. (1925), Ltd.
Bayliss, Ltd., W.
Bowyer Lowe & A.E.D., Ltd.
Bulgin & Co., Ltd., A. F.
Burne, Jones & Co., Ltd.
Carborundum Co., Ltd.
Castagnoli, G.
Colvern, Ltd.
Daly, H. C.
Dubilier Co. (1925), Ltd.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Elliott Radio Mfg. Co., Ltd.
Ferranti, Ltd.
Franklin Electric Co., Ltd.
Frost Radio Co.
Graham Farish, Ltd.
Gresley Radio, Ltd.
Groves Bros.
Igranic Electric Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Loewe Radio Co., Ltd.
London Electric Wire Co. and Smiths, Ltd.
London Electrical Co.
Lyons, Ltd., Claude.
McLeod & McLeod.
Melbourne Radio Supply.
Peace, Ltd., Henry.
Pearson Bros. & Co.
Precision-Electric, Ltd.
Precision Radio & Mfg. Co., Ltd.
Pye Radio, Ltd.
Ready Radio, Ltd.
Rothermel Corporation, Ltd.
Rotor Electric, Ltd.
Shearing, Ltd., A. E.
Siemens Schuckert (Gt. Britain), Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Tunewell Radio, Ltd.
Varley.
Wego Condenser Co., Ltd.
Wright & Weaire, Ltd.
Zenith Electric Co., Ltd.

BAKELITE AND SYNTHETIC RESIN (sheet and raw).

Attwater & Sons.
A.E.G. Electric Co., Ltd.
Bakelite, Ltd.
Bromley-Langton Electric Wire & Insulator Co., Ltd.
Bullphone Radio.
Charlesworth, W. J.
Clarke & Co. (Manchester), Ltd., H.
De La Rue & Co., Ltd. T.
Diamond Fibre Co., Ltd.
Ellison Insulations, Ltd.
Ellmar Mouldings Co.
General Electric Co., Ltd.
Lissen, Ltd.
Lorival Mfg. Co. (1921), Ltd.
McLeod & McLeod.
Marks & Son, S.
Maul & Murphy, Ltd.
Merrington Bros., Ltd.
Micanite & Insulators Co., Ltd.
Mountford Rubber Co., Ltd.
Philips Industrial.
Scott & Co., Ltd., G. L.
Spicers, Ltd.
Standard Insulator Co.
Willmott, Son & Phillips, Ltd.
Wright & Weaire, Ltd.

BAKELITE AND SYNTHETIC RESIN (mouldings).

Ashdown (B'ham), Ltd., H. E.
Ashley Wireless Telephone Co. (1925), Ltd.
Attwater & Sons.
A.E.G. Electric Co., Ltd.
Birkbys, Ltd.
Birmingham Mica Co., Ltd.
British General Manufacturing Co., Ltd.
Brownie Wireless Co. of Gt. Britain, Ltd.
Bulgin & Co., Ltd., A. F.
Charlsworth, W. J.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Cole, Ltd., E. K.
Daly, H. C.
De La Rue & Co., Ltd., T.
Ebonestos Insulators, Ltd.
Edison Bell, Ltd.
Elliott, E.
Ellison Insulations, Ltd.
Ellmar Mouldings Co.
Ernest Turner Electrical Instruments, Ltd.
Ferranti, Ltd.
General Electric Co., Ltd.
Harlie, Ltd.
Harrison & Co., A. T.
Kolster-Brandes, Ltd.
Lissen, Ltd.
Litholite Insulators, Ltd.
London Electric Wire Co. & Smiths, Ltd.
Lorival Mfg. Co. (1921), Ltd.
McLeod & McLeod.
Maul & Murphy, Ltd.
Merrington Bros., Ltd.
Mica Manufacturing Co., Ltd.
Ormond Engineering Co., Ltd.
Partridge, Wilson & Co.
Philips Industrial.
Precision Radio & Mfg. Co., Ltd.
Redfern's Rubber Works, Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
Rose & Son, Ltd., T. A.
R.L.M. Co.
St. Helens Cable & Rubber Co., Ltd.
Shearing, Ltd., A. E.
Solidite & Synthetic Mouldings, Ltd.
Sovereign Products, Ltd.
Standard Insulator Co.
Standard Mfg. (Wireless) Co., Ltd.
Telephone Mfg. Co., Ltd.
Trelleborgs Ebonite Works, Ltd.
Webster & Co., Ltd., T.
Westinghouse Brake & Saxby Signal Co., Ltd.
Wilkins & Wright, Ltd.
W.R.C., Ltd.

BATTERIES H.T. (dry).

Adie & Co., Ltd.
Atlas Carbon & Battery Co., Ltd.
Batteries, Ltd.
Baxendale & Co., Ltd.
Blue Comet, Ltd.
Bowerman, Ltd., G.
Boynton & Co., Ltd.
Britannia Batteries, Ltd.
British Battery Co., Ltd.
British G.W.Z. Battery Co., Ltd.
British Zonophone Co., Ltd.
Brown Bros., Ltd.
Calmont, King & Co., Ltd.
Chloride Electrical Storage Co., Ltd.
Chorlton Metal Co., Ltd.
Columbia Graphophone Co., Ltd.
Cordesia Batteries, Ltd.
Cossor, Ltd.
Custerson, R.
Dr. Nesper, Ltd.
Dundas Fox, Ltd.
Eagle Engineering Co., Ltd.
Ecco Battery Co., Ltd.
Edison Swan Electric Co., Ltd.
Electrical & Radio Products (1931), Ltd.
Elliott Radio Mfg. Co., Ltd.
Ever Ready Co. (Gt. Britain), Ltd.
Fuller Accumulator Co. (1926), Ltd.
General Electric Co., Ltd.
Grosvenor Electric Batteries, Ltd.
Harwol Specialities Co.
Hellesens, Ltd.
Hewitt, Ltd., A. J.
India Rubber & Gutta Percha Telegraph Works, Ltd.
Kalisky (Aldgate), Ltd., S.
Knopf, A.
Kolster-Brandes, Ltd.
Le Carbone Co., Ltd.
Lissen, Ltd.
Maisner & Co., Ltd., E. H.
Manufacturers Accessories Co. (1928), Ltd.
Marconiphone Co., Ltd.
Merrington Bros., Ltd.
Metal Agencies Co., Ltd.
Metropolitan Lighting Co., Ltd.
Michelson Bros.
Midland Electrical Co.
Millet, J.
Northern Steel & Hardware Co., Ltd.
Oldham & Son, Ltd.
Pearson Bros. & Co.
Pye Radio, Ltd.
Richardsons (R. M. L.), Ltd.
Ripaults, Ltd.
Runwell Cycle Co. (Birmingham), Ltd.
Sandler, Frank.
Saxon Radio Co.
Service Equipment Co., Ltd.
Siemens Electric Lamps & Supplies, Ltd.
Smith & Sons (Motor Accessories), Ltd., S.
Storey, F. M.
Taylor & Co., J. H.
Taylor, P.
Toubkin, J.
Vandervell, Ltd., C. A.
Vee Cee Dry Cell (1927), Ltd.
Vince's Dry Batteries, Ltd.
Vulco Dry Battery Co., Ltd.
Ward and Golstone, Ltd.
Wilrose Co. (Birmingham), Ltd.
Winston, T.
Wood, E. A.

BATTERIES (grid bias)

Adie & Co., Ltd.
Atlas Carbon & Battery Co., Ltd.
Batteries, Ltd.
Baxendale & Co., Ltd.
Blue Comet, Ltd.
Boynton & Co., Ltd.
Britannia Batteries, Ltd.
British Battery Co., Ltd.
British G.W.Z. Battery Co., Ltd.
British Zonophone Co., Ltd.
Chloride Electrical Storage Co., Ltd.
Chorlton Metal Co., Ltd.
Columbia Graphophone Co., Ltd.
Cordesia Batteries, Ltd.
Cossor, Ltd.
Custerson, R.
Dr. Nesper, Ltd.
Dundas Fox, Ltd.
Eagle Engineering Co., Ltd.
Ecco Battery Co., Ltd.
Edison Swan Electric Co., Ltd.
Electrical & Radio Products (1931), Ltd.
Elliott Radio Mfg. Co., Ltd.
Ever Ready Co. (Gt. Britain), Ltd.
Fuller Accumulator Co. (1926), Ltd.
General Electric Co., Ltd.
Grosvenor Electric Batteries, Ltd.
Hellesens, Ltd.
India Rubber & Gutta Percha Telegraph Works Ltd.
Kalisky (Aldgate), Ltd., S.
Le Carbone Co., Ltd.
Lissen, Ltd.
Manufacturers Accessories Co. (1928), Ltd.
Marconiphone Co., Ltd.
Michelson Bros.
Midland Electrical Co.
Millet, J.
Northern Steel & Hardware Co., Ltd.
Oldham & Son, Ltd.
Pearson Bros. & Co.
Pye Radio, Ltd.
Richardsons (R. M. L.), Ltd.
Ripaults, Ltd.
Runwell Cycle Co. (Birmingham), Ltd.
Sandler, Frank.
Saxon Radio Co.
Siemens Electric Lamps & Supplies, Ltd.
Smith & Sons (Motor Accessories), Ltd., S.
Storey, F. M.
Toubkin, J.
Vandervell, Ltd., C. A.
Vee Cee Dry Cell (1927), Ltd.
Vince's Dry Batteries, Ltd.
Vulco Dry Battery Co., Ltd.
Wilrose Co. (Birmingham), Ltd.
Winston, T.

BOBBINS (headphones, speakers or transformer).

Ashley Wireless Telephone Co. (1925), Ltd.
Attwater & Sons.
British General Mfg. Co., Ltd.
British Hard Rubber Co., Ltd.
Bromley-Langton Electric Wire & Insulator Co., Ltd
Brownie Wireless Co. of Gt. Britain, Ltd.
Bulgin & Co., Ltd., A. F.
Colassi, W. L.
Crystalate Gramophone Record Mfg. Co., Ltd.
Daly, H. C.
Ellmar Mouldings Co.
Elvy, C. L.
Elvy & Anderson.
Frost Radio Co.
Goodmans.
Jewel Pen Co., Ltd.
Johnson & Phillips, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
McLeod & McLeod.
Merrington Bros., Ltd.
Mic Wireless Co.
Micanite & Insulators Co., Ltd.
Millet, J.
Patton, Ltd., D. J.
Poupard & Co., Ltd., C. Haddon.
Radio Gramophone Development Co., Ltd.
Rotor Electric, Ltd.
Sound Sales, Ltd.
Standard Insulator Co., Ltd.
Standard Telephones & Cables, Ltd.
W.R.C., Ltd.

BOXES (cardboard, display cartons, etc.)

Aviss (Rugby), Ltd., A.
Boxfoldia, Ltd.
Hyatt & Co., Ltd., J.
Longley Radio Mfg. Co.
Philips Industrial.

PRODUCTS SUPPLIED

BRACKETS (panel and baseboard).

Andrews & Co., A. E.
Bulgin & Co., Ltd., A. F.
Burne Jones & Co., Ltd.
Carrington Mfg. Co., Ltd.
Chorlton Metal Co., Ltd.
Collet Mfg. Co., S. H.
Danipad Rubber Co., Ltd.
Francis, T. R.
Gee (Birmingham), Ltd.
Goodmans.
Harris, G. & R.
Hewitt, Ltd., A. J.
Ivory Electric, Ltd.
Junit Mfg. Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
McWhirr, Paterson & Co.
Manufacturers Accessories Co. (1928), Ltd.
Marks & Son, S.
Millet, J.
Perks & Co., H.
Peto-Scott Co., Ltd.
Radio Sundries Co.
Shearing, Ltd., A. E.
Smith (Radio), Ltd., A.
Speedwell Gearcase Co.
Standard Mfg. (Wireless) Co., Ltd.
Toubkin, J.
Whiteley Electrical Radio Co., Ltd.
Wright & Weaire, Ltd.
W.R.C., Ltd.

BRASSWORK.

Andrews & Co., A. E.
Anglo-Swiss Screw Co., Ltd.
Automobile Accessories (Bristol), Ltd.
Baker & Finnemore, Ltd.
Beddoes, Ltd., J. G.
Bijou Radio Co.
Birmingham Products, Ltd.
Bligh, S. W.
Britannia Lathe & Oil Engine Co., Ltd.
British General Manufacturing Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Buck & Hickman, Ltd.
Burne Jones & Co., Ltd.
Busby & Co., Ltd.
B. & J. Wireless, Ltd.
Calvete, Ltd., I.
Castagnoli, G.
Castle, T. L.
Certex Products.
Colvern Ltd.
Davis & Timmins, Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Edmonds, Ltd., G.
Elvey and Anderson.
Fenriss (1932), Ltd.
Francois, E. J.
Gee (Birmingham), Ltd.
Goodmans.
Gresley Radio.
Harris, G. & R.
Henderson & Co., Ltd., D. M.
Hounslow & Co., C.
Ivory Electric, Ltd.
Jackson Bros.
Junit Mfg. Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lilley & Son, Ltd., S.
Limit Engineering Co., Ltd.
Lissen, Ltd.
McLeod & McLeod.
McWhirr, Paterson & Co.
Marks & Son, S.
Melbourne Radio Supply.
Meyer & Co., E.
Morton, Ltd., E. R.
Muller & Co. (England), Ltd.
M.C.L. and Repetition, Ltd.
Nicklin & Co., Ltd., J.
Ormond, Engineering Co., Ltd.
Peace, Ltd., Henry.
Perks & Co., H.
Person & Son, L.
Prideaux, Junr., R.
Reliance Mfg. Co. (Southwark), Ltd.
Reliance (Name Plates) Ltd.
Righton & Co., H.
Ross, Courtney & Co., Ltd.
R.L.M. Co.
Shearing, Ltd., A. E.
Skeldings, Ltd.
Sovereign Products, Ltd.
Spears & Co.
Standard Mfg. (Wireless) Co., Ltd.
Toubkin, J.
True Screws, Ltd.
Walter, Ltd., J. & H.
Whiteley Electrical Radio Co., Ltd.
Wilkins & Wright, Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.
Wood, E. A.
Wright & Weaire, Ltd.
Yorkshire Radio Co.

CABINETS (wood).

Aladdin Gramophone & Accessories Co.
Altham Radio Co.
Appletons (Leeds) Ltd.
Automobile Accessories (Bristol) Ltd.
A. B. Compton Cabinet Co., Ltd.
Bell Piano Co., Ltd.
Bligh, S. W.
Bond & Sons, Ltd., V. C.
Bradnam & Co.
Brownie Wireless Co. of Great Britain, Ltd.
Calders, Ltd.
Carrington Mfg. Co., Ltd.
Castagnoli, G.
Clarion Radio Furniture.
Craftease.
Custerson, R.
Digby, F.
Doherty & Sons, Edward.
Downing & Sons, Ltd., J. S.
Dunster & Son, Ltd., A. J.
Eagle Engineering Co., Ltd.
Eastham, Thos.
Eastick, J. J., & Sons.
Electrolines, Ltd.
Elliott Radio Mfg. Co., Ltd.
Elvey & Anderson.
Fairfield Mfg. Co.
Ferranti, Ltd.
Goodmans.
Goodwin Radio Ltd.
Gould, Harper & Co., Ltd.
Gresley Radio.
Hercus Mfg. Co.,
Holmes Bros. (London), Ltd.
Joseph H.
J. B. Mfg. Co. (Cabinets) Ltd.
Kestrel Radio Supply Co.
Kone-Dope Co.
Lathwood, J.
Lissen, Ltd.
Lock, Ltd. W. & T.
London Super Cabinet Co.
Longley Radio Mfg. Co.
Manufacturers' Accessories Co. (1928), Ltd.
Margolin, J. & A.
Merrington Bros., Ltd.
Miscellaneous Trading Co.
Northampton Plating Co.
O'Brien Ltd., T.
Ormond Engineering Co., Ltd.
Osborn, C. A.
Pearson, Bros. & Co.
Peto Scott, Ltd.
Philomel Radio Equipment Co.
Picketts Wireless Cabinet Wks.
Pozzuoli, F.
Radiocabinets (Walsall), Ltd.
Ramsey, F. W.
Ready Radio, Ltd.
Reproducers & Amplifiers, Ltd.
Richardsons (R. M. L.) Ltd.
Rose & Son, Ltd., T. A.

Rothermel Corporation, Ltd.
Shalless & Evans.
Shapland & Petter.
Six-Sixty Radio Co., Ltd.
Smith Cabinets, Ltd.
Stanton, T.
Storey, F. M.
Storrar & Balls.
Supertone Pianos, Ltd.
Tyrela Electric, Ltd.
Vibranti Products, Co.
West, W. G.
Wood, E. A.
Yagerphone, Ltd.
Yeldon (Radio), Ltd.
Yorkshire Radio Co.

CABINETS (leather and fabric, for portables).

Aladdin Gramophone & Accessories Co.
Appletons (Leeds), Ltd.
Barrow, Hepburn & Gale, Ltd.
Carrington Mfg. Co., Ltd.
Doherty & Sons, Edward.
Eagle Engineering Co., Ltd.
Elvey & Anderson.
Eon Vacuum Wireless Co.
Goodwin Radio, Ltd.
Holmes Bros. (London), Ltd.
Hyatt & Co., Ltd., J.
J. B. Mfg. Co. (Cabinets), Ltd.
Lissen, Ltd.
Longley Radio Mfg. Co.
Merrington Bros., Ltd.
Morton & Co., R.
O'Brien, Ltd., T.
Ruhl (1922), Ltd.
Storrar & Balls.

CABINETS (metal).

Bijou Radio Co.
Burne Jones & Co., Ltd.
Castagnoli, G.
Custerson, R.
Harris, G. & R.
Lissen, Ltd.
London Radio-Electric Co.
Longley Radio Mfg. Co.
Marks & Son, S.
M.P.A. Wireless (1930), Ltd.
Paroussi, E.
Sankey & Sons, Ltd., Joseph.
Smith (Radio) Ltd.
Speedwell Gear Case Co.
Wright & Weaire, Ltd.

CABINETS (moulded composition).

A.E.G. Electric Co., Ltd.
Birkbys, Ltd.
Elliott, E.
Lissen Ltd.
Merrington, Bros., Ltd.
Philips Industrial.
Reliance Mfg. Co. (Southwark) Ltd.
Solidite & Synthetic Mouldings, Ltd.
United Ebonite Manufacturers, Ltd.

CASEIN PRODUCTS.

Elliott, E.
Freed, S. R. F.
Sicaloid, Ltd.

CASTINGS.

Allen & Co., Ltd., E.
Bullers, Ltd.
Crabtree & Co., Ltd., J.A.
Elvy, C. L.
Elvy & Anderson.
Ferranti, Ltd.
Gresley Radio.
Harris, G. & R.
Junit Mfg. Co., Ltd.
Lathwood, J.
Lissen, Ltd.
Peace, Ltd., Henry.
Perks & Co., H.
Porter, C. J.
Reliance (Name Plates) Ltd.
Smith (Radio) Ltd., A.
Standard Telephones & Cables, Ltd.
Yorkshire Radio Co.

CHATTERTON'S COMPOUND.

Bromley Langton Elec. Wire & Insulator Co., Ltd.
General Electric Co., Ltd.
India Rubber, Gutta Percha & Telegraph Works, Ltd.
London Electric Wire Co., & Smiths, Ltd.
Moores & Co., J.
Mountford Rubber Co., Ltd.
Pioneer Mfg. Co.
Pomona Rubber Co.
Standard Insulator Co., Ltd.

CHOKES H.F.

Advance Components, Ltd.
Andrews & Co., A. E.
Ashley Wireless Telephone Co. (1925), Ltd.
Automobile Accessories (Bristol), Ltd.
Bayliss William, Ltd.
Berclif, Ltd.
Blundell-Curtis, Ltd.
British Ebonite Co., Ltd.
British General Manufacturing Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bulgin & Co., Ltd., A. F.
Bullphone Radio.
Burne Jones & Co., Ltd.
B. &. J. Wireless, Ltd.
Castagnoli, G.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Climax Radio Electric, Ltd.
Cordo Electrical Products, Ltd.
Custerson, R.
Daly, H. C.
Dubilier Condenser Co. (1925), Ltd.
Dyson & Co. (Wks.) Ltd., J.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg. Co., Ltd.
Faraday Allwave Wireless, Ltd.
Ferranti, Ltd.
Formo Co.
Franklin & Freeman, Ltd.
Frost Radio Co.
Goodwins Radio, Ltd.
Gould, Harper & Co., Ltd.
Graham Farish, Ltd.
Gresley Radio.
Groves Bros.
Harmo Products.
Harrison & Co., A. T.
Hewitt, Ltd., A. J.
Igranic Electric Co., Ltd.
Imp Radio Co.
Ivory Electric, Ltd.
Jewel Pen Co., Ltd.
Johnson & Phillips, Ltd.
Junction Engineering Co., Ltd.
Lanchester Laboratories, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
London Radio Electric Co.
Lorival, M. F.
Lotus Radio, Ltd.
McMichael, Ltd., L.
McWhirr, Paterson & Co.
Mains Radio Gramophones, Ltd.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Mic Wireless Co.
Mile End Radio Co.
Ormond Engineering Co., Ltd.
Paroussi, E.
Patton, Ltd., D. J.
Peace, Ltd., Henry.
Pearson, Bros. & Co.
Peto-Scott, Co., Ltd.
Plessey Co., Ltd.
Pooley, G. J.
Posthlewaite Bros.

PRODUCTS SUPPLIED

Poupard & Co., Ltd., C. Haddon.
Powertone Products.
Precision-Electric, Ltd.
Precision Radio & Mfg. Co., Ltd.
Pressland Products, Ltd.
Pye Radio, Ltd.
Quartz Crystal Co.
Radio Instruments, Ltd.
Radio Sundries Co.
Ready Radio, Ltd.
Realistic Speakers.
Rigaut, J.
Rothermel Corporation, Ltd.
Rotor Electric, Ltd.
Saxon Radio Co.
Scott & Co., S. W.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Stratton & Co., Ltd.
Supertone Pianos, Ltd.
Telsen Electric Co., Ltd.
Tonex Co.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Varley
Walter, Ltd., J. & H.
Whiteley Electrical Radio Co., Ltd.
Wilson, W. H.
Wingrove & Rogers, Ltd.
Wood, E. A.
Wright & Weaire, Ltd.
W.R.C., Ltd.
Yagerphone, Ltd.

CHOKES L.F.

Ashley Wireless Telephone Co. (1925), Ltd.
Automobile Accessories (Bristol), Ltd.
Bayliss, William, Ltd.
Birmingham Sound Reproducers.
Blundell-Curtis, Ltd.
British Ebonite Co., Ltd.
British General Manufacturing Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bulgin & Co., Ltd., A. F.
Bullphone Radio.
Burndept, Ltd.
Burne-Jones & Co., Ltd.
B. & J. Wireless, Ltd.
Castagnoli, G.
Chorlton Metal Co., Ltd.
City Accumulator Co.
Clarke & Co. (Manchester), Ltd., H.
Climax Radio Electric, Ltd.
Daly, H. C.
Danipad Rubber Co., Ltd.
Dyson & Co. (Wks.), Ltd., J.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg., Co. Ltd.
Fel-Electric Radio.
Ferranti, Ltd.
Formo Co.
Franklin & Freeman, Ltd.
Frost Radio Co.
Gambrell Radio, Ltd.
Gent & Co., Ltd.
Graham Farish, Ltd.
Great Western Radio Co.
Gresley Radio.
Hill & Co., F. C.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Johnson & Phillips, Ltd.
Junction Engineering Co., Ltd.
Junit Mfg. Co.
Lang & Squire, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
London Radio Electric Co.
Lotus Radio, Ltd.
Maestrophone Radio Gramophone & Wireless Co.
Mains Radio Gramophones, Ltd.
Mains Radio Mfg. Co.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Mic Wireless Co.
Mile End Radio Co.
Ormond Engineering Co., Ltd.
Patton, Ltd., D. J.
Peace, Ltd., Henry
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Precision-Electric, Ltd.
Pressland Products, Ltd.
Pye Radio, Ltd.
Radio Gramophone Development Co., Ltd.
Radio Instruments, Ltd.
Realistic Speakers.
Rolls Radio, Ltd.
Savage, W. B.
Scott & Co., S. W.
Scott, Sessions & Co., G.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Sound Sales, Ltd.
Sovereign Products, Ltd.
Star Engineering.
Telsen Electric Co., Ltd.
Tonex Co.
Tunewell Radio, Ltd.
Varley.
Whiteley Electrical Radio Co., Ltd.
Wilson, W. H.
Wood, E. A.
Wright & Weaire, Ltd.
W.R.C., Ltd.
Yagerphone, Ltd.
Zenith Electric Co., Ltd.

CHOKE COUPLING UNITS.

Bayliss, Ltd., W.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
B. & J. Wireless, Ltd.
Castagnoli, G.
Clarke & Co. (Manchester), Ltd., H.
Elliott Radio Mfg. Co., Ltd.
General Electric Co., Ltd.
Graham Farish, Ltd.
Igranic Electric Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
London Radio Electric Co.
Mic Wireless Co.
Mile End Radio Co.
Peace, Ltd., Henry.
Peto-Scott Co., Ltd.
Plessey Co., Ltd.
Precision-Electric, Ltd.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Sovereign Products, Ltd.
Telsen Electric Co., Ltd.
Tonex Co.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Whiteley Electrical Radio Co., Ltd.
Wright & Weaire, Ltd.

CHOKES (mains).

Alpha Coil and Component Co.
Austin Mills & Co.
Bayliss, Ltd., W.
Birmingham Sound Reproducers.
Blundell-Curtis, Ltd.
British General Manufacturing Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bulgin & Co., Ltd., A. F.
Bullphone Radio, Ltd.
Burndept, Ltd.
Burne-Jones & Co., Ltd.
B. & J. Wireless, Ltd.
Castagnoli, G.
City Accumulator Co.
Clarke & Co. (Manchester), Ltd., H.
Commercial Engineering Co.
Daly, H. C.

Dyson & Co. (Wks.), Ltd.
Eagle Enginecing Co., Ltd.
Edison Bell, Ltd.
Edmonds, E.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg. Co., Ltd.
Fel-Electric Radio.
Ferranti, Ltd.
Franklin & Freeman, Ltd.
Frost Radio Co.
Gent & Co., Ltd.
Graham Farish, Ltd.
Gresley Radio.
Heayberd & Co., F. C.
Hill & Co., F. C.
H.C.H. Co.
Igranic Electric Co., Ltd.
Imp Radio Co.
Johnson & Phillips, Ltd.
Junction Engineering Co., Ltd.
Junit Mfg. Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
London Radio Electric Co.
Lyons, Ltd., Claude.
Maestrophone Radio Gramophone & Wireless Co.
Mains Radio Mfg. Co.
Melbourne Radio Supply.
Mic Wireless Co.
Mile End Radio Co.
Nassak Mfg. Co., Ltd.
Partridge, Wilson & Co.
Patton, Ltd., D. J.
Peace, Ltd., Henry.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Radio Gramophone Development Co., Ltd.
Radio Instruments, Ltd.
Realistic Speakers.
Rectifiers, Ltd.
Regentone, Ltd.
Rich & Bundy, Ltd.
Rolls Radio, Ltd.
Scott Sessions & Co., G.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Smith (Radio), Ltd., A.
Sound Sales, Ltd.
Sovereign Products, Ltd.
Star Engineering.
Supertone Pianos, Ltd.
Tonex Co.
Tunewell Radio, Ltd.
Varley.
Whiteley Electrical Radio Co., Ltd.
Wright & Weaire, Ltd.
Zenith Electric Co., Ltd.

CLOCKS, ELECTRIC.

Bulle Clock Co.
Edison Swan Electric Co., Ltd.
Electriclocks & Radio, Ltd.
Everett, Edgcumbe & Co., Ltd.
Ferranti, Ltd.
Gent & Co., Ltd.
Landis & Gyr, Ltd.
Rothermel Corporation, Ltd.
Smith's English Clocks.
Stockall, Marples & Co., Ltd.
Synchronome Co., Ltd.
Telephone Manufacturing Co., Ltd.

COIL FORMERS.

Automobile Accessories (Bristol), Ltd.
British Ebonite Co., Ltd.
British General Manufacturing Co., Ltd.
British Hard Rubber Co., Ltd.
Bromley-Langton Electric Wire & Insulator Co., Ltd.
Burne-Jones & Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Colvern, Ltd.
Crystalate Gramophone Record Mfg. Co., Ltd.
Daly, H. C.
Danipad Rubber Co., Ltd.
Edison Bell, Ltd.
Elliott Radio Mfg. Co., Ltd.
Evington Electrical Mfg. Co.
Ferranti, Ltd.
Francis, T. R.
Franklin & Freeman, Ltd.
Gresley Radio.
Groves Bros.
Harrison & Co., A. T.
Ivory Electric, Ltd.
Jewel Pen Co., Ltd.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
Lorival Mfg. Co. (1921), Ltd.
McWhirr, Paterson & Co.
Marks & Son, S.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Patton, Ltd., D. J.
Peace, Ltd., Henry.
Pearson Bros. & Co.
Peto Scott, Ltd.
Plessey Co., Ltd.
Precision Radio & Mfg. Co., Ltd.
Redfern's Rubber Wks., Ltd.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Solidite & Synthetic Mouldings, Ltd.
Sound Sales, Ltd.
Sovereign Products, Ltd.
Standard Insulator, Co., Ltd.
Standard Mfg. (Wireless) Co., Ltd.
Standard Telephones & Cables, Ltd.
Stratton & Co., Ltd.
Tonex Co.
Trelleborgs' Ebonite Wks., Ltd.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Whiteley Electrical Radio Co., Ltd.
Wright & Weaire, Ltd.
W.R.C., Ltd.

COILS (two pin).

Andrews & Co., A. E.
Bright Co.
Bulgin & Co., Ltd., A. F.
B. & J. Wireless, Ltd.
Chalkley, C. G.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Custerson, R.
Danipad Rubber Co., Ltd.
Dyson & Co. (Wks.), Ltd.
D.X. Coils, Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Eon Vacuum Wireless Co.
Frost Radio Co.
Gambrell Radio, Ltd.
Gent & Co., Ltd.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Johnson & Phillips, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
McWhirr, Paterson & Co.
Merrington Bros., Ltd.
Mic Wireless Co.
Northampton Plating Co.
Pearson Bros. & Co.
Peto-Scott Co., Ltd.
Primus Mfg. Co.
Radio Sundries Co.
Rotor Electric, Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Stratton & Co., Ltd.
Sylvex, Ltd.
Tunewell Radio, Ltd.
Wilson, W. H.

COILS (six pin).

Andrews & Co., A. E.
Berclif, Ltd.
Bright Co.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
B. & J. Wireless, Ltd.
Chalkley, C. G.

PRODUCTS SUPPLIED

Chorlton Metal Co., Ltd.
Colvern, Ltd.
Custerson, R.
Daly, H. C.
Danipad Rubber Co., Ltd.
Dyson & Co. (Wks.), Ltd.
Eon Vacuum Wireless Co.
Formo Co.
Francis, T. R.
Franklin & Freeman, Ltd.
Frost Radio Co.
Gent & Co., Ltd.
Harrison & Co., A. T.
Ivory Electric, Ltd.
Johnson & Phillips, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
London Electrical Co.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Mic Wireless Co.
Nassak Mfg. Co., Ltd.
Paroussi, E.
Pearson Bros. & Co.
Pooley, G. J.
Radio Sundries Co.
Scott & Co., S. W.
Shearing, Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Stonehouse Radio Supplies.
Stratton & Co., Ltd.
Tunewell Radio, Ltd.
Wright & Weaire, Ltd.
W.R.C., Ltd.

COILS (dual range).

Alpha Coil & Component Co.
Altham Radio Co.
Andrews & Co., A. E.
Bell Piano Co., Ltd.
Berclif, Ltd.
British General Manufacturing Co., Ltd.
British Radiophone, Ltd.
Bulgin & Co., Ltd., A. F.
Bullphone Radio, Ltd.
Burne-Jones & Co., Ltd.
B. & J. Wireless, Ltd.
Castagnoli, G.
Chalkley, C. G.
Chorlton Metal Co., Ltd.
Cifel Products, Ltd.
Colvern, Ltd.
Cordo Electrical Products, Ltd.
Custerson, R.
Daly, H. C.
Danipad Rubber Co., Ltd.
Dyson & Co. (Wks.), Ltd.
D.X. Coils, Ltd.
Eagle Engineering Co., Ltd.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg. Co., Ltd.
Evington Electrical Mfg. Co.
Faraday Allwave Wireless, Ltd.
Ferranti, Ltd.
Formo Co.
Francis, T. R.
Franklin & Freeman, Ltd.
Frost Radio Co.
Gent & Co., Ltd.
Goodwin Radio, Ltd.
Gould, Harper & Co., Ltd.
Great Western Radio Co.
Groves Bros.
Hambling, A. W.
Harmo Products.
Harrison & Co., A. T.
Hewitt, Ltd., A. J.
Igranic Electric Co., Ltd.
Imp Radio Co.
Ivory Electric, Ltd.
Johnson & Phillips, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
London Electrical Co.
Lotus Radio, Ltd.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Mic Wireless Co.
Midland Mag-Radio Co.
Morton, Ltd., E. R.
Paul's Wireless Stores.
Pearson Bros. & Co.
Peto-Scott Co., Ltd.
Pooley, G. J.
Precision Radio & Mfg. Co., Ltd.
Pressland Products, Ltd.
Radio Instruments, Ltd.
Radio Sundries, Co.
Ready Radio, Ltd.
Rigant, J.
St. Pauls Radio, Ltd.
Scott & Co., S. W.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Smith (Radio) Ltd., A.
Sovereign Products, Ltd.
Storey, F. M.
Stratton & Co., Ltd.
Telsen Electric Co., Ltd.
Tonex Co.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Wright & Weaire, Ltd.

COILS (toroidal).

B. J. Wireless, Ltd.
Custerson, R.
Dubilier Condenser Co. (1925), Ltd.
Franklin & Freeman, Ltd.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
Melbourne Radio Supply.
Scott & Co., S. W.
Shearing, Ltd., A. E.

COIL-HOLDERS.

Bowerman, Ltd., G.
Bulgin & Co., Ltd., A. F.
Chorlton Metal Co., Ltd.
Christie & Sons, Ltd., Jas.
Colvern, Ltd.
Crystalate Gramophone Record Mfg. Co., Ltd.
Danipad Rubber Co., Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Franklin & Freeman, Ltd.
Graham Farish, Ltd.
Harmo Products.
Harris, G. & R.
Hemelik, J.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen Ltd.
London Electric Wire Co. & Smiths, Ltd.
Melbourne Radio Supply.
Nassak Mfg. Co., Ltd.
Needham & Bro., Ltd., C. E.
Patton, Ltd., D. J.
Peto-Scott & Co., Ltd.
Pressland Products, Ltd.
Radio Sundries Co.
Reliance Mfg. Co. (Southwark), Ltd.
Shearing, Ltd., A. E.
Solidite & Synthetic Mouldings, Ltd.
Sovereign Products, Ltd.
Standard Mfg. (Wireless) Co., Ltd.
Standard Telephones & Cables, Ltd.
Stratton & Co., Ltd.
Tunewell Radio, Ltd.
Wright & Weaire, Ltd.

COIL WINDING MACHINES.

Amalgamated Manufacturers.
Automatic Coil Winder & Electrical Equipment Co., Ltd.
Britannia Lathe & Oil Engine Co., Ltd.

Enderlein, E.
Eta Tool Co.
Lissen, Ltd.
Standard Insulator Co., Ltd.
Universal Winding Co.

CONDENSERS (fixed, Mansbridge).

Altham Radio Co.
Ashley Wireless Telephone Co. (1925), Ltd.
British Insulated Cables, Ltd.
Chorlton Metal Co., Ltd.
Cifel Products, Ltd.
Daly, H. C.
Dubilier Condenser Co., Ltd.
Ferranti, Ltd.
Formo, Co.
Franklin Electric Co., Ltd.
General Electric Co., Ltd.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
Loewe Radio Co., Ltd.
Millet, J.
Morton, Ltd., E. R.
Muirhead & Co., Ltd.
Pearson Bros. & Co.
R.L.M. Co.
Siemens Shuckert (Gt. Britain), Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Supremus Specialities, Ltd.
Telegraph Condenser Co., Ltd.
Telephone Mfg. Co., Ltd.
Telsen Electric Co., Ltd.
Wego Condenser & Co., Ltd.
Wilburn & Co.
W.R.C., Ltd.

CONDENSERS (fixed, mica).

Advance Components, Ltd.
Altham Radio Co.
Ashley Wireless Telephone Co. (1925), Ltd.
British N. S. F. Co., Ltd.
Bulgin & Co., Ltd., A. F.
Dubilier Condenser Co. (1925), Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Emkabe Radio Co., Ltd.
Ferranti, Ltd.
Formo Co.
Franklin Electric Co., Ltd.
Graham Farish, Ltd.
Hellesens, Ltd.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Loewe Radio Co., Ltd.
Lyons, Ltd., Claude
McLeod & McLeod.
Millet, J.
Muirhead & Co., Ltd.
Ormond Engineering Co., Ltd.
Pearson Bros. & Co.
Person & Son, L.
Siemens Shuckert (Gt. Britain), Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Sullivan, Ltd., H. W.
Taylor & Co., J. H.
Taylor & Petters, Ltd.
Telegraph Condenser Co., Ltd.
Telephone Mfg. Co., Ltd.
Telsen Electric Co., Ltd.
Wilson, W. H.
W.R.C., Ltd.

CONDENSERS (fixed, for mains).

Ashley Wireless Telephone Co. (1925), Ltd.
Clarke & Co. (Manchester), Ltd., H.
Daly, H. C.
Dubilier Condenser Co. (1925), Ltd.
Emkabe Radio Co., Ltd.
Formo Co.
Ferranti, Ltd.
Franklin Electric Co., Ltd.
Graham Farish, Ltd.
Heayberd & Co., F. C.
Igranic Electric Co., Ltd.
Lever (Trix), Ltd. E. J.
Lissen, Ltd.
Loewe Radio Co., Ltd.
Lyons, Ltd., Claude.
Millet, J.
Morton, Ltd., E. R.
Muirhead & Co., Ltd.
Pearson Bros. & Co.
Rotor Electric, Ltd.
Savage, W. B.
Siemens Schuckert (Gt. Britain), Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Telegraph Condenser Co., Ltd.
Telephone Mfg. Co., Ltd.
Wego Condenser Co., Ltd.
Wilburn & Co.
W.R.C., Ltd.
Zenith Electric Co., Ltd.

CONDENSERS (electrolytic).

Ashley Wireless Telephone Co. (1925), Ltd.
British N.S.F. Co., Ltd.
Cifel Products, Ltd.
Dubilier Condenser Co. (1925) Ltd.
Ferranti, Ltd.
Franklin Electric Co., Ltd.
Hellesen's, Ltd.
Igranic Electric Co., Ltd.
Longton & Co., H.
Magnavox (Gt. Britain), Ltd.
Millet & Co.
Pearson Bros. & Co.
Rothermel Corporation, Ltd.
Rotor Electric, Ltd.
Standard Telephones & Cables, Ltd.
Telegraph Condenser Co., Ltd.
Telephone Mfg. Co., Ltd.
Triotron Radio Co., Ltd.
Wego Condenser Co., Ltd.

CONDENSERS (variable).

Altham Radio Co.
Andrews & Co., A. E.
Benoit, M.
Bird & Sons, Sidney S.
British N. S. F. Co., Ltd.
British Radiophone, Ltd.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Certex Products.
Chalkley C. G.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Custerson, R.
Danipad Rubber Co., Ltd.
Edison Bell, Ltd.
Emkabe Radio Co., Ltd.
Ferranti, Ltd.
Formo, Co.
Francis, T. R.
Franklin Electric Co., Ltd.
General Electric Co., Ltd.
Graham Farish, Ltd.
Hewitt, Ltd., A. J.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Jackson Bros.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. and Smiths, Ltd.
Lotus Radio, Ltd.
Lyons, Ltd., Claude.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Morton, Ltd., E. R.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Peto-Scott, Co., Ltd.
Plessey Co., Ltd.
Pooley, G. J.
Radio Sundries Co.
Ready Radio, Ltd.
Shearing, Ltd., A. E.
Sovereign Products, Ltd.

PRODUCTS SUPPLIED

Standard Telephones and Cables, Ltd.
Stratton & Co., Ltd.
Sullivan, Ltd., H. W.
Taylor & Co., J. H.
Tekade Radio & Electric, Ltd.
Telsen Electric Co., Ltd.
Webb Condenser Co., Ltd.
Wilkins & Wright, Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.
Wingrove & Rogers, Ltd.
W.R.C. Ltd.
Yagerphone, Ltd.

CONDENSERS (pre-set).

Altham Radio Co.
Ashley Wireless Telephone Co. (1925), Ltd.
British Pix Co., Ltd.
British Radiophone, Ltd.
Chorlton Metal Co., Ltd.
Colvern Ltd.
Clarke & Co. (Manchester), Ltd., H.
Danipad Rubber Co., Ltd.
Edison Bell, Ltd.
Emkabe Radio Co., Ltd.
Formo, Co.
Franklin & Freeman, Ltd.
Graham Farish, Ltd.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Jackson Bros.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Morton & Co., E. R.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Plessey Co., Ltd.
Radio Instruments, Ltd.
Radio Sundries Co.
Shearing, Ltd., A. E.
Sovereign Products, Ltd.
Standard Mfg. (Wireless) Co., Ltd.
Telsen Electric Co., Ltd.
Wilkins & Wright, Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.
Wingrove & Rogers, Ltd.

CORDS
(battery, headphone and speaker).

Altham Radio Co.
Belling & Lee, Ltd.
British Insulated Cables, Ltd.
Bromley Langton Electric Wire & Insulator Co., Ltd.
Bulgin & Co., Ltd., A. F.
Elliott Radio Mfg. Co., Ltd.
Elvy, C. L.
Hart Bros. Electrical Mfg. Co., Ltd.
Ivory Electric, Ltd.
Johnson & Phillips, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
McLeod & McLeod.
Melbourne Radio Supply.
Millet, J.
Olympia Radio, Ltd.
Rigaut, J.
Standard Insulator Co., Ltd.
Standard Telephones and Cables, Ltd.
Toubkin, J.
Trent Electric Wire Works, Ltd.
Ward and Goldstone, Ltd.

CRYSTAL (quartz oscillating).

Brookes' Measuring Tools.
Ivory Electric, Ltd.
Lawwol Co.
London Commercial Electrical Stores, Ltd.
Lyons, Ltd., Claude.
Quartz Crystal Co.
Rose and Son, Ltd., T. A.
Sullivan, Ltd., H. W.
Toubkin, J.
Wood, E. A.

DIALS (standard, slow motion).

Benoit, M.
British Radiophone, Ltd.
Brodersen, A.
Burndept, Ltd.
Celluloid Printers, Ltd.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd.
Contal Radio, Ltd.
Custerson, R.
Danipad Rubber Co., Ltd.
Ellmar Mouldings Co.
Emkabe Radio Co., Ltd.
Formo Co.
Gresley Radio.
Harlie, Ltd.
Harwol Specialities Co.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Jackson Bros.
Kalisky (Aldgate), Ltd., S.
Lissen, Ltd.
Lotus Radio, Ltd.
Merrington Bros., Ltd.
Money Hicks, Ltd.
Morton, Ltd., E. R.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Plessey Co., Ltd.
Radio Sundries Co.
Ready Radio, Ltd.
Reliance (Name Plates), Ltd.
Solidite & Synthetic Mouldings, Ltd.
Stratton & Co., Ltd.
Telsen Electric, Ltd.
Toubkin, J.
Webb Condenser Co., Ltd.
Wilkins & Wright, Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.
Wingrove & Rogers, Ltd.
W.R.C., Ltd.

DIALS (drum control).

British Radiophone, Ltd.
Brodersen, A.
Celluloid Printers, Ltd.
Chorlton Metal Co., Ltd.
Crystalate Gramophone Record Mfg. Co., Ltd.
Custerson, R.
Emkabe Radio Co., Ltd.
Formo Co.
Harrison & Co., A. T.
Hemelik, J.
Igranic Electric Co., Ltd.
Jackson Bros.
Kalisky (Aldgate), Ltd., S.
Lissen, Ltd.
Lotus Radio, Ltd.
Money Hicks, Ltd.
Morton, Ltd., E. R.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Plessey Co., Ltd.
Reliance (Name Plates), Ltd.
Stratton & Co., Ltd.
Telsen Electric, Ltd.
Webb Condenser Co., Ltd.
Wilkins & Wright, Ltd.
Williams & Moffat, Ltd.
Wingrove & Rogers, Ltd.
W.R.C., Ltd.

DIAPHRAGMS
(headphone and speaker).

Bridger & Co., R. O.
Brodersen, A.
Lever (Trix), Ltd., Eric J.
London Radio-Electric Co.
Poupard & Co., Ltd., C. Haddon.
Sankey & Sons, Ltd., Joseph.
Standard Telephones & Cables, Ltd.
Sullivan, Ltd., H. W.
Taylor & Petters, Ltd.
Telephone Mfg. Co., Ltd.

EARTH CLIPS.

Andrews & Co., A. E.
Ashley Wireless Telephone Co.
Beuttell, Ltd., A. W.
Burne-Jones & Co., Ltd.
Cadisch & Sons, R.
Certex Products.
Eastick & Sons, J. J.
Edmonds, Ltd., G.
Enderlein, E.
Fenriss (1932), Ltd.
Francois, E. J.
Gee (Birmingham), Ltd.
General Electric Co., Ltd.
Gripso Co.
Harris, G. & R.
Hercus Mfg. Co.
Hill, Ltd., Ernest H.
Ivory Electric, Ltd.
Lever (Trix), Ltd., Eric J.
Lilley & Son, Ltd., S.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Richardsons (R. M. L.), Ltd.
Skeldings, Ltd.
Standard Mfg. (Wireless) Co., Ltd.
Toubkin, J.
W.R.C., Ltd.

EARTH TUBES (plates and mats).

British Radio Mfg. Co. (Liverpool), Ltd.
Climax Radio Electric, Ltd.
Dyson & Co. (Works), Ltd., J.
Eastick, J. J., & Sons.
Enderlein, E.
General Electric Co., Ltd.
Gresley Radio, Ltd.
Hercus Mfg. Co.
Ivory Electric, Ltd.
Kalisky (Aldgate), Ltd., S.
Laker Co., Ltd., J. & J.
Lever (Trix), Ltd., Eric J.
Melbourne Radio Supply.
Olympia Radio, Ltd.
Richardsons (R.M.L.), Ltd.
Spong & Co., Ltd.
Toubkin, J.
Wright & Weaire, Ltd.

EBONITE (panel, sheet, rod and tube).

Altham Radio Co.
American Hard Rubber Co. (Britain), Ltd.
Attwater & Sons.
British Ebonite Co., Ltd.
British Hard Rubber Co., Ltd.
Chorlton Metal Co., Ltd.
Clayton (Rubber Sales), Ltd.
Danipad Rubber Co., Ltd.
Francis, T. R.
Frost Radio Co.
General Electric Co., Ltd.
Hercus Mfg. Co.
India-Rubber, Gutta-Percha and Telegraph Works, Ltd.
Jewel Pen Co., Ltd.
Kay Brothers, Ltd.
Lissen, Ltd.
Marks & Son, S.
Maul & Murphy, Ltd.
Moores & Co., J.
Peto-Scott Co., Ltd.
Potter & Co., Ltd., H. B.
Radio Sundries Co.
Redfern's Rubber Works, Ltd.
Ripaults, Ltd.
St. Helens Cable & Rubber Co., Ltd.
Shearing, Ltd., A. E.
Spicers, Ltd.
Taylor & Co., J. H.
Trelleborgs Ebonite Works, Ltd.
United Ebonite Manufacturers, Ltd.
Wright & Weaire, Ltd.

EBONITE (mouldings and turnings).

American Hard Rubber Co. (Britain), Ltd.
Attwater & Sons.
British Ebonite Co., Ltd.
British Hard Rubber Co., Ltd.
B. & J. Wireless, Ltd.
Danipad Rubber Co., Ltd.
General Electric Co., Ltd.
India-Rubber, Gutta-Percha & Telegraph Works, Ltd.
Jewel Pen Co., Ltd.
Lever (Trix), Ltd., Eric J.
Marks & Son, S.
Maul & Murphy, Ltd.
Merrington Bros., Ltd.
Mountford Rubber Co., Ltd.
Patton, Ltd., David J.
Redfern's Rubber Works, Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
St. Helens Cable & Rubber Co., Ltd.
Shearing, Ltd., A. E.
Standard Insulator Co., Ltd.
Trelleborgs Ebonite Works, Ltd.
Walter, Ltd., J. & H.
Wright & Weaire, Ltd.

EBONITE CEMENT.

Kay Brothers, Ltd.
Maul & Murphy, Ltd.
Walter, Ltd., J. & H.

ELECTRO-PLATING.

Bright Co.
British Ideal Patents, Ltd.
Cruickshank, Ltd., R.
Nixon & Sons, J.
Telephone Mfg. Co., Ltd.
Yorkshire Radio Co.

ENGRAVING.

Automobile Accessories (Bristol), Ltd.
British General Manufacturing Co., Ltd.
British Hard Rubber Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Burndept, Ltd.
Burne-Jones & Co., Ltd.
Cellgrave Co.
Celluloid Printers, Ltd.
Ching & Son, R.
Clarke & Co. (Manchester), Ltd., H.
Danipad Rubber Co. Ltd.
Elliott Radio Mfg. Co., Ltd.
Gould, Harper & Co., Ltd.
Jeacock, W.
Limit Engineering Co., Ltd.
Limit Radio, Ltd.
Marks & Son, S.
Money Hicks, Ltd.
Reliance (Name Plates), Ltd.
Stebbings, J. R.
Stilwell & Sons.
Sugden General Engraving Co.
Sullivan, Ltd., H. W.
Trelleborgs Ebonite Works, Ltd.
United Chemical Engraving Co., Ltd.
Williams & Gray, Ltd.

ENGRAVING MACHINES.

Automobile Accessories (Bristol) Ltd.
Gould, Harper & Co., Ltd.

ERINOID AND CASEIN PRODUCTS.

Certix Products.
Elliott, E.
Harris, G. & R.
Jewel Pen Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lilley & Son, Ltd., S.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Patten, Ltd., David J.
Shearing, Ltd., A. E.
Standard Mfg. (Wireless) Co., Ltd.
Trelleborgs Ebonite Works, Ltd.

FIBRE.

Attwater & Sons.
Diamond Fibre Co., Ltd.
Moores & Co., J.
Mountford Rubber Co., Ltd.
Spicers, Ltd.
Trelleborgs Ebonite Works, Ltd.
Wilmott, Son & Phillips, Ltd.

PRODUCTS SUPPLIED

FILTERS (output).

Bayliss, Ltd., W.
British General Manufacturing Co., Ltd.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Duray.
Eagle Engineering Co., Ltd.
Ferranti, Ltd.
Frost Radio Co.
Igranic Electric Co., Ltd.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
London Electrical Co.
Lyons, Ltd., Claude.
Pearson Bros. & Co.
Radio Instruments, Ltd.
Savage, W. B.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Tonex Co.
Union Radio Co., Ltd.
Varley.
Wright & Weaire, Ltd.
Zenith Electric Co., Ltd.

FITTINGS (for portable set cases).

Aladdin Gramophone & Accessories Co.
Beddoes, Ltd., J. G.
Harris, G. & R.
Lissen, Ltd.
Longley Radio Mfg. Co.
Wright & Weaire, Ltd.

FUSES.

Advance Components, Ltd.
Artic Fuse & Electrical Manufacturing Co., Ltd.
Belling & Lee, Ltd.
Beswick, Ltd., K. E.
Blue Comet, Ltd.
Bromley Langton Electric Wire & Insulator Co., Ltd.
Bulgin & Co., Ltd., A. F.
Coates, Ltd., G. J.
Crabtree, J. A. & Co., Ltd.
Edison Swan Electric Co., Ltd.
Enderlein, E.
Ferranti, Ltd.
Frost Radio Co.
Gambrell Radio, Ltd.
General Electric Co., Ltd.
Hellesens, Ltd.
Hercus Mfg. Co.
Imp Radio Co.
Ivory Electric, Ltd.
Kalisky (Aldgate), Ltd., S.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
McLeod & McLeod.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Microfuses, Ltd.
Millet, J.
Nassak Mfg. Co., Ltd.
Reliance Mfg. Co. (Southwark) Ltd.
Rotor Electric, Ltd.
Service Equipment Co., Ltd.
Sifam Electrical Instrument Co., Ltd.
Sound Sales, Ltd.
Standard Telephones & Cables, Ltd.
Telsen Electric Co., Ltd.
Toubkin, J.
Tunewell Radio Ltd.

GENERATORS, ROTARY.

Bayliss, Ltd., W.
Electro-Dynamic Construction Co., Ltd.
General Electric Co., Ltd.
Higgs Motors.
Lancashire Dynamo and Crypto, Ltd.
Lever (Trix), Ltd., Eric J.
Lyons, Ltd., Claude.
Mortley, Sprague & Co., Ltd.
Rotax, Ltd.

GRID LEAKS.

Abingdon Wireless Supplies.
Advance Components, Ltd.
Ashley Wireless Telephone Co. (1925), Ltd.
British N.S.F. Co., Ltd.
Brodersen, A.
Bulgin & Co., Ltd., A. F.
Carborundum Co., Ltd.
Daly, H. C.
Dubilier Condenser Co., Ltd.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Elliott Radio Mfg. Co., Ltd.
Ferranti, Ltd.
Graham Farish, Ltd.
Harrison & Co., A. T.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Loewe Radio Co., Ltd.
Lyons, Ltd., Claude.
McLeod & McLeod.
Pearson Bros. & Co.
Pye Radio, Ltd.
Ready Radio, Ltd.
Rotor Electric, Ltd.
Siemens-Schuckert (Gt. Britain), Ltd.
Six-Sixty Radio Co., Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Telsen Electric Co., Ltd.
Toubkin, J.
Tunewell Radio, Ltd.
Wego Condenser Co., Ltd.
W.R.C. Ltd.

HEADPHONES.

Bowerman, Ltd., G.
Brodersen, A.
Edison Swan, Electric Co., Ltd.
Edmonds, Ltd., G.
General Electric Co., Ltd.
Gent & Co., Ltd.
Kolster-Brandes, Ltd.
Lissen, Ltd.
Manufacturers Accessories Co. (1928), Ltd.
Poupard & Co., Ltd., C. Haddon.
Siemens-Schuckert (Gt. Britain), Ltd.
Sullivan, Ltd., H. W.
Taylor & Co., J. H.
Toubkin, J.

HOME TALKIE APPARATUS.

Bijou Radio Co.
British Talkatome, Ltd.
Eon Vacuum Wireless Co.
Gorman Radio Electric Service Depot.
Johnson and Phillips, Ltd.
Lever (Trix), Ltd., Eric J.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Wright & Weaire, Ltd.
Zimba Radio Co.

HYDROMETERS.

Altham Radio Co.
Arnull, Watt & Co., S.
Chorlton Metal Co., Ltd.
Collie & Co., J. H.
Contal Radio, Ltd.
Cookson and Co.
Eastick & Sons, J. J.
Gordon, Fredk. J.
Guiterman & Co., Ltd.
Ivory Electric, Ltd.
Kalisky (Aldgate), Ltd., S.
Lever (Trix), Ltd., Eric J.
Millet, J.
Newtons of Taunton, Ltd.
Richardsons (R. M. L.), Ltd.
Rose & Son, Ltd., T. A.
Service Equipment Co., Ltd.
Stadium, Ltd.
Toubkin, J.
Vandervell, Ltd., C. A.

INSULATORS.

Aladdin Gramophone & Accessories Co.
Barrett & Elers, Ltd.
Birmingham Mica Co., Ltd.
Bullers, Ltd.
Crystalate Gramophone Record Mfg. Co., Ltd.
Ellmar Mouldings Co.
Enderlein, E.
General Electric Co., Ltd.
Graham Farish, Ltd.
Gripso Co.
Hercus Mfg. Co.
Igranic Electric Co., Ltd.
India-Rubber, Gutta-Percha & Telegraph Works, Ltd.
Jobling & Co., J. A.
Joseph, H.
Junction Engineering Co., Ltd.
Laker Co., Ltd., J. & J.
Lesingham, F. L.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Litholite Insulators, Ltd.
Lyons, Ltd., Claude.
McWhirr, Paterson & Co.
Merrington Bros., Ltd.
Micanite & Insulators Co., Ltd.
Millet, J.
New London Electron Works, Ltd.
Patton, Ltd., David J.
Pearson Bros. & Co.
Reliance Mfg. Co. (Southwark), Ltd.
Robinson & Co., Lionel.
Saxon Radio Co.
Solidite & Synthetic Mouldings, Ltd.
Toubkin, J.
Trelleborgs Ebonite Works, Ltd.
Vandervelde, L.

INSULATING COMPOUNDS AND MATERIALS (other than ebonite).

Attwater & Sons.
A.E.G. Electric Co., Ltd.
Barrett & Elers, Ltd.
Birmingham Mica Co., Ltd.
British Insulated Cables, Ltd.
Crystalate Gramophone Record Mfg. Co., Ltd.
De-La-Rue & Co., Ltd., Thos.
Diamond Fibre Co., Ltd.
Elephant Chemical Co., Ltd.
Ellison Insulations, Ltd.
Ellmar Mouldings Co.
Enderlein, E.
Erinoid, Ltd.
General Electric Co., Ltd.
Harris, G. & R.
Lissen, Ltd.
Lorival Mfg. Co. (1921), Ltd.
McLeod & McLeod.
Maul & Murphy, Ltd.
Micanite & Insulators Co., Ltd.
Moores & Co., J.
Pearson Bros. & Co.
Pomona Rubber Co.
Reliance Mfg. Co. (Southwark), Ltd.
R.L.M. Co.
St. Helens Cable & Rubber Co., Ltd.
Solidite & Synthetic Mouldings, Ltd.
Sterling Varnish Co.
Taylor & Petters, Ltd.
Trelleborgs Ebonite Works, Ltd.
Webster & Co., Ltd., T.

KIT SETS.

British Lumophon, Ltd.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
City Accumulator Co.
Cossor, Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Ferranti, Ltd.
Forbat, Eugen.
Formo Co.
General Electric Co., Ltd.
Haynes Radio.
Hewitt, Ltd., A. J.
H. & B. Radio Co.
Igranic Electric Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Lotus Radio, Ltd.
Merrington Bros., Ltd.
Nassak Mfg. Co., Ltd.
Peto Scott Co., Ltd.
Plessey Co., Ltd.
Ready Radio, Ltd.
Shearing, Ltd., A. E.
Six-Sixty Radio Co., Ltd.
Smith (Radio), Ltd., Arthur.
Sovereign Products, Ltd.
Stonehouse Radio Supplies.
Stratton & Co., Ltd.
Telsen Electric, Ltd.
Tonex Co.
Tunewell Radio, Ltd.
United Radio Manufacturers, Ltd.
Whiteley Electrical Radio Co., Ltd.
Yagerphone, Ltd.

KNOBS AND DIALS.

Bulgin & Co., Ltd., A. F.
Celluloid Printers, Ltd.
Clarke & Co. (Manchester), Ltd.
Crystalate Gramophone Record Mfg. Co., Ltd.
Edison Bell, Ltd.
Ellmar Mouldings Co.
Enderlein, E.
Formo Co.
Harlie, Ltd.
Harrison & Co., A. T.
Igranic Electric Co., Ltd.
Jackson Bros.
Jewel Pen Co., Ltd.
Lissen, Ltd.
Lorival Mfg. Co. (1921), Ltd.
Lotus Radio, Ltd.
McLeod & McLeod.
Maul & Murphy, Ltd.
Merrington Bros., Ltd.
Money Hicks, Ltd.
Morton, Ltd., E. R.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Precision Radio & Mfg. Co., Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
Reliance (Nameplates), Ltd.
R.L.M. Co.
Solidite and Synthetic Mouldings, Ltd.
Stilwell & Sons.
Stratton & Co., Ltd.
Toubkin, J.
Trelleborgs Ebonite Works, Ltd.
Webster & Co., Ltd., T.
Wilkins & Wright, Ltd.
Wingrove & Rogers, Ltd.
W.R.C., Ltd.

LABELS AND SCALES.

Cellgrave.
Celluloid Printers, Ltd.
Ching & Sons, R.
Elliott, E.
Ellmar Mouldings Co.
Gripso Co.
McLeod & McLeod.
Marks & Son, S.
Melbourne Radio Supply.
Money Hicks, Ltd.
Pollock & Co., Ltd.
Reliance (Nameplates), Ltd.
Stilwell & Sons.
United Chemical Engraving Co., Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.

LABORATORY INSTRUMENTS.

Anglo-Swiss Electrical Co., Ltd.
Arnull, Watt & Co., S.
Bayliss, Ltd., W.
Bi-Metals.
Burndept, Ltd.

PRODUCTS SUPPLIED

Cambridge Instrument Co., Ltd.
Ernest Turner Electrical Instruments, Ltd.
Evershed & Vignoles, Ltd.
Ferranti, Ltd.
Gambrell Radio, Ltd.
General Electric Co., Ltd.
Godfrey (Radio), Ltd., F. E.
Hilger, Ltd., Adam.
Johnson & Phillips, Ltd.
Lyons, Ltd., Claude.
Muirhead & Co., Ltd.
Partridge & Mee, Ltd.
Partridge, Wilson & Co.
Precision Electric, Ltd.
Rich & Bundy, Ltd.
Shearing, Ltd., A. E.
Siemens-Schuckert (Gt. Britain), Ltd.
Standard Telephones & Cables, Ltd.
Sullivan, Ltd., H. W.
Weston Electrical Instrument Co., Ltd.
Zenith Electric Co., Ltd.

LEAD-IN TUBES.

Andrews & Co., A. E.
Automobile Accessories (Bristol), Ltd.
Bird & Sons, W.
Birmingham Products, Ltd.
Blue Comet, Ltd.
British Hard Rubber Co., Ltd.
Brodersen, A.
Bullers, Ltd.
Certex Products.
Danipad Rubber Co., Ltd.
Eagle Engineering Co., Ltd.
Eastick & Sons, J. J.
Enderlein, E.
Francis, T. R.
Francois, E. J.
Franklin & Freeman, Ltd.
Gould, Harper & Co., Ltd.
Hercus Mfg. Co.
Ivory Electric, Ltd.
Jewel Pen Co., Ltd.
Laker Co., Ltd., J. & J.
Lever (Trix) Ltd., Eric J.
Lilley & Son, Ltd., S.
Lissen, Ltd.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Millet, J.
Moores & Co., J.
Olympia Radio, Ltd.
Pioneer Mfg. Co.
Pressland Products, Ltd.
Redferns Rubber Works, Ltd.
Sparkes & Co., J.
Standard Mfg. (Wireless) Co., Ltd.
Star Engineering.
Stratton & Co., Ltd.
Toubkin, J.
Trelleborgs Ebonite Works, Ltd.
Wood, E. A.
Wright & Weaire, Ltd.

LIGHTNING ARRESTERS.

Aladdin Gramophone & Accessories Co.
Andrews & Co., A. E.
Ashley Wireless Telephone Co. (1925), Ltd.
Automobile Accessories (Bristol), Ltd.
British Insulated Cables, Ltd.
Brodersen, A.
Bulgin, & Co., Ltd., A. F.
Busby & Co., Ltd.
Cann, Ltd., J. Churley
Castagnoli, G.
Christie & Sons, Ltd., Jas.
Cooke & Co., Howard S.
Danipad Rubber Co., Ltd.
Eastick & Sons, J. J.
Edison Bell, Ltd.
Enderlein, E.
General Electric Co., Ltd.
Goodman Instrument Co.
Gould, Harper & Co., Ltd.
Graham Farish, Ltd.
Harmo Products.
Harris, G. & R.
Ivory Electric, Ltd.
Joseph, H.
Laker Co., Ltd., J. & J.
Lever (Trix), Ltd., Eric J.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Millet, J.
Philips Lamps, Ltd.
Pioneer Mfg. Co.
Pressland Products, Ltd.
Robins, Ltd.
Star Engineering.
Stratton & Co., Ltd.
Willmott, Son & Phillips, Ltd.
Yeldon (Radio), Ltd.

MAGNETS (telephone and speaker).

Allen & Co., Ltd., E.
Darwins, Ltd.
English Steel Corporation.
Film Industries, Ltd.
McMillan & Co., J.
Neill & Co. (Sheffield), Ltd., James.
Poupard & Co., Ltd., C. Haddon.
Swift Levick & Sons, Ltd.
Watson, Saville & Co., Ltd.
W.R.C., Ltd.

MAINS SUPPLY UNITS A.C., H.T.

Baty, E. J.
Bijou Radio Co.
Bligh, S. W.
Blue Comet, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bullphone Radio.
City Accumulator Co.
Clarke & Co. (Manchester), Ltd., H.
Climax Radio Electric, Ltd.
Cole, E. K., Ltd.
Commercial Engineering Co.
Custerson, R.
Duray.
Dyson & Co. (Works), Ltd., J.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
Edison Swan Electric Co., Ltd.
Edwards, E.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Fel-Electric Radio.
Ferranti, Ltd.
Formo Co.
Frost Radio Co.
Gent & Co., Ltd.
Godfrey (Radio), Ltd., F. E.
Gresley Radio, Ltd.
Hartley & Co., A.
Heayberd & Co., F. C.
H. & B. Radio Co.
H.C.H. Co.
Johnson & Phillips, Ltd.
Junction Engineering Co., Ltd.
Junit Mfg. Co., Ltd.
Lanchester Laboratories, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electrical Co.
London Radio-Electric Co.
Longton & Co., H.
Lotus Radio, Ltd.
Maestrophone Radio Gramophone & Wireless Co.
Mains Power Radio, Ltd.
Merrington Bros., Ltd.
Mic Wireless Co.
Mile End Radio Co.
Northampton Plating Co.
Partridge & Mee, Ltd.
Peace, Ltd., Henry.
Philomel Radio Equipment Co.
Plessey Co., Ltd.
Pressland Products, Ltd.
Poupard & Co., Ltd., C. Haddon.
Radio Instruments, Ltd.
Radio Services Co.
Realistic Speakers.

Rectifiers, Ltd.
Regentone, Ltd.
Smith (Radio), Ltd., Arthur.
Sound Sales, Ltd.
Spiers & Browne.
Stratton & Co., Ltd.
Supremus Specialities, Ltd.
Tonex Co.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Yeldon (Radio), Ltd.
Zimba Radio Co.

MAINS SUPPLY UNITS, A.C., L.T.

Baty, E. J.
Bijou Radio Co.
Bligh, S. W.
Blue Comet, Ltd.
Blundell-Curtis, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bullphone Radio.
City Accumulator Co.
Clarke & Co. (Manchester), Ltd., H.
Custerson, R.
Duray.
Dyson & Co. (Works), Ltd., J.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
Edison Swan Electric Co., Ltd.
Edwards, E.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Fel-Electric Radio.
Formo Co.
Gent & Co., Ltd.
Godfrey (Radio) Ltd., F. E.
Gresley Radio, Ltd.
Heayberd & Co., F. C.
H. & B. Radio Co.
Johnson & Phillips, Ltd.
Junction Engineering Co., Ltd.
Junit Mfg. Co., Ltd.
Lanchester Laboratories, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electrical Co.
London Radio-Electric Co.
Maestrophone Radio Gramophone & Wireless Co.
Mains Power Radio, Ltd.
Merrington Bros., Ltd.
Mic Wireless Co.
Mile End Radio Co.
Partridge & Mee, Ltd.
Peace, Ltd., Henry.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Radio Services Co.
Rectifiers, Ltd.
Smith (Radio), Ltd., Arthur.
Sound Sales, Ltd.
Spiers & Browne.
Supremus Specialities, Ltd.
Tannoy Products.
Tonex Co.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Yeldon (Radio), Ltd.
Zimba Radio Co.

MAINS SUPPLY UNITS A.C. (all power).

Baty, E. J.
Bijou Radio Co.
Bligh, S. W.
Blue Comet, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bullphone Radio.
City Accumulator Co.
Clarke & Co. (Manchester), Ltd., H.
Commercial Engineering Co.
Custerson, R.
Dyson & Co. (Works), Ltd., J.
East Ham Wireless Supplies.
Edison Swan Electric Co., Ltd.
Electrolines, Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Faraday Allwave Wireless, Ltd.
Fel-Electric Radio.
Ferranti, Ltd.
Formo Co.
Frost Radio Co.
Godfrey (Radio), Ltd., F. E.
H. & B. Radio Co.
Johnson & Phillips, Ltd.
Junction Engineering Co., Ltd.
Junit Mfg. Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electrical Co.
London Radio-Electric Co.
Maestrophone Radio Gramophone & Wireless Co.
Mains Power Radio, Ltd.
Merrington Bros., Ltd.
Mio Wireless Co.
Mile End Radio Co.
Partridge & Mee, Ltd.
Peace, Ltd., Henry.
Philomel Radio Equipment Co.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Radio Instruments, Ltd.
Radio Services Co.
Realistic Speakers.
Regentone, Ltd.
Six-Sixty Radio Co., Ltd.
Smith (Radio), Ltd., Arthur.
Sound Sales, Ltd.
Spiers & Browne.
Stratton & Co., Ltd.
Supertone Pianos, Ltd.
Tannoy Products.
Tarry's.
Tonex Co.
Toubkin, J.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Yeldon (Radio), Ltd.
Zimba Radio Co.

MAINS SUPPLY UNITS, D.C., H.T.

Baty, E. J.
Bijou Radio Co.
Bligh, S. W.
Blue Comet, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bullphone Radio.
Clarke & Co. (Manchester), Ltd., H.
Climax Radio Electric, Ltd.
Cole, E. K., Ltd.
Custerson, R.
Duray.
Dyson & Co. (Works) Ltd., J.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
Edison Swan Electric Co., Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Fel-Electric Radio.
Formo Co.
Frost Radio Co.
Hartley & Co., A.
Heayberd & Co., F. C.
H. & B. Radio Co.
H.C.H. Co.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electrical Co.
London Radio-Electric Co.
Longton & Co., H.
Maestrophone Radio Gramophone & Wireless Co.
Mains Power Radio, Ltd.
Merrington Bros., Ltd.
Mic Wireless Co.
Peace, Ltd., Henry.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Radio Instruments, Ltd.
Radio Services Co.
Regentone, Ltd.
Rotax, Ltd.
Smith (Radio), Ltd., Arthur

PRODUCTS SUPPLIED

Sound Sales, Ltd.
Spiers & Browne.
Stratton & Co., Ltd.
Supertone Pianos, Ltd.
Supremus Specialities, Ltd.
Tannoy Products.
Tunewell Radio, Ltd.
Zimba Radio Co.

MAINS SUPPLY UNITS, D.C., L.T.

Baty, E. J.
Blue Comet, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bullphone Radio.
Clarke & Co. (Manchester), Ltd., H.
Custerson, R.
Dyson & Co. (Works), Ltd., J.
East Ham Wireless Supplies.
Edison Swan Electric Co., Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Fel-Electric Radio.
Formo Co.
Frost Radio Co.
H. & B. Radio Co.
Lever (Trix), Ltd., Eric J.
London Electrical Co.
London Radio Electric Co.
Mains Power Radio, Ltd.
Merrington Bros., Ltd.
Mic Wireless Co.
Peace, Ltd., Henry.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Radio Services Co.
Rotax, Ltd.
Smith (Radio) Ltd., Arthur.
Sound Sales, Ltd.
Spiers & Browne.
Supertone Pianos, Ltd.
Tannoy Products.
Tunewell Radio, Ltd.
Zimba Radio Co.

MAINS SUPPLY UNITS D.C. (all power).

Baty, E. J.
Bligh, S. W.
Blue Comet, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bullphone Radio.
Clarke & Co. (Manchester), Ltd., H.
Dyson & Co. (Works) Ltd., J.
East Ham Wireless Supplies.
Edison Swan Electric Co., Ltd.
Electrolines, Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Faraday Allwave Wireless, Ltd.
Fel-Electric Radio.
Formo Co.
Lancashire Dynamo & Crypto, Ltd.
Lever (Trix), Ltd., Eric J.
London Electrical Co.
London Radio-Electric Co.
Longton & Co., H.
Maestrophone Radio Gramophone & Wireless Co.
Mains Power Radio, Ltd.
Merrington Bros., Ltd.
Mic Wireless Co.
Peace, Ltd., Henry.
Philomel Radio Equipment Co.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Realistic Speakers.
Regentone, Ltd.
Rotax, Ltd.
Smith (Radio) Ltd., Arthur.
Sound Sales, Ltd.
Spiers & Browne.
Tannoy Products.
Tunewell Radio, Ltd.
Zimba Radio Co.

MASTS (aerial).

Abbey Engineering Works.
Bullers, Ltd.
Hildick & Hildick.
Laker Co., Ltd., J. & J.
Terry & Sons, Ltd.

METALS, RARE.

Hilger, Ltd., Adam.
Johnson, Mathey & Co., Ltd.
Philips Industrial.
Righton & Co., Ltd., Henry.
Siemens-Schuckert (Gt. Britain), Ltd.

MICA.

Attwater & Sons.
Birmingham Mica Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Harris, G. & R.
Lissen, Ltd.
Moores & Co., J.
Vandervelde, L.

MICROPHONES.

Cole, Ltd., E. K.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Fay Home Recorders, Ltd.
Harlie, Ltd.
Lanchester Laboratories, Ltd.
Lyons, Ltd., Claude.
Marconi's Wireless Telegraph Co., Ltd.
Philips Lamps, Ltd.
Plessey Co., Ltd.
Rothermel Corporation, Ltd.
Siemens-Schuckert (Gt. Britain), Ltd.
Standard Telephones & Cables, Ltd.
Telephone Mfg. Co., Ltd.
Wilson Microphone & Electrical Co., Ltd.
Wright & Weaire, Ltd.

MILLIAMMETERS.

Anglo-Swiss Electrical Co., Ltd.
Benoit, M.
Bulgin & Co., Ltd., A. F.
Cambridge Instrument Co., Ltd.
Ernest Turner Electrical Instruments, Ltd.
Everett, Edgcumbe & Co., Ltd.
Ferranti, Ltd.
General Electric Co., Ltd.
Gorman Radio Electric Service Depot.
Howard Butler, Ltd.
Johnson & Phillips, Ltd.
McMillan & Co.
Millet, J.
Park Royal Engineering Co., Ltd.
Siemens-Schuckert (Gt. Britain), Ltd.
Sifam Electrical Instrument Co., Ltd.
Stadium, Ltd.
Sullivan, Ltd., H. W.
Toubkin, J.
Wilkinson, L.
Weston Electrical Instrument Co.

MOULDINGS (other than ebonite).

Attwater & Sons.
A.E.G. Electric Co., Ltd.
Bridger & Co., R. D.
British Aluminium Co., Ltd.
British General Manufacturing Co., Ltd.
Brownie Wireless Co. of Gt. Britain, Ltd.
Clarke & Co. (Manchester), Ltd., H.
Crystalate Gramophone Record Mfg. Co., Ltd.
Daly, H. C.
De-La-Rue & Co., Ltd., Thos.
Ebonestos Insulators, Ltd.
Elliot, E.
Ellison Insulations, Ltd.
Ellmar Mouldings Co.
Ernest Turner Electrical Instruments, Ltd.
General Electric Co., Ltd.
Graham Farish, Ltd.
Gresley Radio, Ltd.

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PRODUCTS SUPPLIED

[*Continued from page* 286.]

Harlie, Ltd.
Harrison & Co., A. T.
Lissen, Ltd.
Litholite Insulators, Ltd.
London Electric Wire Co. & Smiths, Ltd.
Lorival Mfg. Co. (1921), Ltd.
Lyons, Ltd., Claude.
McLeod & McLeod.
Merrington Bros., Ltd.
Mica Mfg. Co., Ltd.
Morton, Ltd., E. R.
Ormond Engineering Co., Ltd.
Pearson Bros. & Co.
Philips Industrial.
Precision Radio & Mfg. Co., Ltd.
Redfern's Rubber Works, Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
R.L.M. Co.
St. Helen's Cable & Rubber Co., Ltd.
Shearing, Ltd., A. E.
Solidite & Synthetic Mouldings, Ltd.
Sorbo Rubber Sponge Products, Ltd.
Standard Insulator Co., Ltd.
Standard Mfg. (Wireless) Co., Ltd.
Stratton & Co., Ltd.
Trelleborgs Ebonite Works, Ltd.
Webster & Co., T.
Wilkins & Wright, Ltd.
W.R.C., Ltd.

MOULDING POWDERS.

Attwater & Sons.
A. E. G. Electric Co., Ltd.
Bakelite, Ltd.
British Celanese, Ltd.
Imperial Chemical Industries, Ltd.
Sicaloid, Ltd.

PLUGS AND JACKS.

Ashley Wireless Telephone Co. (1925), Ltd.
Bulgin & Co., Ltd., A. F.
Cossor, Ltd., A. C.
Edison Bell, Ltd.
Edmonds, Ltd., George.
Ferranti, Ltd.
Francois, E. J.
Harmo Products.
Harris, G. & R.
Igranic Electric Co., Ltd.
Lesingham, F. L.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Lotus Radio, Ltd.
Millet, J.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Plessey Co., Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
Rotor Electric, Ltd.
Standard Telephones & Cables, Ltd.
Telephone Mfg. Co., Ltd.
Trelleborgs Ebonite Works, Ltd.
Wright & Weaire, Ltd.

PLUGS AND SOCKETS (not jack or wander plugs).

Anglo-Swiss Screw Co., Ltd.
Belling & Lee, Ltd.
Birmingham Products, Ltd.
Bonson, E. W.
Brodersen, A.
Bulgin & Co., Ltd., A. F.
Certex Products.
Crabtree, J. A., & Co., Ltd.
Davis & Timmins, Ltd.
Eastick, & Sons, J. J.
Electrical Devices, Ltd.
Elliott, E.
Enderlein, E.
Fenriss, Ltd.
Francois, E. J.
Graham & Co., R. F.
Gripso Co.
Harris, G. & R.
Hemelik, J.
Holtzman, Ltd., Louis.
Ivory Electric, Ltd.
Jewel Pen Co., Ltd.
Joseph, H.
Lectro Linx, Ltd.
Lesingham, F. L.
Lever (Trix), Ltd., Eric J.
Lilley & Son, Ltd., S.
Lisenin Wireless Co.
Lissen, Ltd.
Lundberg & Sons, Ltd., A. P.
McLeod & McLeod.
Meyer, E.
Millet, J.
Nassak Mfg. Co., Ltd.
Plessey Co., Ltd.
Precision Radio & Mfg. Co., Ltd.
Spears & Co.
Standard Telephones & Cables, Ltd.
Toubkin, J.
Trelleborgs Ebonite Works, Ltd.
True Screws, Ltd.
W.R.C., Ltd.

POTENTIOMETERS.

British N.S.F. Co., Ltd.
British Radiophone, Ltd.
Brodersen, A.
Broderson, E. A.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Cambridge Instrument Co., Ltd.
Castagnoli, G.
Colvern, Ltd.
Enderlein, E.
Franklin & Freeman, Ltd.
Franklin Electric Co., Ltd.
Frost Radio Co.
Goodmans.
Graham Farish, Ltd.
Hemelik, J.
Igranic Electric Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
Lyons, Ltd., Claude.
Merrington Bros., Ltd.
Multitone Electric Co., Ltd.
Nassak Mfg. Co., Ltd.
Pearson Bros. & Co.
Plessey Co., Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
Rothermel Corporation, Ltd.
Rotor Electric, Ltd.
Siemens-Schuckert (Gt. Britain), Ltd.
Sovereign Products, Ltd.
Tunewell Radio, Ltd.
Varley.
Watmel Wireless Co., Ltd.
Wood, E. A.
Wright & Weaire, Ltd.
W.R.C., Ltd.

PRESSINGS.

Baker & Finnemore, Ltd.
Beddoes, Ltd., J. G.
Benjamin Electric, Ltd.
Bijou Radio Co.
British Radiophone, Ltd.
Bromley Langton Electric Wire & Insulator Co., Ltd.
Burne-Jones & Co., Ltd.
Busby & Co., Ltd.
Celluloid Printers.
Christie & Sons, Ltd., Jas.
Custerson, R.
Daly, H. C.
Edmonds, Ltd., G.
Elldons.
Ellmar Mouldings Co.
Elvey & Anderson.
Gee (Birmingham), Ltd.
Gresley Radio, Ltd.
Harris, G. & R.

Hounslow & Co., C.
Jackson Bros.
Lilley & Son, Ltd., S.
Limit Engineering Co., Ltd.
Limit Radio, Ltd.
Line & Co., F.
Marks & Son, S.
Morton, Ltd., E. R.
Nicklin & Co., Ltd., J.
Nuvolion Electrics, Ltd.
Ormond Engineering Co., Ltd.
Person & Son, L.
Pioneer Mfg. Co.
Radio Sundries Co.
Reliance Mfg. Co. (Southwark), Ltd.
Remus Co., Ltd.
Righton & Co., Ltd., Henry.
Ross Courtney & Co., Ltd.
Sankey & Sons, Ltd., Joseph.
Shearing, Ltd., A. E.
Skeldings, Ltd.
Spears & Co.
Speedwell Gear Case Co., Ltd.
Standard Mfg. (Wireless) Co., Ltd.
Telephone Mfg. Co., Ltd.
True Screws, Ltd.
Turner Tool Mfg. Co.
Whiteley Electrical Radio Co., Ltd.
Wilkins & Wright, Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.
Wright & Weaire, Ltd.
Yorkshire Radio Co.

P.A. AND KINEMA EQUIPMENT.

Austin Mills & Co.
Bayliss, Ltd., W.
Birmingham Sound Reproducers.
Bligh, S. W.
British Radio Mfg. Co. (Liverpool), Ltd.
City Accumulator Co.
Custerson, R.
Donophone.

Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Electrocet Radio Co.
Emerson, R. Waldo.
Epoch Radio Mfg. Co., Ltd.
Faraday Allwave Wireless, Ltd.
Ferranti, Ltd.
Film Industries, Ltd.
General Electric Co., Ltd.
Gent & Co., Ltd.
Godfrey (Radio), Ltd., F. E.
Gorman Radio Electric Service Depot.
Hacker & Sons, H.
Igranic Electric Co., Ltd.
Johnson & Phillips, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Londona, Ltd.
L.S. Units.
Lyons, Ltd., Claude.
Maestrophone Radio Gramophone & Wireless Co.
Magnavox (Gt. Britain), Ltd.
Marconiphone Co., Ltd.
Mic Wireless Co.
Midgley Leighton, Ltd.
M.P.A. Wireless (1930), Ltd.
Paroussi, E.
Pearson Bros.
Philips Industrial.
Philomel Radio Equipment Co.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Radio Gramophone Development Co., Ltd.
Rolls Radio, Ltd.
Rothermel Corporation, Ltd.
Savage, W. B.
Siemens-Schuckert (Gt. Britain), Ltd.
Smith (Radio), Ltd., Arthur.
Sound Sales, Ltd.
Spiers & Browne.
Standard Telephones & Cables, Ltd.
Tannoy Products.
Triotron Radio Co., Ltd.
Webber, Ltd., R. A.
Zimba Radio Co.

RECEIVERS (crystal).

Bright, Co.
British Radio Mfg. Co. (Liverpool), Ltd.
Brownie Wireless Co. of Gt. Britain, Ltd.
Burne-Jones & Co., Ltd.
Chalkley, C. G.
Colassi, W. L.
Custerson, R.
Dagnall, Ltd., S.
East Ham Wireless Supplies.
Elliott Radio Mfg. Co., Ltd.
Fallowfield, Ltd., Jonathan.
Improved Wilson Microphone & Electrical Co., Ltd.
Lever (Trix), Ltd., Eric J.
London Electrical Co.
Merrington Bros., Ltd.
Poupard & Co., Ltd., C. Haddon.
Radio Sundries Co.
Rooke Bros., Ltd.
Tarry's.
Wood, E. A.
W.R.C., Ltd.
Yorkshire Radio Co.

RECEIVERS (battery type).

Abingdon Wireless Supplies.
Alliance Radio, Ltd.
Altham Radio Co.
Automobile Accessories (Bristol), Ltd.
Balcombe, Ltd., A. J.
Bearsall & Co., Ltd., W. E.
Bird & Sons, W.
Bligh, S. W.
Blue Comet, Ltd.
Blundell-Curtis, Ltd.
British Blue Spot Co., Ltd.
British General Manufg. Co., Ltd.
British Ideal Patents, Ltd.
British Lumophon, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.

PRODUCTS SUPPLIED

Brownie Wireless Co. of Gt. Britain, Ltd.
Bullphone Radio.
Bulmer, Fred.
Burgoyne Wireless (1930), Ltd.
Burndept, Ltd.
Burne-Jones & Co., Ltd.
Burton, C. F., & H.
Butcher & Sons (Ross), Ltd., W.
Chalkley, C. G.
Clarke & Co. (Manchester), Ltd., H.
Columbia Graphophone Co., Ltd.
Contal Radio, Ltd.
Cossor, Ltd.
Currys, Ltd.
Custerson, R.
Dagnall, Ltd., S.
Danipad Rubber Co., Ltd.
Dibben & Sons, Ltd., W.
Distavox, Ltd.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
Electrical & Radio Products (1931), Ltd.
Electrical Devices Co.
Electriclocks & Radio, Ltd.
Electrocet Radio Co.
Electrolines, Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Falk Stadelmann & Co., Ltd.
Faraday Allwave Wireless, Ltd.
Fallowfield, Ltd., Jonathan.
Franklin & Freeman, Ltd.
Frost Radio Co.
Galt & Sons, R.
General Electric Co., Ltd.
Gould, Harper & Co., Ltd.
Great Western Radio Co.
Gresley Radio, Ltd.
Hunter & Co., H. K.
Hustler, Simpson & Webb, Ltd.
H. & B. Radio Co.
Imp Radio Co.
Impex Electrical, Ltd.
Improved Radio Co.
Innes, D. & G.
Johnson & Phillips, Ltd.
Kolster Brandes, Ltd.
Kone Dope Co.
Lamparex Electrical Supply Co.
Lanchester's Laboratories, Ltd.
Lawrence, P. Harold.
Lee-Castle Co.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Liverpool Radio Supplies.
London Electrical Co.
Lotus Radio, Ltd.
McMichael, Ltd., L.
Mæstrophone Radio Gramophone & Wireless Co.
Mains-Radio Mfg. Co.
Marconiphone Co., Ltd.
Marlborough Radio Co., Ltd.
Merrington Bros., Ltd.
Mic Wireless Co.
Northampton Plating Co.
Paramount Gramophone Co.
Philco.
Philips Lamps, Ltd.
Plessy Co., Ltd.
Portadyne Radio, Ltd.
Poupard & Co., Ltd., C. Haddon.
Psychon, Ltd.
Pye Radio, Ltd.
Radiomonic, Ltd.
Radio Services Co.
Radio Sundries Co.
Rees Mace Mfg. Co., Ltd.
Rolls Radio, Ltd.
Rooke Bros., Ltd.
R.M. Radio, Ltd.
Scott & Co., James.
Six Sixty Radio Co., Ltd.
Slektun Products, Ltd.
Smith (Radio), Ltd., Arthur.
Smurthwaite, F. W.
Spiers & Browne.
Standard Telephones & Cables, Ltd.
Stonehouse Radio Supplies.
Stratton & Co., Ltd.
Sunbeam Electric, Ltd.
Supertone Pianos, Ltd.
Tarry's.
Taylor, F.
Telsen Electric, Ltd.
Tonex Co.
Toubkin, J.
Unicfon, Ltd.
Union Radio Co., Ltd.
Walker, Fuller & Ellis, Ltd.
Wathes & Co., Ltd., T. H.
Wendell Radio, Ltd.
Whetton & L. Gold, G. P.
Whiteley Electrical Radio Co., Ltd.
Wilrose Co. (Birmingham), Ltd.
Wood, E. A.
Yagerphone, Ltd.
Yorkshire Radio Co.

RECEIVERS (valve, short wave).

Baty, E. J.
Blue Comet, Ltd.
British Ideal Patents, Ltd.
British Lumophon, Ltd.
British Radio Gramophone Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bulmer, Fred.
Burne-Jones & Co., Ltd.
Chalkley, C. G.
Custerson, R.
Dagnall, Ltd., S.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
Eastick & Sons, J. J.
Electrical Devices Co.
Electrocet Radio Co.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Fallowfield, Ltd., Jonathan.
Faraday Allwave Wireless, Ltd.
Gambrell Radio, Ltd.
General Electric Co., Ltd.
Godfrey (Radio), Ltd., F. E.
Hacker & Sons, H.
Haynes Radio.
Hunter & Co., H. K.
Hustler, Simpson & Webb, Ltd.
H. & B. Radio Co.
Innes, D. & G.
Kolster-Brandes, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electrical Co.
McMichael, Ltd., L.
Mains-Radio Mfg. Co.
Marlborough Radio Co., Ltd.
Merrington Bros., Ltd.
Paramount Gramophone Co.
Peto Scott Co., Ltd.
Philco.
Poupard & Co., Ltd., C. Haddon.
Pye Radio, Ltd.
Quartz Crystal Co.
Radio Services Co.
Radio Sundries Co.
Rooke Bros., Ltd.
Scott, Sessions & Co., G.
Smith (Radio), Ltd., Arthur.
Smurthwaite, F. W.
Spiers & Browne.
Standard Telephones & Cables, Ltd.
Stonehouse Radio Supplies.
Stratton & Co., Ltd.
Taylor, F.
Tecalemit Radio Co.
Union Radio Co., Ltd.
Wood, E. A.
Yagerphone, Ltd.
Yorkshire Radio Co.

RECEIVERS (valve, D.C. mains).

Aga Radio.
Alliance Radio, Ltd.
Automobile Accessories (Bristol), Ltd.
Balcombe, Ltd., A. J.

Baty, E. J.
Bijou Radio Co.
Bligh, S. W.
Blue Comet, Ltd.
British Blue Spot Co., Ltd.
British General Mfg. Co., Ltd
British Ideal Patents, Ltd.
British Lumophon, Ltd.
British Radiophone, Ltd.
Bulmer, Fred.
Burgoyne Wireless (1930), Ltd.
Burne-Jones & Co., Ltd.
Burton, C. F. & H.
Cifel Products, Ltd.
Clarke & Co. (Manchester), Ltd., H.
Climax Radio Electric, Ltd.
Cole, E. K., Ltd.
Columbia Graphophone Co., Ltd.
Contal Radio, Ltd.
Custerson, R.
Dagnall, Ltd., S.
Danipad Rubber Co., Ltd.
Dibben & Sons, Ltd., W.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
Edison Bell, Ltd.
Electrical & Radio Products (1931), Ltd.
Electriclocks & Radio, Ltd.
Electrolines, Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Epoch Radio Mfg. Co., Ltd.
Fallowfield, Ltd., Jonathan.
Faraday Allwave Wireless, Ltd.
Faraday Radio Gramophones, Ltd.
Franklin & Freeman, Ltd.
Frost Radio Co.
Gambrell Radio, Ltd.
General Electric Co., Ltd.
Godfrey (Radio), Ltd., F. E.
Goodwin Radio, Ltd.
Gould, Harper & Co., Ltd.
Great Western Radio Co.
Greatrex & Co., R. G.
Gramophone Co., Ltd.
Hacker & Sons, H.
Hart, Collins, Ltd.
Haynes Radio.
Howard, Thomas, & Co., Ltd.
Hunter & Co., H. K.
Hustler, Simpson & Webb, Ltd.
H. & B. Radio Co.
Kestrel Radio Supply Co.
Innes, D. & G.
Kolster-Brandes, Ltd.
Lamparex Electrical Supply Co.
Lee-Castle Co.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Liverpool Radio Supplies.
Loewe Radio Co., Ltd.
London Electrical Co.
Lotus Radio, Ltd.
McMichael, Ltd., L.
Mæstrophone Radio Gramophone & Wireless Co.
Mains Power Radio, Ltd.
Mains Radio Gramophones, Ltd.
Mains Radio Mfg. Co.
Marconiphone Co., Ltd.
Marlborough Radio Co., Ltd.
Master Radio Co.
Merrington Bros., Ltd.
Mic Wireless Co.
Paramount Gramophone Co.
Peace, Ltd., Henry.
Philco.
Philips Lamps, Ltd.
Philomel Radio Equipment Co.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Precision-Electric, Ltd.
Psychon, Ltd.
Pye Radio, Ltd.
Radiomonic, Ltd.
Radio Services Co.
Radio Sundries Co.
Realistic Speakers.
Rhapsody-Twin.
Rolls Radio, Ltd.
Rooke Bros., Ltd.
R.C. Radio Electric, Ltd.
R.M. Radio, Ltd.
Scott & Co., James.
Scott, Sessions & Co., G.
Smith (Radio), Ltd., Arthur.
Smurthwaite, F. W.
Spiers & Browne.
Standard Mfg. (Wireless) Co., Ltd.
Stonehouse Radio Supplies.
Sunbeam Electric, Ltd.
Supertone Pianos, Ltd.
Taylor, F.
Tecalemit Radio Co.
Tower Radio Supplies.
Tunewell Radio, Ltd.
Tyrela Electric, Ltd.
Ultra Electric, Ltd.
Unicfon, Ltd.
Union Radio Co., Ltd.
Varley.
Walker, Fuller & Ellis, Ltd.
Whetton & L. Gold, E. P.
Wood, E. A.
Yorkshire Radio Co.
Zimba Radio Co.

RECEIVERS (valve, A.C. mains).

Alliance Radio, Ltd.
Amplion (1932), Ltd.
Automobile Accessories (Bristol), Ltd.
Balcombe, Ltd., A. J.
Baty, E. J.
Beardsall & Co., Ltd., W. E.
Bell Piano Co., Ltd.
Bijou Radio Co.
Birmingham Sound Reproducers.
Bligh, S. W.
Blue Comet, Ltd.
Blundell-Curtis, Ltd.
British Clarion Co., Ltd.
British General Mfg. Co., Ltd.
British Ideal Patents, Ltd.
British Lumophon, Ltd.
British Radio Gramophone Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
Brodersen, A.
Brownie Wireless Co. of Gt. Britain, Ltd.
Bulmer, Fred.
Burgoyne Wireless (1930), Ltd.
Burndept, Ltd.
Burne-Jones & Co., Ltd.
Burton, C. F. & H.
Bush Radio, Ltd.
Cifel Products, Ltd.
Clarke & Co. (Manchester), Ltd., H.
Climax Radio Electric, Ltd.
Cole, E. K., Ltd.
Columbia Graphophone Co., Ltd.
Contal Radio, Ltd.
Cossor, Ltd.
Custerson, R.
Dagnall, Ltd., S.
Danipad Rubber Co., Ltd.
Detex (1931), Ltd.
Dibben & Sons, Ltd., W.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
Edison Bell, Ltd.
Electrical & Radio Products (1931), Ltd.
Electriclocks & Radio, Ltd.
Electrocet Radio Co.
Electrolines, Ltd.
Elliott Radio Mfg. Co., Ltd.
Epoch Radio Mfg. Co., Ltd.
Fallowfield, Ltd., Jonathan.
Faraday Allwave Wireless, Ltd.
Faraday Radio Gramophones, Ltd.
Ferranti, Ltd.
Franklin & Freeman, Ltd.
Frost Radio Co.
Gambrell Radio, Ltd.
General Electric Co., Ltd.
Gent & Co., Ltd.
Godfrey (Radio), Ltd., F. E.
Goodwin Radio, Ltd.
Gould, Harper & Co., Ltd.

PRODUCTS SUPPLIED

Gramophone Co., Ltd.
Great Western Radio Co.
Greatrex & Co., R. G.
Gresley Radio, Ltd.
Hacker & Sons, H.
Halford Radio, Ltd.
Hart Collins, Ltd.
Haynes Radio.
Howard, Thomas, & Co., Ltd.
Hustler, Simpson & Webb, Ltd.
Hunter & Co., H. K.
H. &. B Radio Co.
Imp Radio Co.
Impex Electrical, Ltd.
Innes, D. & G.
Johnson & Phillips, Ltd.
Kestrel Radio Supply Co.
Kolster-Brandes, Ltd.
Lamparex Electrical Supply Co.
Lawrence, P. Harold.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Liverpool Radio Supplies.
Loewe Radio Co., Ltd.
London Electrical Co.
Lotus Radio, Ltd.
McMichael, Ltd., L.
Maestro Radio.
Maestrophone Radio Gramophone & Wireless Co.
Mains Power Radio, Ltd.
Mains Radio Gramophones, Ltd.
Mains-Radio Mfg. Co.
Majestic Electric Co., Ltd.
Marconiphone Co., Ltd.
Marlborough Radio Co., Ltd.
Merrington Bros., Ltd.
Mic Wireless Co.
Mile End Radio Co.
Montague Radio Inventions & Development Co., Ltd.
Murdoch Trading Co.
M.P.A. Wireless (1930), Ltd.
Paramount Gramophone Co.
Paroussi, E.
Peace, Ltd., Henry.
Peto Scott Co., Ltd.
Philco.
Philips Lamps, Ltd.
Philomel Radio Equipment Co.
Plessey Co., Ltd.
Portadyne Radio, Ltd.
Poupard & Co., Ltd., C. Haddon.
Precision-Electric, Ltd.
Psychon, Ltd.
Pye Radio, Ltd.
Radio Instruments, Ltd.
Radiomonic, Ltd.
Radio Services Co.
Radio Sundries Co.
Realistic Speakers.
Rees Mace Mfg. Co., Ltd.
Regentone, Ltd.
Rhapsody-Twin.
Rooke Bros., Ltd.
Rothermel Corporation, Ltd.
R.C. Radio Electric, Ltd.
R.M. Radio, Ltd.
Scott & Co., James.
Scott Sessions & Co., G.
Smith (Radio) Ltd., Arthur.
Smurthwaite, F. W.
Sonochorde Reproducers, Ltd.
Spiers & Browne.
Standard Mfg. (Wireless) Co., Ltd.
Standard Telephones & Cables, Ltd.
Stonehouse Radio Supplies.
Stratton & Co., Ltd.
Sunbeam Electric, Ltd.
Supertone Pianos, Ltd.
Tarry's.
Taylor, F.
Tecalemit Radio Co.
Telsen Electric, Ltd.
Tonex Co.
Tower Radio Supplies.
Toubkin, J.
Tunewell Radio, Ltd.
Tyrela Electric, Ltd.
Ultra Electric, Ltd.
Umello, Ltd.
Unicfon, Ltd.
Union Radio Co., Ltd.
Varley.
Walker, Fuller & Ellis, Ltd.
Wathes & Co., Ltd., T. H.
Wendell Radio, Ltd.
Whetton & L. Gold, E. P.
Whitehall Radio Service Co.
Wood, E. A.
Yagerphone, Ltd.
Yorkshire Radio Co.
Zetavox Radio & Television, Ltd.

RECEIVERS
(valve, portable and transportable).

Adey Portable Radio.
Alliance Radio, Ltd.
Altham Radio Co.
Amplion (1932), Ltd.
Automobile Accessories (Bristol), Ltd.
Baker & Co., Ltd., G. F.
Bell Piano Co., Ltd.
Bijou Radio Co.
Blitz Bros.
Blue Comet, Ltd.
Blundell-Curtis, Ltd.
British Ideal Patents, Ltd.
British Radio Gramophone Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
Bulmer, Fred.
Burne-Jones & Co., Ltd.
Chalkley, C. G.
Climax Radio Electric, Ltd.
Columbia Graphophone Co., Ltd.
Contal Radio, Ltd.
Custerson, R.
Dagnall, Ltd., S.
Danipad Rubber Co., Ltd.
Detex (1931) Ltd.
Distavox, Ltd.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
Edison Bell, Ltd.
Electrical & Radio Products (1931), Ltd.
Electrical Devices, Ltd.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Falk, Stadelmann & Co., Ltd.
Faraday Allwave Wireless, Ltd.
Faraday Radio Gramophone, Ltd.
Goodwin Radio, Ltd.
Gramophone Co., Ltd.
Great Western Radio Co.
Greatrex & Co., R. G.
Gresley Radio, Ltd.
Harmonic Radio Co.
Hart-Collins, Ltd.
Hunter & Co., H. K.
Hustler, Simpson & Webb, Ltd.
H. & B. Radio Co.
Impex Electrical, Ltd.
Improved Radio Co.
Innes, D. & G.
Kone-Dope Co.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Liverpool Radio Supplies.
London Electrical Co.
Lotus Radio, Ltd.
McMichael, Ltd., L.
Maestrophone Radio, Gramophone & Wireless Co.
Mains Radio Gramophones, Ltd.
Mains-Radio Mfg. Co.
Mall Radio & Electric, Ltd.
Marconiphone Co., Ltd.
Marlborough Radio Co., Ltd.
Master Radio Co.
Merrington Bros., Ltd.
Mic Wireless Co.
Mile End Radio Co.

Montague Radio Inventions & Development Co., Ltd.
Paramount Gramophone Co.
Peto Scott Co., Ltd.
Plessey Co., Ltd.
Portadyne Radio, Ltd.
Poupard & Co., Ltd., C. Haddon.
Pye Radio, Ltd.
Radiomonic, Ltd.
Radio Services Co.
Radio Sundries Co.
Rees Mace Mfg. Co., Ltd.
Rhapsody-Twin.
Rigaut, J.
Rooke Bros., Ltd.
Scott, Sessions & Co., G.
Shalless & Evans.
Slektun Products, Ltd.
Smith (Radio) Ltd., Arthur.
Spencer Radio, Ltd.
Stonehouse Radio Supplies.
Supertone Pianos, Ltd.
Tarry's.
Tecalemit Radio Co.
Tower Radio Supplies.
Whetton & L. Gold, E. P.
Whitehall Radio Service Co.
Wood, E. A.
Yagerphone, Ltd.
Yorkshire Radio Co.
Zetavox Radio & Television, Ltd.

RECEIVERS (valve, supersonic).

Blue Comet, Ltd.
British Lumophon, Ltd.
British Pix Co., Ltd.
Burne-Jones & Co., Ltd.
Custerson, R.
Dagnall, Ltd., S.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
Edison Bell, Ltd.

Electrical Devices Co.
Elliott Radio Mfg. Co., Ltd.
Fallowfield, Ltd., Jonathan.
Faraday Allwave Wireless, Ltd.
Ferranti, Ltd.
Franklin & Freeman, Ltd.
Gambrell Radio, Ltd.
General Electric Co., Ltd.
Godfrey (Radio), Ltd., F.E.
Gramophone Co., Ltd.
Hacker & Sons, H.
Haynes Radio.
Hunter & Co., H. K.
H. & B. Radio Co.
Johnson & Phillips, Ltd.
Kolster-Brandes, Ltd.
Lever (Trix), Ltd., Eric J.
Liverpool Radio Supplies.
London Electrical Co.
McMichael, Ltd., L.
Maestrophone Radio Gramophone & Wireless Co.
Mains-Radio Mfg. Co.
Majestic Electric Co., Ltd.
Marconiphone Co., Ltd.
Merrington Bros., Ltd.
Mic Wireless Co.
Peto Scott Co., Ltd.
Philco.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pye Radio, Ltd.
Radio Instruments, Ltd.
Radiomonic, Ltd.
Radio Services Co.
Rees Mace Mfg. Co., Ltd.
Rothermel Corporation, Ltd.
Scott Sessions & Co., G.
Smith (Radio), Ltd., Arthur.
Smurthwaite, F. W.
Sonochorde Reproducers, Ltd.
Standard Telephones & Cables, Ltd.
Wood, E. A.
Yorkshire Radio Co.

RECTIFIERS (metal and dry contact).

Dyson & Co. (Works), Ltd., J.
Formo Co.
Merrington Bros., Ltd.
Partridge Wilson & Co.
Rectifiers, Ltd.
Supremus Specialities, Ltd.
Westinghouse Brake & Saxby Signal Co., Ltd.
Zenith Electric Co., Ltd.

RELAY APPARATUS

Automobile Accessories (Bristol), Ltd.
Bayliss, Ltd., W.
Birmingham Sound Reproducers.
Bullers, Ltd.
Coates, Ltd., J. G.
General Electric Co., Ltd.
Goodmans.
M.P.A. Wireless (1930), Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
Siemens-Schuckert (Gt. Britain), Ltd.
Standard Telephones & Cables, Ltd.

REMOTE CONTROL UNITS.

Bayliss, Ltd., W.
Bulgin & Co., Ltd., A. F.
Enderlein, E.
Lesingham, F. L.
Lotus Radio, Ltd.
Pearson Bros.
Plessey Co., Ltd.

REPAIRS
(headphone, receiver, transformer, etc).

Bayliss, Ltd., W.
Bligh, S. W.
British Radio Mfg. Co. (Liverpool), Ltd.
Colassi, W. L.
Dagnall, Ltd., S.
Dyson & Co. (Works), Ltd., J.
Electrolines, Ltd.
Fletcher & Co., Ltd., H. J.
Frost Radio Co.

PRODUCTS SUPPLIED

Gorman Radio Electric Service Depot.
Groves Bros.
H.C.H. Co.
London Electrical Co. (Sherbourne Lane), Ltd.
London Radio Electric Co.
Mason, E.
Mile End Radio Co.
National Radio Service Co.
Paramount Gramophone Co.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Scott Sessions & Co., G.
Tarry's.
Tonex Co.
Union Radio Co., Ltd.
Zenith Electric Co., Ltd.

REPETITION WORK.

Anglo Swiss Screw Co., Ltd.
Atalanta, Ltd.
Automobile Accessories (Bristol), Ltd.
Beddows, Ltd., J. G.
Bijou Radio Co.
Bligh, S. W.
British Hard Rubber Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
Brodersen, A.
Buck & Hickman, Ltd.
Busby & Co., Ltd.
B. & J. Wireless, Ltd.
Castle, T. L.
Christie & Sons, Ltd., Jas.
Custerson, R.
Davis & Timmins, Ltd.
Elvy & Anderson.
Eon Vacuum Wireless Co.
Fenriss (1932), Ltd.
Francois, E. J.
Gee (Birmingham), Ltd.
Graham Farish, Ltd.
Grayson & Co.
Harris, G. & R.
Henderson & Co., D. M. Ltd.
Holmes Bros. (London), Ltd.
Jackson Bros.
Lectro Linx, Ltd.
Lilley & Son, Ltd., S.
Limit Engineering Co., Ltd.
Limit Radio, Ltd.
Lissen, Ltd.
London Elec. Wire Co. & Smiths, Ltd.
Losonzci, E.
Marks & Son, S.
Merrington Bros., Ltd.
Meyer, E.
Mic Wireless Co.
Morton, Ltd., E. R.
Muller & Co. (England), Ltd.
M. C. L. & Repetition, Ltd.
Nicklin & Co., Ltd., J.
Ormond Engineering Co., Ltd.
Patton, Ltd., D. J.
Peace, Ltd., Henry.
Person & Son, L.
Porter, C. J.
Prideaux, Junr., R.
Reliance Mfg. Co. (Southwark), Ltd.
Righton & Co., Ltd., H.
Ross, Courtney & Co., Ltd.
Shearing, Ltd., A. E.
Simpsons Electricals, Ltd.
Skeldings, Ltd.
Spears & Co.
Standard Mfg Co. (Wireless), Ltd.
Sullivan, Ltd., H. W.
Telephone Mfg. Co., Ltd.
Toubkin, J.
Trelleborgs Ebonite Wks., Ltd.
True Screws, Ltd.
Wilkins & Wright, Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.
Wright & Weaire, Ltd.

R.C. COUPLING UNITS.

Abingdon Wireless Supplies.
Ashley Wireless Telephone Co. (1925), Ltd.
A.E.F. Manufacturing Co.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Carborundum Co., Ltd.
Castagnoli, G.
Dubilier Condenser Co. (1925), Ltd.
Elliott Radio Mfg. Co., Ltd.
Graham Farish, Ltd.
Harrison & Co., A. T.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Merrington Bros., Ltd.
Mile End Radio Co.
Pearson Bros. & Co.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Standard Telephones & Cables, Ltd.
Varley.
Wright & Weaire, Ltd.

RESISTANCES (heavy duty).

Abingdon Wireless Supplies.
Advance Components, Ltd.
Alpha Coil and Component Co.
Ashley Wireless Telephone Co. (1925), Ltd.
A.E.F. Manufacturing Co.
Bayliss, Ltd., W.
British Electric Resistance Co., Ltd.
British Resistor Co., Ltd.
Brodersen, A.
Bulgin & Co., Ltd., A. F.
Castagnoli, G.
Clarke & Co. (M'chester), Ltd.
Cordo Electric Products, Ltd.
Cressall Manufacturing Co.
Curtis Manufacturing Co., Ltd.
Daly, H. C.
Dubilier Condenser Co. (1925), Ltd.
Electric Depot, Ltd.
Elliott Radio Mfg. Co., Ltd.
Enderlein, E.
Erie Resistor, Ltd.
Ferranti, Ltd.
Franklin Elec., Ltd.
Frost Radio Co.
Howard Thomas & Co., Ltd.
Le Carbone, Ltd.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
London Elec. Wire Co. & Smiths, Ltd.
London Electrical Co. (Sherbourne Lane), Ltd.
Lyons, Ltd., Claude.
McLeod & McLeod.
Mansell & Ogan, Ltd.
Mile End Radio Co.
Peace, Ltd., Henry
Pearson Bros. & Co.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Pye Radio, Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
Rothermel Corporation, Ltd.
Rotor Electric, Ltd.
Siemens Schuckert (Gt. Britain), Ltd.
Sovereign Products, Ltd.
Standard Telephones and Cables, Ltd.
Varley.
Watmel Wireless Co., Ltd.
Wright & Weaire, Ltd.
Zenith Electric Co., Ltd.

RHEOSTATS.

Automatic Coil Winder & Elec. Equipment Co. Ltd.
A.E.F. Manufacturing Co.
British Electric Resistance Co., Ltd.
Brodersen, A.
Bruntons (Musselburg), Ltd.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Castagnoli, G.
Colvern, Ltd.
Cressall Mfg. Co.
Curtis Manufacturing Co., Ltd.

Eagle Engineering Co., Ltd.
Enderlein, E.
Hemelik, J.
Igranic Electric Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Elec. Wire Co. & Smiths, Ltd.
Lyons, Ltd., Claude.
Mansell & Ogan, Ltd.
Millet, J.
Nassak Manfacturing Co., Ltd.
Ormond Engineering Co., Ltd.
Pearson, Bros., & Co.
Plessey Co., Ltd.
Precision Radio & Mfg. Co., Ltd.
Radio Sundries Co.
Reliance Mfg. Co. (Southwark), Ltd.
Robinson & Co., Lionel.
Rotor Electric, Ltd.
Siemens Schuckert (Gt. Britain), Ltd.
Sovereign Products, Ltd.
Sullivan, Ltd., H. W.
Union Radio Co., Ltd.
Watmel Wireless Co., Ltd.
Wright & Weaire, Ltd.
Zenith Electric Co., Ltd.

SCREENS.

Andrews & Co., A. E.
Automobile Accessories (Bristol), Ltd.
Bayliss, Ltd., W.
Benjamin Electric, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Burne-Jones & Co., Ltd.
Castagnoli, G.
City Accumulator Co.
Colvern, Ltd.
Custerson, R.
Daly, H. C.
Ferranti, Ltd.
Francis, T. R.
Gee (Birmingham), Ltd.
Harrison & Co., A. T.
Hounslow & Co., C.
H. & B. Radio Co.
Ivory Electric, Ltd.
Jackson Bros.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electrical Co. (Sherbourne Lane), Ltd.
McWhirr, Paterson & Co.
Marks & Son, S.
Melbourne Radio Supply.
Mic Wireless Co.
Morton, Ltd., E. R.
Paroussi, E.
Peto-Scott Co., Ltd.
Plessey Co., Ltd.
Radio Sundries Co.
Sankey, & Sons, Ltd., J.
Shearing, Ltd., A. E.
Six-Sixty Radio Co., Ltd.
Speedwell Gearcase Co., Ltd.
Standard Mfg. (Wireless) Co., Ltd.
Telsen Electric Co., Ltd.
Tonex Co.
Union Radio Co., Ltd.
White Bros. & Jacobs, Ltd.
Whiteley Electrical Radio Co., Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.
Wright & Wealre, Ltd.

SELECTIVITY DEVICES.

Automobile Accessories (Bristol), Ltd.
Burne-Jones & Co., Ltd.
Custerson, R.
Eagle Engineering Co., Ltd.
Elliott Radio Mfg. Co., Ltd.
Ferranti, Ltd.
Franklin & Freeman, Ltd.
Gent & Co., Ltd.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Mic Wireless Co.
Peto-Scott Co., Ltd.
Pressland Products, Ltd.
Scott & Co., S. W.
Shearing, Ltd., A. E.
Sovereign Products, Ltd.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Wright & Weaire, Ltd.

SHORT WAVE COMPONENTS.

Bayliss, Ltd., W.
Berclif, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Colvern, Ltd.
Custerson, R.
Dubilier Condenser Co. (1925), Ltd.
Elliott Radio Mfg. Co., Ltd.
Franklin & Freeman, Ltd.
Graham Farish, Ltd.
H. &. B. Radio Co.
Igranic Electric Co., Ltd.
Jackson Bros.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Morton, Ltd., E. R.
Peto-Scott Co., Ltd.
Pooley, G. J.
Poupard & Co., Ltd., C. Haddon.
Precision Radio & Mfg. Co., Ltd.
Quartz Crystal Co.
Radio Gramophone Development Co., Ltd.
Radio Instruments, Ltd.
Radio Sundries Co.
Reliance Mfg. Co. (Southwark), Ltd.
Rotor Electric, Ltd.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Stonehouse Radio Supplies.
Stratton & Co., Ltd.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Wilkins & Wright, Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.
Wingrove & Rogers, Ltd.
Wright & Weaire, Ltd.
W.R.C., Ltd.

SLEEVING (insulating).

Attwater & Sons.
A.E.G. Electric Co., Ltd.
Brasse, Ltd.
Bromley-Langton Electric Wire & Insulator Co. Ltd.
Clarke & Co. (Manchester), Ltd., H.
Concordia Electric Wire Co., Ltd.
Elliott, E.
Elvy, C. L.
Franklin Electric, Ltd.
Frost Radio Co.
General Electric Co., Ltd.
Hart Bros. Electrical Mfg. Co., Ltd.
Hercus Mfg. Co.
Holzman, L.
Ivory Electric, Ltd.
London Electric Wire Co. & Smiths, Ltd.
McLeod & McLeod.
McWhirr, Paterson & Co.
Micanite & Insulators Co., Ltd.
Millet, J.
Ripaults, Ltd.
Robinson & Co., Lionel.
Rotor Electric, Ltd.
Saxonia Electrical Wire Co., Ltd.
Scott & Co., Ltd., G. L.
Spicers, Ltd.
Sterling Varnish Co.
Taylor & Petter, Ltd.
Toubkin, J.
Vandervelde, L.
Wright & Weaire, Ltd.

PRODUCTS SUPPLIED

SOLDERING MATERIALS.

Ardea Vulcaniser Syndicate, Ltd.
Automatic Coil Winder & Electric Equipment Co., Ltd.
British Insulated Cables, Ltd.
Buck & Hickman, Ltd.
Elephant Chemical Co., Ltd.
Elmesan (London), Ltd.
Fluxite, Ltd.
Gre-Solvent.
Hercus Mfg. Co.
Igranic Electric Co., Ltd.
Improved Wilson Microphone & Electrical Co., Ltd.
Johnson Matthey & Co., Ltd.
Righton & Co., Ltd., D.
R.C. Radio Electric, Ltd.

SPEAKERS (cone type).

Amplion (1932), Ltd.
Appletons (Leeds), Ltd.
Automobile Accessories (Bristol), Ltd.
Baty, E. J.
Beardsall & Co., Ltd., W. E.
British Blue Spot Co., Ltd.
British Radiophone, Ltd.
Celestion, Ltd.
Chorlton Metal Co., Ltd.
Colassi, W. L.
Columbia Graphophone Co., Ltd.
Contal Radio, Ltd.
Cossor, Ltd.
Custerson, R.
Dent & Co. & Johnson, Ltd.
Dibben & Sons, Ltd., W.
Donophone.
Dr. Nesper, Ltd.
Duray.
Eagle Engineering Co., Ltd.
Edison Swan Electric Co., Ltd.
Elektra Supplies.
Falk Stadelmann & Co., Ltd.
Film Industries, Ltd.
Frost Radio Co.
Goodmans.
Goodwin Radio, Ltd.
Graham Farish, Ltd.
Grampian Reproducers, Ltd.
Ivory Electric, Ltd.
Joseph, H.
Kolster-Brandes, Ltd.
Kone-Dope Co.
Lissen, Ltd.
Loewe Radio Co., Ltd.
Londona, Ltd.
Loud Speaker Engineering Co., Ltd.
Mackintosh & Co., E. V.
Marconiphone Co., Ltd.
Marks & Son, S.
Nassak Mfg. Co., Ltd.
Olympia Radio, Ltd.
Ormond Engineering Co., Ltd.
Paramount Gramophone Co.
Pearson Bros. & Co.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Radio Services Co.
Radio Sundries Co.
Rees Mace Mfg. Co., Ltd.
Reproducers & Amplifiers, Ltd.
Ripaults, Ltd.
Rotor Electric, Ltd.
Shalless & Evans.
Shapland & Petter, Ltd.
Siemens-Schuckert (Gt. Brit.), Ltd.
Six-Sixty Radio Co., Ltd.
Slektun Products, Ltd.
Smith (Radio), Ltd., A.
Sovereign Products, Ltd.
Spalton Electrical Stores, Ltd.
Squire, Frederick, Ltd.
Standard Telephones & Cables, Ltd
Storey, F. M.
Supertone Radio Mfg. Co.
Tekade Radio & Electric, Ltd.
Thompson, Diamond & Butcher.
Toubkin, J.
Triotron Radio Co., Ltd.
Whiteley Electrical Radio Co., Ltd.
Wilrose Co. (B'ham), Ltd.
Wood, E. A.
W.R.C. Ltd.
Yorkshire Radio Co.

SPEAKERS (inductor dynamic).

British Blue Spot Co., Ltd.
Brodersen, A.
Contal Radio, Ltd.
Custerson, R.
Fay Home Recorders, Ltd.
Ferranti, Ltd.
Film Industries, Ltd.
General Electric Co., Ltd.
Grampian Reproducers, Ltd.
Hemelik, J.
Joseph, H.
Nassak Mfg Co., Ltd.
Philips Industrial.
Poupard & Co., Ltd., C. Haddon.
Radio Sundries Co.
Realistic Speakers.
Rotor Electric, Ltd.
Smith (Radio), Ltd., A.
Spalton Electrical Stores, Ltd.
Squire, Frederick, Ltd.
Toubkin, J.
Wilrose Co. (B'ham), Ltd.

SPEAKERS, MOVING COIL (P.M. TYPE).

Aerialite, Ltd.
Amplion (1932), Ltd.
Appletons (Leeds), Ltd.
Automobile Accessories (Bristol), Ltd.
Baker's Selhurst Radio.
Beardsall & Co., Ltd., W. E.
British Blue Spot Co., Ltd.
British Lumophon, Ltd.
British Rola Co., Ltd.
Celestion, Ltd.
Chorlton Metal Co., Ltd.
Clarith Reproducers, Ltd.
Clarke & Co. (M'chester), Ltd., H.
Contal Radio, Ltd.
Dent & Co., and Johnson, Ltd.
Donophone.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Edison Swan Elec. Co., Ltd.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg. Co., Ltd.
Epoch Radio Mfg. Co., Ltd.
Ferranti, Ltd.
Film Industries, Ltd.
Gambrell Radio, Ltd.
General Electric Co., Ltd.]
Gent & Co., Ltd.
Goodmans.
Grampian Reproducers, Ltd.
Gramophone Co., Ltd.
Harlie, Ltd.
Hicking, H. B.
Igranic Electric Co., Ltd.
Johnson & Phillips, Ltd.
Joseph, H.
Knopf, A.
Kolster-Brandes, Ltd.
Lamplugh, Ltd., S. A.
Lanchester Laboratories, Ltd.
Lang & Squire, Ltd.
Lissen, Ltd.
Loewe Radio, Co., Ltd.
Londona, Ltd.
L. S. Units.
Magnavox (Gt. Britain), Ltd.
Marconiphone Co., Ltd.
Nuvolion Electrics, Ltd.
Ormond Engineering Co., Ltd.
Paramount Gramophone Co.
Paroussi, E.
Pearson Bros. & Co.
Philco.

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PRODUCTS SUPPLIED

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Philips Industrial.
Philips Lamps, Ltd.
Porter, C. J.
Pye Radio, Ltd.
Radio Gramophone Development Co., Ltd.
Realistic Speakers.
Reproducers & Amplifiers, Ltd.
Rothermel Corporation, Ltd.
Rotor Electric, Ltd.
Siemens-Schuckert (Gt. Brit.), Ltd.
Smith (Radio), Ltd., A.
Sonochorde Reproducers, Ltd.
Squire, Ltd., F.
Standard Telephones & Cables, Ltd.
Star Engineering.
Stratton & Co., Ltd.
Tarry's.
Tekade Radio & Electric, Ltd.
Thompson, Diamond & Butcher.
Toubkin, J.
Triotron Radio Co., Ltd.
Ultra Electric, Ltd.
Walker, Fuller & Ellis, Ltd.
Webber, Ltd., R. A.
Whiteley Electrical Radio Co., Ltd.
Wilrose Co. (B'ham), Ltd.
W.R.C., Ltd.
Yagerphone, Ltd.

SPEAKERS, MOVING COIL (ENERGISED).

Automobile Accessories (Bristol), Ltd.
Baker's Selhurst Radio.
British Lumophon, Ltd.
British Rola Co., Ltd.
Celestion, Ltd.
Clarke & Co. (Manchester), Ltd., A.
Columbia Graphophone Co., Ltd.
Contal Radio, Ltd.
Cossor, Ltd.
Dibben & Sons, Ltd., W.
East Ham Wireless Supplies.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Electriclocks & Radio, Ltd.
Epoch Radio Mfg. Co., Ltd.
Fay Home Recorders, Ltd.
Ferranti, Ltd.
Forbat, E.
General Electric Co., Ltd.
Godfrey (Radio), Ltd., F. E.
Goodmans.
Grampian Reproducers, Ltd.
Harlie, Ltd.
Hicking, H. B.
Igranic Electric Co., Ltd.
Johnson & Phillips, Ltd.
Joseph, H.
Kolster-Brandes, Ltd.
Lang & Squire, Ltd.
Lissen, Ltd.
Maestrophone Radio Gramophone & Wireless Co.
Magnavox (Gt. Britain), Ltd.
Mains Radio Gramophones, Ltd.
Marconiphone Co., Ltd.
Midgely-Leighton, Ltd.
Nuvolion Electrics, Ltd.
Ormond Engineering Co., Ltd.
Paramount Gramophone Co.
Paroussi, E.
Pearson Bros. & Co.
Philips Industrial.
Porter, C. J.
Poupard & Co., Ltd., C. Haddon.
Pye Radio, Ltd.
Radio Gramophone Development Co., Ltd.
Radio Sundries Co.
Realistic Speakers.
Reproducers & Amplifiers, Ltd.
Rothermel Corporation, Ltd.
Rotor Electric, Ltd.
Siemens-Schuckert (Gt. Britain), Ltd.
Sonochorde Reproducers, Ltd.
Spalton Electrical Stores, Ltd.
Squire, Frederick, Ltd.
Standard Telephones & Cables, Ltd.
Stratton & Co., Ltd.
Tarry's.
Tekade Radio & Electric, Ltd.
Toubkin, J.
Triotron Radio Co., Ltd.
Ultra Electric, Ltd.
Webber, Ltd., R. A.
Whiteley Electrical Radio Co., Ltd.
Wilrose Co. (Birmingham), Ltd.,
W.R.C., Ltd.

SPEAKERS (cones for).

Automobile Accessories (Bristol), Ltd.
Bridger & Co., R. O.
British Blue Spot Co., Ltd.
Celestion, Ltd.
Colassi, W. L.
Custerson, R.
Dr. Nesper, Ltd.
Dux Chemical Solutions Co., Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Elektra Supplies.
Fenriss (1932), Ltd.
Goodmans.
Graham Farish, Ltd.
Grampian Reproducers, Ltd.
Ivory Electric, Ltd.
Johnstone, C. G.
Knopf, A.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
McLeod & McLeod.
Olympia Radio, Ltd.
Ormond Engineering Co., Ltd.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Radio Sundries Co.
Rees Mace Mfg. Co., Ltd.
Reproducers & Amplifiers, Ltd.
Rothermel Corporation, Ltd.
Rotor Electric, Ltd.
R. C. Radio Electric, Ltd.
Six-Sixty Radio Co., Ltd.
Spalton Electrical Stores, Ltd.
Sylvex, Ltd.
Toubkin, J.
Walter, Ltd., J. & H.
Whiteley Electrical Radio Co., Ltd.
Wood, E. A.

SPEAKER UNITS, CONE.

Automobile Accessories (Bristol), Ltd.
Beardsall & Co., Ltd., W. E.
Bowerman, Ltd., G.
British Blue Spot Co., Ltd.
British Radiophone, Ltd.
Celestion, Ltd.
Colassi, W. L.
Contal Radio, Ltd.
Custerson R.
Dr. Nesper, Ltd.
Eagle Engineering Co., Ltd.
East Ham Wireless Supplies.
General Electric Co., Ltd.
Goodmans.
Goodwin Radio, Ltd.
Graham Farish, Ltd.
Grampian Reproducers, Ltd.
Ivory Electric, Ltd.
Johnson & Phillips, Ltd.
Joseph, H.
Kalisky (Aldgate), Ltd., S.
Knopf, A.
Limit Radio, Ltd.
Lissen, Ltd.
Marks & Son, S.
Nassak Mfg. Co., Ltd.
Olympia Radio, Ltd.
Ormond Engineering Co., Ltd.
Pearson Bros. & Co.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Radio Sundries Co.
Rees Mace Mfg. Co., Ltd.

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ROLA

Rola Speakers are
The Outcome of 9 Years Acoustical Research.

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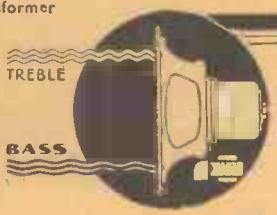

THE
BRITISH ROLA Co., Ltd.
Brondesbury Works,
179, High Road, Kilburn, N.W.6
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PRODUCTS SUPPLIED

[*Continued from page* 298.]

Reproducers & Amplifiers, Ltd.
Rooke Bros., Ltd.
Rotor Electric, Ltd.
Six-Sixty Radio Co., Ltd.
Slektun Products, Ltd.
Spalton Electrical Stores, Ltd.
Supertone Radio Mfg. Co.
Tekade Radio & Electric, Ltd.
Telsen Electric Co., Ltd.
Toubkin, J.
Triotron Radio Co., Ltd.
Walter, Ltd., J., & H.
Whiteley Electrical Radio Co., Ltd.
Wood, E. A.
Yagerphone, Ltd.
Yorkshire Radio Co.

SPEAKER CHASSIS, MOVING COIL

British Blue Spot Co., Ltd.
British Rola Co., Ltd.
Celestion, Ltd.
Cossor, Ltd., A. C.
Custerson, R.
Dent & Co., & Johnson, Ltd.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Epoch Radio Mfg. Co., Ltd.
Eta Tool Co.
Ferranti, Ltd.
General Electric Co.,Ltd.
Goodmans.
Grampian Reproducers, Ltd.
Knopf, A.
Kolster-Brandes, Ltd.
Lanchester's Laboratories, Ltd.
Lissen, Ltd.
Maestrophone Radio Gramophone & Wireless Co.
Magnavox (Great Britain), Ltd.
Mains Radio Gramophones, Ltd.
Marconiphone Co., Ltd.
Nassak Manufacturing Co., Ltd.
Nuvolion Electrics, Ltd.
Pearson Bros., & Co.
Perks & Co., H.
Philips Industrial.
Porter, C. J.
Poupard & Co., Ltd., C. Haddon.
Primus Mfg. Co.
Radio Sundries Co.
Reproducers & Amplifiers, Ltd.
Rotor Electric, Ltd.
Sankey & Sons, Ltd., J.
Smith (Radio) Ltd., A.
Spalton Electrical Stores, Ltd.
Standard Telephones & Cables, Ltd.
Star Engineering.
Toubkin, J.
Walker, Fuller & Ellis, Ltd.
Webber, Ltd., R. A.
Whiteley Electrical Radio Co., Ltd.
Wood, E. A.

STAMPINGS.

Aladdin Gramophone & Accessories Co.
Andrews & Co., A. E.
Ashley Wireless Telephone Co. (1925), Ltd.
Automobile Accessories (Bristol) Ltd.
Beddoes, Ltd., J. G.
Benjamin Electric, Ltd.
Bijou Radio Co.
Birmingham Products, Ltd.
British Ideal Patents, Ltd.
British Pens, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
Burne-Jones & Co., Ltd.
Busby & Co., Ltd.
Celluloid Printers, Ltd.
Custerson, R.
Daly, H. C.
Elldons.
Elvy, C. L.
Elvy & Anderson.
Ernest Turnel Electrical Instruments, Ltd.
Fenriss (1932), Ltd.
Francois, E. J.
Frost Radio Co.
Gee (Birmingham), Ltd.
Goodmans.
Graham Farish, Ltd.
Gresley Radio, Ltd.
Harris & Co. (Birminghan) Ltd., A. E.
Harris, G. & R.
Jackson Bros.
Johnson Matthey & Co., Ltd.
Junit Manufacturing Co., Ltd.
Lilley & Son, Ltd., S.
Limit Engineering Co., Ltd.
Limit Radio, Ltd.
Line & Co., F.
Lissen, Ltd.
Losonzei, E.
Magnetic & Electrical Alloys, Ltd.
Manor Works, Co.
Marks & Son, S.
Morton, Ltd., E. R.
Nicklin & Co., Ltd., J.
Patton, Ltd., D. J.
Person & Son, L.
Pioneer Mfg. Co.
Plessey Co., Ltd.
Radio Sundries, Co.
Remus Co., Ltd.
Ross, Courtney & Co., Ltd.
Sankey & Sons, Ltd., Joseph.
Scott & Co., Ltd., G. L.
Shearing, Ltd., A. E.
Simpson Electricals, Ltd.
Skeldings, Ltd.
Sound Sales, Ltd.
Sovereign Products, Ltd.,
Spears & Co.
Speedwell Gearcase Co., Ltd.
Standard Mfg. (Wireless) Co., Ltd.
Telephone Mfg. Co., Ltd.
Toubkin, J.
True Screws, Ltd.
Walter, Ltd., J. & H.
Whiteley Electrical Radio Co., Ltd.
Wilkins & Wright, Ltd.
Williams & Gray, Ltd.
Williams & Moffat, Ltd.
Wright & Weaire, Ltd.
Zenith Electric Co., Ltd.

SUPERSONIC COMPONENTS.

Berclif, Ltd.
Custerson, R.
Elliott Radio Mfg. Co., Ltd.
Igranic Electric Co., Ltd.
Merrington Bros., Ltd.
Mic Wireless Co.
Morton, Ltd., E. R.
Plessey Co., Ltd.
Rees Mace Mfg. Co., Ltd.
Shearing, Ltd., A. E.
Wright & Weaire, Ltd.

SWITCHES (multiple).

Automobile Accessories (Bristol), Ltd.
British Ideal Patents, Ltd.
Brodersen, E. A.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Castagnoli, G.
Chalkley, C. G.
Chorlton Metal Co., Ltd.
Christie & Sons, Ltd., Jas.
Custerson, R.
Danipad Rubber Co., Ltd.
Enderlein, E.
Francois, E. J.
Franklin Elec. Ltd.
Goodmans.
Harlie, Ltd.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Junit Mfg. Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Commercial Elec Stores, Ltd.
Lotus Radio, Ltd.

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PRODUCTS SUPPLIED

[*Continued from page* 300.]

Lundberg & Sons, Ltd., A. P.
Lyons, Ltd., Claude.
McLeod & McLeod.
Melbourne Radio Supply.
Mic Wireless Co.
Millet. J.
Morton, Ltd., E. R.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Park Royal Engineering Co., Ltd.
Person & Son, L.
Plessey, Co., Ltd.
Pye Radio, Ltd.
Radio Sundries Co.
Reliance Mfg. Co. (Southwark) Ltd.
Rooke Bros., Ltd.
Rose & Son, Ltd., T. A.
Rotor Electric, Ltd.
Service Equipment Co., Ltd.
Shearing, Ltd., A. E.
Six-Sixty Radio Co., Ltd.
Solidite & Synthetic Mouldings, Ltd.
Sovereign Products, Ltd.
Telephone Mfg. Co., Ltd.
Union Radio Co., Ltd.
Walter, Ltd., J. & H.
Whiteley Electrical Radio Co., Ltd.
Wilkins & Wright, Ltd.
Wright & Weaire, Ltd.
W.R.C., Ltd.

SWITCHES (push-pull).

Advance Components, Ltd.
Andrews & Co., A. E.
Benjamin Electric, Ltd.
Brodersen, A.
Bulgin & Co., Ltd., A. F.
Busby & Co., Ltd.
Cadisch & Sons, R.
Castagnoli, G.
Certex Products.
Chorlton Metal Co., Ltd.
Christie & Sons, Ltd., Jas.
Coates, Ltd., J. G.
Cook & Co., H. S.
Custerson, R.
Danipad Rubber Co., Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Edmonds, Ltd., G.
Enderlein, E.
Francis, T. R.
Francois, E. J.
Goodmans.
Graham Farish, Ltd.
Gripso Co.
Harrison & Co., A. T.
Hewitt, Ltd., A. J.
Hill, Ltd., E. H.
Igranic Electric Co., Ltd.
Imp Radio Co.
Ivory Electric, Ltd.
Jewel Pen Co., Ltd.
Junit Manufacturing Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lilley & Son, Ltd., S.
Lissen, Ltd.
Lotus Radio, Ltd.
Lundberg & Sons, Ltd., A. P.
Lyons, Ltd., Claude.
McLeod & McLeod.
McWhirr, Paterson & Co.
Millet, J.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Park Royal Engineering Co., Ltd.
Person & Son, L.
Pioneer Mfg. Co.
Plessey Co., Ltd.
Precision Radio & Mfg. Co., Ltd.
Radio Sundries Co.
Ready Radio, Ltd.
Richardsons (R.M.L.), Ltd.
Rooke Bros., Ltd.
Rose & Son, Ltd., T. A.
Rotor Electric, Ltd.
Saxon Radio Co.
Scott & Co., S. W.
Shearing, Ltd., A. E.
Sovereign Products, Ltd.
Telsen Electric Co., Ltd.
Tunewell Radio, Ltd.
Whiteley Electrical Radio Co., Ltd.
Wilkins & Wright, Ltd.
Wright & Weaire, Ltd.
W.R.C., Ltd.

SWITCHES (other).

Aladdin Gramophone & Accessories Co.
Altham Radio Co.
Automobile Accessories (Bristol), Ltd.
British General Mfg. Co., Ltd.
Brodersen, A.
Bromley-Langton Electric Wire & Insulator Co., Ltd.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Castagnoli, G.
Chalkley, C. G.
Chorlton Metal Co., Ltd.
Christie & Sons, Ltd., Jas.
Colvern, Ltd.
Cook & Co., H. S.
Crabtree & Co., Ltd., J. A.
Custerson, R.
Danipad Rubber Co., Ltd.
Eastick & Sons, J. J.
Edmonds, Ltd., G.
Elliott, E.
Enderlein, E.
Ferranti, Ltd.
Francis, T. R.
Franklin & Freeman, Ltd.
Franklin Elec., Ltd.
Gec (Birmingham), Ltd.
General Electric Co., Ltd.
Goodmans.
Harlie, Ltd.
Harris, G. & R.
Hewitt, Ltd., A. J.
Holzman, L.
Igranic Electric Co., Ltd.
Joseph, H.
Junit Mfg. Co., Ltd.
Lesingham, F. L.
Lever (Trix), Ltd., Eric J.
Lotus Radio, Ltd.
Lundberg & Sons, Ltd., A. P.
Lyons, Ltd., Claude.
McLeod & McLeod.
Melbourne Radio Supply.
Mic Wireless Co.
Millet, J.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Pioneer Mfg. Co.
Plessey Co., Ltd.
Pye Radio, Ltd.
Radio Sundries Co.
Ready Radio, Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
Rooke Bros., Ltd.
Rose & Son, Ltd., T. A.
Rotor Electric, Ltd.
Service Equipment Co., Ltd.
Shearing, Ltd., A. E.
Solidite & Synthetic Mouldings, Ltd.
Sullivan, Ltd., H. W.
Toubkin, J.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Venner Time Switches, Ltd.
Whiteley Electrical Radio Co., Ltd.
Wilkins & Wright, Ltd.
Wilkinson, L.
Wright & Weaire, Ltd.
W.R.C., Ltd.

TAPE (insulating).

Attwater & Sons.
A.E.G. Electric Co., Ltd.
Blue Comet, Ltd.
British Central Electrical Co., Ltd.

British Insulated Cables, Ltd.
Bromley-Langton Elec. Wire & Insulator Co., Ltd.
Clarke & Co. (Manchester), Ltd.
Connollys (Blackley), Ltd.
Elephant Chemical Co., Ltd.
General Electric Co., Ltd.
Hellesens, Ltd.
Hercus Mfg. Co.
Imp Radio Co.
India Rubber, Gutta Percha & Telegraph Wks. Co., Ltd.
Ioco Rubber & Waterproofing Co., Ltd.
Ivory Electric, Ltd.
London Elec. Wire Co. & Smiths, Ltd.
McLeod & McLeod.
McWhirr, Paterson & Co.
Moores & Co., J.
Pomona Rubber Co.
Redferns Rubber Works, Ltd.
Ripaults, Ltd.
St. Helens Cable & Rubber Co., Ltd.
Saxonia Electrical Wire Co., Ltd.
Service Equipment Co., Ltd.
Spicers, Ltd.
Standard Insulator Co., Ltd.
Toubkin, J.
Wilkinson, L.
Wilmott, Son & Phillips, Ltd.
Wood, E. A.

TERMINALS AND CONNECTORS.

Andrews & Co., A. E.
Anglo-Swiss Screw Co., Ltd.
Belling & Lee, Ltd.
Birmingham Products, Ltd.
Bulgin & Co., Ltd., A. F.
Castle, T. L.
Certex Products.
Clarkes (Redditch), Ltd.
Colvern, Ltd.
Crystalate Gramophone Record Mfg. Co., Ltd.
Davis & Timmins, Ltd.
Eastick, J. J. & Sons.
Edmonds, Ltd., G.
Francois, E. J.
Gee (Birmingham), Ltd.
Goodmans.
Gripso Co.
Harris, G. & R.
Hercus Mfg. Co.
Igranic Electric Co., Ltd.
Jackson Bros. (London), Ltd.
Lectro Linx, Ltd.
Lever (Trix), Ltd., Eric J.
Lilley & Son, Ltd., S.
Lisenin Wireless Co.
Lissen, Ltd.
McLeod & McLeod.
McWhirr, Paterson & Co.
Marks & Son, S.
Meyer & Co., E.
Muller & Co. (England), Ltd.
M.C.L. and Repetition, Ltd.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Plessey Co., Ltd.
Prideaux, Junr., R.
Radio Sundries Co.
Righton & Co., Ltd., H.
Rose & Son, Ltd., T. A.
Ross, Courtney & Co., Ltd.
Shearing, Ltd., A. E.
Spears & Co.
Standard Telephones & Cables, Ltd.
Toubkin, J.
True Screws, Ltd.
Ward & Goldstone, Ltd.
Wilburn & Co.
Wilkins & Wright, Ltd.
Wood, E. A.
Wright & Weaire, Ltd.

TINSEL (for speakers).

Altham Radio Co.
Ashton & Co. (Est. 1787), Ltd.
Frost Radio Co.
Hart Bros. Electrical Manufacturing Co., Ltd.
Hercus Mfg. Co.
Ivory Electric, Ltd.
Lever (Trix), Ltd., Eric J.
Olympia Radio, Ltd.
Pioneer Mfg. Co.
Saxonia Electrical Wire Co., Ltd.
Sylvex, Ltd.
Toubkin, J.
Wilkinson, L.
Wood, E. A.

TONE CONTROLS.

Burne-Jones & Co., Ltd.
Custerson, R.
Eagle Engineering Co., Ltd.
Harlie, Ltd.
Hemelik, J.
Junction Engineering Co., Ltd.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
London Electrical Co. (Sherbourne Lane), Ltd.
Lyons, Ltd., Claude.
Merrington Bros., Ltd.
Millet, J.
Paroussi, E.
Pearson Bros. & Co.
Posthlewaite Bros.
Radio Instruments, Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
Rothermel Corporation, Ltd.
Smith (Radio), Ltd., A.
Sovereign Products, Ltd.
Tunewell Radio, Ltd.
Wright & Weaire, Ltd.

TOOLS.

Atalanta, Ltd.
Benoit, M.
Bi-Metals.
Britannia Lathe & Oil Engine Co., Ltd.
British Ideal Patents, Ltd.
Buck & Hickman, Ltd.
Custerson, R.
Elldons.
Ellin (Footprint Works), Ltd., Thos. R.
Eta Tool Co.
Frys (London), Ltd.
Grayson & Co.
Harris, G. & R.
Harrison & Co., A. T.
Henderson & Co., D. M., Ltd.
Junit Mfg. Co., Ltd.
Lehmann, Archer & Co., Ltd.
Line & Co., F.
McLeod & McLeod.
Marks & Son, S.
Person & Son, L.
Philomel Radio Equipment Co.
Plessey Co., Ltd.
Precision Radio Mfg. Co., Ltd.
Radio Sundries Co.
Simpson's Electricals, Ltd.
Whiteley Elec. Radio Co., Ltd.
Wright & Weaire, Ltd.

TRANSFERS.

Eagle Transfer, Ltd.
General Electric Co., Ltd.
Hewett & Co., W.
Plessey Co., Ltd.

TRANSFORMERS H.F.

Alpha Coil & Component Co.
Ashley Wireless Telephone Co. (1925), Ltd.
Bayliss, Ltd., W.
Berclif, Ltd.
British General Manufacturing Co., Ltd.
British Ideal Patents, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
Bullphone, Ltd.
Burne-Jones & Co., Ltd.
B. & J. Wireless, Ltd.
Castagnoli, G.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Cordo Electrical Products, Ltd.
Custerson, R.
Daly, H. C.
Dyson & Co. (Wks.), Ltd., J.
Eagle Engineering Co., Ltd.

PRODUCTS SUPPLIED

Elliott Radio Mfg. Co., Ltd.
Emkabe Radio Co., Ltd.
Faraday Allwave Wireless, Ltd.
Ferranti, Ltd.
Franklin & Freeman, Ltd.
Great Western Radio Co.
Gresley Radio, Ltd.
Groves, Bros.
Igranic Electric Co., Ltd.
Johnson & Phillips, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Electric Wire Co. & Smiths, Ltd.
London Radio-Electric Co.
Lotus Radio, Ltd.
Mains Radio Gramophones, Ltd.
Merrington Bros., Ltd.
Mile End Radio Co.
Nassak Mfg. Co., Ltd.
Ormond Engineering Co., Ltd.
Peace, Ltd., Henry.
Peto-Scott Co., Ltd.
Philips Industrial
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Produots, Ltd.
Realistic Speakers.
Rooke Bros., Ltd.
Scott & Co., S. W.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Smith (Radio) Ltd., A.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Stratton & Co., Ltd.
Supertone Pianos, Ltd.
Telsen Electric Co., Ltd.
Tonex, Co.
Tunewell Radio, Ltd.
Varley.
Whiteley Elec. Radio Co., Ltd.
Wilson, W. H.
Wright & Weaire, Ltd.
W.R.C., Ltd.

TRANSFORMERS L.F.

Ashley Wireless Telephone Co. (1925), Ltd.
Bayliss, Ltd., W.
Benjamin Electric, Ltd.
Birmingham Sound Reproducers.
Bowyer, Lowe, & A. E. D., Ltd.
British General Mfg. Co., Ltd.
British Ideal Patents, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
Bulgin & Co., Ltd., A. F.
Bullphone Radio, Ltd.
B. & J. Wireless, Ltd.
Castagnoli, G.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd.
Climax Radio Electric, Ltd.
Concerton Radio & Electrical Co., Ltd.
Cossor, Ltd.
Custerson, R.
Daly, H. C.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg. Co., Ltd.
Emkabe Radio Co., Ltd.
Epoch Radio Mfg. Co., Ltd.
Ferranti, Ltd.
Formo Co.
Frost Radio Co.
General Electric Co., Ltd.
Gent & Co., Ltd.
Goodwin Radio, Ltd.
Graham Farish, Ltd.
Great Western Radio Co.
Gresley Radio, Ltd.
Heayberd & Co., F. C.
Hewitt, Ltd., A. J.
Hill & Co., F.C.
Igranic Electric Co., Ltd.
Johnson & Phillips, Ltd.
Kalisky (Aldgate), Ltd., S.
Lanchester Laboratories, Ltd.
Lee-Castle Co.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
London Elec. Wire Co. & Smiths, Ltd.
London Radio-Electric Co.
Lotus Radio., Ltd.
Lyons, Ltd., Claude.
Magnacore, Ltd.
Merrington Bros., Ltd.
Mile End Radio Co.
Multitone Electric Co., Ltd.
Nassak Mfg. Co., Ltd.
Northampton Plating Co.
Ormond Engineering Co., Ltd.
Partridge & Mee, Ltd.
Peace, Ltd., Henry.
Philips Industrial.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Powertone Products.
Pressland Products, Ltd.
Pye Radio, Ltd.
Radio Instruments, Ltd.
Radio Sundries Co.
Ready Radio, Ltd.
Rooke Bros., Ltd.
Rothermel Corporation, Ltd.
Scott Sessions & Co., G.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Smith (Radio), Ltd., A.
Sovereign Products, Ltd.
Stadium, Ltd.
Standard Telephones & Cables, Ltd.
Star Engineering.
Telephone Mfg. Co., Ltd.
Telsen Electric Co., Ltd.
Tonex Co.
Toubkin, J.
Tunewell Radio, Ltd.
Varley.
Whitley Elec. Radio Co., Ltd.
Wilson, W. H.
W.R.C., Ltd.
Yagerphone, Ltd.
Zenith Electric Co., Ltd.

TRANSFORMERS (mains).

Alpha Coil & Component Co.
Ashley Wireless Telephone Co. (1925), Ltd.
Austin Mills & Co.
Bayliss, William, Ltd.
Birmingham Sound Reproducers.
British General Manufacturing Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
Burndept, Ltd.
B. & J. Wireless, Ltd.
Castagnoli, G.
Chester Bros.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Climax Radio Electric, Ltd.
Coates, Ltd., J. G.
Commercial Eng. Co.
Custerson, R.
Daly, H. C.
Dyson & Co. (Wks.), Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Edwards & Co., E.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg. Co., Ltd.
Emkabe Radio Co., Ltd.
Fel-Ectric Radio.
Ferranti, Ltd.
Formo Co.
Franklin & Freeman, Ltd.
Frost Radio Co.
Gent & Co., Ltd.
Graham Farish, Ltd.
Great Western Radio Co.
Gresley Radio, Ltd.
Heayberd & Co., F. C.

Hill & Co., F. C.
H.C.H. Co.
Igranic Electric Co., Ltd.
Imp Radio Co.
Johnson & Phillips, Ltd.
Junction Engineering Co., Ltd.
Junit Mfg. Co., Ltd.
Kestrel Radio Supply Co.
Lang & Squire, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Elec. Wire Co. & Smiths, Ltd.
London Radio-Electric Co.
Longton & Co., H.
Lotus Radio, Ltd.
Lyons, Ltd., Claude.
Maestrophone Radio Gramophone & Wireless Co.
Magnacore, Ltd.
Mains Radio Gramophones, Ltd.
Mains Radio Mfg. Co.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Mile End Radio Co.
M.P.A. Wireless (1930), Ltd.
Partridge & Mee, Ltd.
Partridge, Wilson & Co.
Peace, Ltd., Henry.
Philips Industrial.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Pye Radio, Ltd.
Radio Instruments, Ltd.
Radio Sundries Co.
Realistic Speakers.
Rectifiers, Ltd.
Regentone, Ltd.
Rich & Bundy, Ltd.
Rooke Bros., Ltd.
Rotax, Ltd.
Savage, W. B.
Saxon Radio Co.
Scott, Sessions & Co., G.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Smith (Radio) Ltd., A.
Sound Sales, Ltd.
Sovereign Products, Ltd.
Supertone Pianos, Ltd.
Supremus Specialties, Ltd.
Tannoy Products.
Tarry's.
Telephone Mfg. Co., Ltd.
Tonex Co.
Tunewell Radio, Ltd.
Varley.
Whiteley Elec. Radio Co., Ltd.
Wilson, W. H.
Wright & Weaire, Ltd.
Zenith Electric Co., Ltd.
Zimba Radio Co.

TRANSFORMERS (output).

Aladdin Gramophone & Accessories Co.
Ashley Wireless Telephone Co. (1925), Ltd.
Austin Mills & Co.
Bayliss, William, Ltd.
Birmingham Sound Reproducers.
British General Manufacturing Co., Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
B. & J. Wireless, Ltd.
Castagnoli, G.
Celestion, Ltd.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester) Ltd.
Custerson, R.
Daly, H. C.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg. Co., Ltd.
Emkabe Radio Co., Ltd.
Epoch Radio Mfg., Co., Ltd.
Fel-Ectric Radio.
Ferranti, Ltd.
Frost Radio Co.
Gent & Co., Ltd.
Graham Farish, Ltd.
Great Western Radio Co.
Hill & Co., F. C.
Igranic Electric Co., Ltd.
Johnson & Phillips, Ltd.
Junit Mfg. Co., Ltd.
Lanchester's Laboratories, Ltd.
Lee-Castle Co.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Elec. Wire Co. & Smiths, Ltd.
London Radio-Electric Co.
Lotus Radio, Ltd.
Lyons, Ltd., Claude.
Magnacore, Ltd.
Mains Radio Gramophones, Ltd.
Merrington Bros., Ltd.
Mile End Radio Co.
M.P.A. Wireless (1930), Ltd.
Partridge & Mee, Ltd.
Peace, Ltd., Henry.
Philips Industrial.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Pye Radio, Ltd.
Radio Gramophone Development Co., Ltd.
Radio Instruments, Ltd.
Radio Sundries, Co.
Realistic Speakers.
Rich & Bundy, Ltd.
Rooke Bros., Ltd.
Savage, W. B.
Scott, Sessions & Co., G.
Shearing, Ltd., A. E.
Slektun Products, Ltd.
Smith (Radio) Ltd., A.
Sound Sales, Ltd.
Sovereign Products, Ltd.
Star Engineering.
Supremus Specialities, Ltd.
Telephone Mfg. Co., Ltd.
Telsen Electric Co., Ltd.
Tonex Co.
Tunewell Radio, Ltd.
Varley.
Whiteley Elec. Radio Co., Ltd.
Wilson, W. H.
Wright & Weaire, Ltd.
Zenith Electric Co., Ltd.

TRANSFORMERS (push-pull).

Birmingham Sound Reproducers.
Blundell-Curtis, Ltd.
British Radio Mfg. Co. (Liverpool), Ltd.
British Radiophone, Ltd.
B. & J. Wireless, Ltd.
Chorlton Metal Co., Ltd.
Custerson, R.
Electriclocks & Radio, Ltd.
Elliott Radio Mfg. Co., Ltd.
Emkabe Radio Co., Ltd.
Epoch Radio Mfg. Co., Ltd.
Ferranti, Ltd.
Graham Farish, Ltd.
Hill & Co., F. C.
Igranic Electric Co., Ltd.
Kestrel Radio Supply Co.
Lanchester's Laboratories, Ltd.
Lever (Trix), Ltd., Eric J.
London Elec. Wire Co. & Smiths, Ltd.
London Radio-Electric Co.
Lyons, Ltd., Claude.
Magnacore, Ltd.
Merrington Bros., Ltd.
Mile End Radio Co.
Partridge & Mee, Ltd.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Pye Radio, Ltd.
Radio Instruments, Ltd.
Radio Sundries Co.
Realistic Speakers.
Rothermel Corporation, Ltd.
Savage, W. B.
Scott, Sessions & Co., G.
Shearing, Ltd., A. E.

PRODUCTS SUPPLIED

Smith (Radio) Ltd., A.
Sovereign Products, Ltd.
Telephone Mfg. Co., Ltd.
Tunewell Radio, Ltd.
Varley.
Whiteley Elec. Radio Co., Ltd.
Wright & Weaire, Ltd.
Zenith Electric Co., Ltd.

TRANSFORMER PARTS.

Bayliss, William, Ltd.
Bijou Radio Co.
British General Manufacturing Co., Ltd.
Chester Bros.
Clarke & Co. (Manchester) Ltd.
Custerson, R.
Emkabe Radio Co., Ltd.
Fel-Ectric Radio.
Frost Radio Co.
Graham Farish, Ltd.
Great Western Radio Co.
Hill & Co., F. C.
H.C.H. Co.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
London Elec. Wire Co. & Smiths, Ltd.
London Radio-Electric Co.
McLeod & McLeod.
Magnacore, Ltd.
Magnetic & Electrical Alloys, Ltd.
Marks & Son, S.
Merrington Bros., Ltd.
Mile End Radio Co.
Peace, Ltd., Henry.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Pressland Products, Ltd.
Radio Sundries Co.
Sankey & Sons, Ltd., Joseph.
Savage, W. B.
Scott & Co., Ltd., G. L.
Shearing, Ltd., A. E.
Skeldings, Ltd.
Slektun Products, Ltd.
Sound Sales, Ltd.
Sovereign Products, Ltd.
Standard Telephones & Cables, Ltd.
Trelleborgs Ebonite Works, Ltd.
Tunewell Radio, Ltd.
Whiteley Elec. Radio Co., Ltd.
Zenith Electric Co., Ltd.

TRANSMITTING APPARATUS.

Bayliss, Ltd., W.
Edison Swan Electric Co., Ltd.
Ferranti, Ltd.
Igranic Electric Co., Ltd.
Johnson & Phillips, Ltd.
London Radio-Electric Co.
Lyons, Ltd., Claude.
Marconi's Wireless Telegraph Co., Ltd.
Olympia Radio, Ltd.
Plessey Co., Ltd.
Poupard & Co., Ltd., C. Haddon.
Quartz Crystal Co.
Smurthwaite, F. W.
Standard Telephones & Cables, Ltd.
Stratton & Co., Ltd.
Zenith Electric Co., Ltd.

TUNING UNITS.

Alpha Coil & Component Co.
Automobile Accessories (Bristol), Ltd.
Bercliff, Ltd.
British General Manufacturing Co., Ltd.
Bulgin & Co., Ltd., A. F.
B. & J. Wireless, Ltd.
Castagnoli, G.
Chalkley, C. G.
Eagle Engineering Co., Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Exact Mfg. Co.
Gorman Radio Electric Service Depot.
Gresley Radio, Ltd.
Groves Bros.
Hambling, Ltd., A. W.
Jackson Bros. (London), Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Peto Scott Co., Ltd.
Plessey Co., Ltd.
Radio Sundries Co.
Reliance Mfg. Co. (Southwark), Ltd.
Scott & Co., S. W.
Shearing, Ltd., A. E.
Sovereign Products, Ltd.
Tarrys.
Tonex Co.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.

TURNTABLES (for portables).

Aladdin Gramophone & Accessories Co.
Blue Comet, Ltd.
British Radiophone, Ltd.
Chapman, Ltd., A. W.
Danipad Rubber Co., Ltd.
Hill, Ltd., E. H.
Lissen, Ltd.
Marconiphone Co., Ltd.
Merrington Bros., Ltd.
Ormond Engineering Co., Ltd.
Plessey Co., Ltd.
Precision Radio & Mfg. Co., Ltd.
Pye Radio, Ltd.
Rooke Bros., Ltd.
Six-Sixty Radio Co., Ltd.

VALVES (standard and battery type).

All British Valve Co.
Blue Comet, Ltd.
British Pix Co., Ltd.
Clarion Radio Valve Co.
Concerton Radio & Electrical Co., Ltd.
Cossor, Ltd.
Edison Swan Electric Co., Ltd.
Electrical Trading Association, Ltd.
General Electric Co., Ltd.
Impex Electrical, Ltd.
Lissen, Ltd.
Lustrolux, Ltd.
Marconiphone Co., Ltd.
Mullard Wireless Service Co., Ltd.
M.O. Valve Co., Ltd.
Neutron (1927), Ltd.
North London Valve & Burts, Ltd.
Octron, Ltd.
Philco.
Rubon, Ltd.
Six-Sixty Radio Co., Ltd.
Standard Telephones & Cables, Ltd.
Triotron Radio Co., Ltd.
Tungsram Electric Lamp Works (Gt. Britain), Ltd.

VALVES (A.C. mains, indirectly heated).

Blue Comet, Ltd.
British Pix Co., Ltd.
Clarion Radio Valve Co.
Concerton Radio & Electrical Co., Ltd.
Cossor, Ltd.
Edison Swan Electric Co., Ltd.
Electrical Trading Association, Ltd.
Ferranti, Ltd.
Forbat, E.
General Electric Co., Ltd.
Impex Electrical, Ltd.
Lissen, Ltd.
Loewe Radio Co., Ltd.
Majestic Electric Co., Ltd.
Marconiphone Co., Ltd.
Mullard Wireless Service Co., Ltd.
M.O. Valve Co., Ltd.
North London Valve & Burts, Ltd.
Octron Ltd.
Philco.,
Six-Sixty Radio Co., Ltd.
Standard Telephones & Cables, Ltd.
Triotron Radio Co., Ltd.
Tungsram Electric Lamp Works (Gt.Britain), Ltd.

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ALL-THE-YEAR-ROUND PROFIT MAKERS

The trade for ETA valves is not so seasonable as for other goods. Valve replacements are needed at all seasons of the year and there is never any falling off in the public's desire to save money, without sacrificing quality!

In ETA valves you are offering quality and amazing value. There is *no* valve in the world of higher quality and *no* valve that can give your customers more lasting and satisfactory service.

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ETA

THE INTERNATIONAL VALVE

THE ELECTRICAL TRADING ASSOCIATION, LTD.
Aldwych House, Aldwych, London, W.C.2

Scottish Agents:
RADIOVISION LTD.
233, St. Vincent St., C.2, Glasgow.

PRODUCTS SUPPLIED

[*Continued from page 306.*]

VALVES (A.C. mains, raw).

Blue Comet, Ltd.
Concerton Radio & Electrical Co., Ltd.
Cossor, Ltd.
Edison Swan Electric Co., Ltd.
Ferranti, Ltd.
Forbat, E.
General Electric Co., Ltd.
Impex Electrical, Ltd.
Lissen, Ltd.
Majestic Electric Co., Ltd.
Marconiphone Co., Ltd.
Mullard Wireless Service Co., Ltd.
M.O. Valve Co., Ltd.
North London Valve & Burts, Ltd.
Six-Sixty Radio Co., Ltd.
Standard Telephones & Cables, Ltd.
Triotron Radio Co., Ltd.
Tungsram Electric Lamp Works (Gt.Britain), Ltd.

VALVES (multiple).

Blue Comet, Ltd.
Concerton Radio & Electrical Co., Ltd.
Forbat, E.
Impex Electrical, Ltd.
Lœwe Radio Co., Ltd.
North London Valve & Burts, Ltd.
Philco.
Six-Sixty Radio Co., Ltd.
Tungsram Electric Lamp Works (Gt. Britain), Ltd.

VALVES (A.C. rectifier).

Blue Comet, Ltd.
British Pix Co., Ltd.
Clarion Radio Valve Co.
Concerton Radio & Electrical Co., Ltd.
Cossor, Ltd., A. C.
Edison Swan Electric Co., Ltd.
Electrical Trading Association, Ltd.
Ferranti, Ltd.
Forbat. E.
General Electric Co., Ltd.
Impex Electrical, Ltd.
Lissen. Ltd.
Lœwe Radio Co., Ltd.
Marconiphone Co., Ltd.
Mullard Wireless Service Co., Ltd.
M.O. Valve Co., Ltd.
North London Valve & Burts, Ltd.
Octron, Ltd.
Olympia Radio, Ltd.
Philco.
Philips Industrial.
Philips Lamps, Ltd.
Six-Sixty Radio Co., Ltd.
Standard Telephones & Cables, Ltd.
Triotron Radio Co., Ltd.
Tungsram Electric Lamp Works (Gt.Britain), Ltd.

VALVE-HOLDERS.

Arctic Fuse and Electrical Manufacturing Co.
Benjamin Electric, Ltd.
Benoit, M.
Bowerman, Ltd., G.
British Radio Mfg. Co. (Liverpool), Ltd.
Brown, Ltd., F.
Bulgin & Co., Ltd., A. F.
Christie & Sons, Ltd., Jas.
Crystalate Gramophone Record Mfg. Co., Ltd.
Dampad Rubber Co., Ltd.
Edison Bell, Ltd.
Ellmar Mouldings Co.
Enderlen, E.
Ferranti, Ltd.
Frost Radio Co.
Graham & Co., R. F.
Graham Farish, Ltd.
Gripso Co.
Hemelik, J.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Junit Mfg. Co., Ltd.
Laker Co., Ltd., J. and J.
Lectro Linx, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Lotus Radio, Ltd.
Lyons, Ltd., Claude.
McWhirr, Paterson & Co.
Marks & Son, S.
Nassak Mfg. Co.
Person & Son, L.
Plessey Co., Ltd.
Precision Radio & Mfg. Co., Ltd.
Pye Radio, Ltd.
Radio Service Co.
Ready Radio, Ltd.
Rotor Electric, Ltd.
Solidite & Synthetic Mouldings, Ltd.
Standard Telephone & Cables, Ltd.
Stratton & Co., Ltd.
Telsen Electric, Ltd.
Tonex Co.
Toubkin, J.
Tunewell Radio, Ltd.
Union Radio Co., Ltd.
Whiteley Elec. Radio Co., Ltd.
Wood, E. A.
Wright & Weaire, Ltd.

VALVE TESTERS.

Bayliss, Ltd., W.
Bligh, S. W.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Elliott Radio Mfg. Co., Ltd.
Emerson, R. W.
Ferranti, Ltd.
Lyons, Ltd., Claude.
Millet, J.
Pressland Products, Ltd.
Siemens Schuckert (Gt. Britain), Ltd.
Sifam Electrical Instrument Co., Ltd.
Six-Sixty Radio Co., Ltd.
Union Radio Co., Ltd.
Zenith Electric Co., Ltd.

VARNISHES, INSULATING.

Bakelite, Ltd.
Blundell-Curtis, Ltd.
British Insulated Cables, Ltd.
Clarke & Co. (Manchester), Ltd., H.
Crane Chemical Co., Ltd., Frederick.
Elephant Chemical Co., Ltd.
Ellison Insulations, Ltd.
General Electric Co., Ltd.
Harding & Co., A. F.
Imperial Chemical Industries, Ltd.
Ioco Rubber & Waterproofing Co., Ltd.
Micanite & Insulators Co., Ltd.
Millet, J.
Nobel Chemical Finishes, Ltd.

VOLT-AMMETERS.

Benoit, M.
Cambridge Instrument Co., Ltd.
Dixon & Co., Leslie.
Ernest Turner Electrical Instruments, Ltd.
Everett Edgcumbe & Co., Ltd.
Ferranti, Ltd.
Gambrell Radio, Ltd.
General Electric Co., Ltd.
Gordon & Co., Ltd., F. J.
Howard Butler, Ltd.
Lyons, Ltd., Claude.
McMillan & Co., C.
Millet, J.
Siemens Schuckert (Gt. Britain), Ltd.
Sifam Electrical Instrument Co., Ltd.
Stadium, Ltd.
Weston Electrical Instrument Co., Ltd.
Wilkinson, L.

VOLT METERS.

Altham Radio Co.
Anglo-Swiss Electrical Co., Ltd.
Benoit, M.
Bowerman, Ltd., G.
Bulgin & Co., Ltd., A. F.
Chorlton Metal Co., Ltd.
Dixon & Co., Leslie.
Ernest Turner Electrical Instrument Co., Ltd.

Everett Edgcumbe & Co., Ltd.
Ferranti, Ltd.
Gambrell Radio, Ltd.
General Electric Co., Ltd.
Heayberd & Co., F. C.
Howard Butler, Ltd.
Johnson & Phillips, Ltd.
Lyons, Ltd., Claude.
McMillan & Co.
Millet, J.
Nassak Mfg. Co., Ltd.
Richardsons (R.M.L.), Ltd.
Siemens Schuckert (Gt. Britain), Ltd..
Sifam Electrical Instrument Co., Ltd
Stadium, Ltd.
Sullivan, Ltd., H. W.
Toubkin, J.
Weston Electrical Instrument Co., Ltd.
Wilkinson, L.
W. R. C., Ltd.

VOLUME CONTROLS.

Altham Radio Co.
Automobile Accessories (Bristol), Ltd.
Bowyer, Lowe & A. E. D., Ltd.
British Electric Resistance Co., Ltd.
British N.S.F. Co., Ltd.
British Radiophone, Ltd.
Brodersen, A.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Chorlton Metal Co., Ltd.
Clarke & Co. (Manchester), Ltd., H.
Cossor, Ltd.
Edison Swan Electric Co., Ltd.
Enderlein, E.
Ferranti, Ltd.
Franklin Electric Co., Ltd.
Frost Radio Co.
Goodmans.
Graham Farish, Ltd.
Harlie, Ltd.
Hemelik, J.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Lever (Trix), Ltd., E. J.
Limit Radio Co., Ltd.
Lissen, Ltd.
Lœwe Radio Co., Ltd.
London Electric Wire Co. & Smiths, Ltd.
Lyons, Ltd., Claude.
Merrington Bros., Ltd.
Millet, J.
Nassak Mfg. Co., Ltd.
Pearson Bros. & Co.
Plessey Co., Ltd.
Pye Radio, Ltd.
Radio Instruments, Ltd.
Ready Radio, Ltd.
Reliance Mfg. Co. (Southwark), Ltd.
Rothermel Corporation, Ltd.
Rotor Electric, Ltd.
Siemens Schuckert (G. Britain), Ltd.
Sovereign Products, Ltd.
Tunewell Radio, Ltd.
Varley.
Wright & Weaire, Ltd.
W.R.C., Ltd.

WANDER PLUGS.

Andrews & Co., A. E.
Anglo-Swiss Screw Co., Ltd.
Belling & Lee, Ltd.
Bulgin & Co., Ltd., A. F.
Cadisch & Sons, R.
Certex Products.
Clarke & Co. (Manchester), Ltd., H.
Davis & Timmins, Ltd.
Eastick & Sons, J. J.
Edmonds, Ltd., G.
Electrical Devices, Ltd.
Elliott, E.
Fenriss (1932), Ltd.
Francois, E. J.
Gripso Co.
Harris, G. & R.
Hemelik, J.
Henderson & Co., Ltd., D. M.
Hercus Mfg. Co.
Hill, Ltd., E. H.
Igranic Electric Co., Ltd.
Ivory Electric, Ltd.
Joseph, H.
Lectro Linx, Ltd.
Lesingham, F. L.
Lever (Trix), Ltd., E. J.
Lilley & Son, Ltd., S.
Lisenin Wireless Co.
Lissen, Ltd.
McLeod & McLeod.
McWhirr, Paterson & Co.
Melbourne Radio Supply
Meyer & Co., E.
Millet, J.
Nassak Mfg. Co., Ltd.
Olympia Radio, Ltd.
Rose & Son, Ltd., T. A.
Standard Mfg. (Wireless) Co., Ltd.
Toubkin, J.
True Screws, Ltd.
W.R.C., Ltd.

WASHERS.

Anglo-Swiss Screw Co, Ltd.
Baker & Finnemore, Ltd.
Birmingham Products, Ltd.
British Hard Rubber Co., Ltd.
Busby & Co., Ltd.
Castle, T. L.
Celluloid Printers, Ltd.
Davis & Timmins, Ltd.
Fenriss (1932), Ltd.
Francois, E. J.
Gee (Birmingham), Ltd.
Gripso Co.
Harris, G. & R.
Henderson & Co., Ltd., D. M.
Hercus Mfg. Co.
Jewel Pen Co., Ltd.
Lever (Trix), Ltd., Eric J.
McLeod & McLeod.
McWhirr, Paterson & Co.
Manor Works Co.
Meyer & Co., E.
Nicklin & Co., Ltd., J.
Ormond Engineering Co., Ltd.
Person & Son, L.
Prideaux, Junr., R.
Redfern's Rubber Works, Ltd.
Righton & Co., Ltd., H.
Shearing, Ltd., A. E.
Skeldings, Ltd.
Sorbo Rubber-Sponge Products, Ltd.
Spears & Co.
Toubkin, J.
True Screws, Ltd.
Williams & Gray, Ltd.
W. R. C., Ltd.

WAVEMETERS.

Automobile Accessories (Bristol), Ltd.
British Blue Spot Co., Ltd.
Castagnoli, G.
Elliott Radio Mfg. Co., Ltd.
Gorman Radio Electric Service Depot.
Johnson & Phillips, Ltd.
Lyons, Ltd., Claude.
Plessey Co., Ltd.
Quartz Crystal Co.
Rose & Son, Ltd., T. A.
Sullivan, Ltd., H. W.
Tunewell Radio, Ltd.

WAVE TRAPS.

Automobile Accessories (Bristol), Ltd.
Bright Co.
Brownie Wireless Co. of Great Britain, Ltd.
Burne-Jones & Co., Ltd.
B. & J. Wireless, Ltd.
Dubilier Condenser Co. (1925), Ltd.
Elliott Radio Mfg. Co., Ltd.
Eon Vacuum Wireless Co.
Ferranti, Ltd.
Franklin & Freeman, Ltd.
Galt & Sons, R.
General Electric Co., Ltd.

PRODUCTS SUPPLIED

Gent & Co., Ltd.
Harlie, Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
Loewe Radio Co., Ltd.
McWhirr, Paterson & Co.
Melbourne Radio Supply.
Merrington Bros., Ltd.
Mic Wireless Co.
Nassak Mfg. Co., Ltd.
Paroussi, E.
Peto-Scott Co., Ltd.
Radio Sundries Co.
Rooke Bros., Ltd.
Scott & Co., S. W.
Shearing, Ltd., A. E.
Sovereign Products, Ltd.
Ward & Goldstone, Ltd.
W.R.C., Ltd.

WIRE (aerial):

Aerialite, Ltd.
British Aluminium Co., Ltd.
British Insulated Cables, Ltd.
British Ropes, Ltd.
Bromley-Langton Electric Wire & Insulator Co., Ltd.
Callender's Cable & Construction Co., Ltd.
Concordia Electric Wire Co., Ltd.
Connollys (Blackley), Ltd.
Coquantin & Co., Ltd., M.
Enderlein, E.
Enfield Cable Works, Ltd.
Franklin Electric Co., Ltd.
General Electric Co., Ltd.
Green & Son, D.
Hart Bros. Electrical Mfg. Co., Ltd.
Laker Co., Ltd., J. & J.
Lesingham, F. L.
Lever (Trix), Ltd., E. J.
London Electric Wire Co. & Smiths, Ltd.
London Metal Warehouses, Ltd.
Midland Electric Wire Co., Ltd.
Millet, J.
New London Electron Works, Ltd.
Olympia Radio, Ltd.
Poupard & Co., Ltd., C. Haddon.
Radio Sundries Co.
Richardsons (R. M. L.), Ltd.
Righton & Co., Ltd., H.
Rooke Bros., Ltd.
R. C. Radio Electric, Ltd.
St. Helen's Cable & Rubber Co., Ltd.
Saxon Radio Co.
Saxonia Electrical Wire Co., Ltd.
Siemens Schuckert (Gt. Britain), Ltd.
Toubkin, J.
Trent Electric Wire Works, Ltd.
Ward & Goldstone, Ltd.

WIRE (connecting).

Aerialite, Ltd.
Altham Radio Co.
Brasse, Ltd.
British Insulated Cables, Ltd.
British Ropes, Ltd.
Bromley-Langton Electric Wire & Insulator Co., Ltd.
Bulgin & Co., Ltd., A. F.
Cadisch & Sons, R.
Callender's Cable & Construction Co., Ltd.
Concordia Electric Wire Co., Ltd.
Coquantin & Co., Ltd., M.
Elvy, C. L.
Enfield Cable Works, Ltd.
Franklin Electric Co., Ltd.
General Electric Co., Ltd.
Hart Bros. Electrical Mfg. Co., Ltd.
Hercus Mfg. Co.
Lesingham, F. L.
Lever (Trix), Ltd., E. J.
London Electric Wire Co. & Smiths, Ltd.
McLeod & McLeod.
McWhirr, Paterson & Co.
Millet, J.
Olympia Radio, Ltd.
Radio Sundries Co.
Richardsons (R. M. L.), Ltd.
Saxon Radio Co.
Saxonia Electrical Wire Co., Ltd.
Shearing, Ltd., A. E.
Siemens Schuckert (Great Britain), Ltd.
Standard Insulator Co., Ltd.
Toubkin, J.
Trent Electric Wire Works, Ltd.
Vandervelde, L.
Ward & Goldstone, Ltd.

WIRE (galvanised stay).

British Ropes, Ltd.
Callender's Cable & Construction Co., Ltd.
Franklin Electric Co., Ltd.
Griffin & Co., Ltd., A. W.
Laker Co., Ltd., J. & J.
Maestrophone Radio Gramophone & Wireless Co.

WIRE (instrument).

British Insulated Cables, Ltd.
Bromley-Langton Electric Wire & Insulator Co., Ltd.
Callender's Cable & Constriction Co., Ltd.
Concordia Electric Wire Co., Ltd.
Connollys (Blackley), Ltd.
Coquantin & Co., Ltd., M.
Elvy, C. L.
Enfield Cable Works, Ltd.
Franklin Electric Co., Ltd.
Frost Radio Co.
General Electric Co., Ltd.
Johnson, Mathey & Co., Ltd.
Johnson & Phillips, Ltd.
Kent Bros. Electric Wire Co. & E. H. Phillips, Ltd.
London Electric Wire Co. & Smiths, Ltd.
McLeod & McLeod.
McMillan & Co., J.
Midland Electric Wire Co., Ltd.
New London Electron Works, Ltd.
Radio Sundries Co.
Saxon Radio Co.
Saxonia Electrical Wire Co., Ltd.
Scott & Co., G. L.
Scott Insulated Wire Co., Ltd.
Siemens Schuckert (Great Britain), Ltd.
Sound Sales, Ltd.
Standard Insulator Co., Ltd.
Trent Electric Wire Works, Ltd.

WIRE (Litz).

British Insulated Cables, Ltd.
Bromley-Langton Electric Wire & Insulator Co., Ltd.
Callender's Cable & Construction Co., Ltd.
Coquantin & Co., Ltd., M.
Elvy, C. L.
Franklin Electric Co., Ltd.
General Electric Co., Ltd.
Kent Bros. Electric Wire Co. & E. H. Phillips, Ltd.
London Electric Wire Co. & Smiths, Ltd.
McLeod & McLeod.
Saxonia Electrical Wire Co., Ltd.
Scott Insulated Wire Co., Ltd.
Standard Insulator Co., Ltd.
Trent Electric Wire Works, Ltd.

WIRE (resistance).

British Ropes, Ltd.
Bromley-Langton Electric Wire & Insulator Co., Ltd.
Bruntons (Musselburgh), Ltd.
Callender's Cable & Construction Co., Ltd.
Concordia Electric Wire Co., Ltd.
Connollys (Blackley), Ltd.
Coquantin & Co., Ltd., M.
Cressall Mfg. Co.
Elvy, C. L.
Franklin Electric Co., Ltd.
Frost Radio Co.
General Electric Co., Ltd.
Johnson, Mathey & Co., Ltd.

Kent Bros. Electric Wire Co. & E. H. Phillips, Ltd.
London Electric Wire Co. & Smiths, Ltd.
McLeod & McLeod.
Maul & Murphy, Ltd.
Radio Sundries Co.
Saxonia Electrical Wire Co., Ltd.
Standard Insulator Co., Ltd.
Trent Electric Wire Works, Ltd.
Ward & Goldstone, Ltd.

GRAMOPHONE SECTION.

CABINETS.

Aladdin Gramophone & Accessories Co.
Apollo Gramophone Co., Ltd.
Appletons (Leeds), Ltd.
Automobile Accessories (Bristol), Ltd.
Balcombe, Ltd., A. J.
Bell Piano Co., Ltd.
Bligh, S. W.
Bond & Sons, Ltd., V. C.
Bradnam & Co.
British East-Light, Ltd.
Calders, Ltd.
Carrington Mfg. Co., Ltd.
City Accumulator Co.
Craftease.
Disque Cabinet Co., Ltd.
Doherty & Sons, Edward.
Dulcetto-Polyphon, Ltd.
Dunster & Son, Ltd., J. J.
Eagle Engineering Co., Ltd.
Eastham, Thos.
Elvy, C. L.
Elvy & Anderson.
Fairfield Mfg. Co.
Garnersound, Ltd.
Goodwin Radio, Ltd.
Gresley Radio, Ltd.
Hercus Mfg. Co.
Holmes Bros. (London) ,Ltd.
Hyatt & Co., Ltd., J.
Joseph, H.
J. B. Mfg. Co. (Cabinets), Ltd.
Kestrel Radio Supply Co.
Lissen, Ltd.
Lock, Ltd., W. & T.
London Super Cabinet Co.
Longley Radio Mfg. Co
Margolin, J. & A.
Merrington Bros., Ltd.
Micro-Perophone & Chromogram, Ltd.
Moores & Co., J.
Morton & Co., Ltd., E. R.
Murdoch Trading Co.
O'Brien, Ltd., T.
Ormond Engineering Co., Ltd.
Osborn, C. A.
Pearson Bros. & Co.
Peto-Scott Co., Ltd.
Philomel Radio Equipment Co.
Pozzuoli, F.
Radiocabinets (Walsall), Ltd.
Ramsey, F. W.
Richardsons (R.M.L.), Ltd.
Rondo Co., Ltd.
Ruhl (1922), Ltd., O.
Shapland & Petter, Ltd.
Six-Sixty Radio Co., Ltd.
Smith's Cabinets, Ltd.
Storrar & Balls.
Supertone Pianos, Ltd.
Thompson, Diamond & Butcher.
Tyrela Gramophones, Ltd.
Vibranti Products Co.
West, W. G.
Wood, E. A.
Yagerphone, Ltd.

GRAMOPHONE FITTINGS.

Aladdin Gramophone & Accessories Co.
Balcombe, Ltd., A. J.
Beddoes, Ltd., J. G.
Bulgin & Co., Ltd., A. F.
Christie & Sons, Ltd., Jas.
Diehl, H.
Edison Bell, Ltd.
Edmonds, Ltd., George.
Garnersound, Ltd.
Harris, G. & R.
Jaccard, L. E.
Lilley & Son, Ltd.
Limit Engineering Co., Ltd.
Longley Radio Mfg. Co.
Manufacturers' Accessories Co. (1928), Ltd.
Marks & Son, S.
Merrington Bros., Ltd.
Osborn, C. A.
Richardsons (R.M.L.), Ltd.
Shearing, Ltd., A. E.
Vibranti Products Co.
Wood, E. A.

GRAMOPHONES (acoustic).

Aladdin Gramophone & Accessories Co.
Apollo Gramophone Co., Ltd.
Appletons (Leeds). Ltd.
Baker & Co., Ltd., G. F.
Balcombe, Ltd., A. J.
Bowley, J. W.
Columbia Graphophone Co., Ltd.
Coppock, J. T.
Dallas & Sons, John E.
Decca Gramophone Co., Ltd.
Dulcetto-Polyphon, Ltd.
Edison Bell, Ltd.
Fletcher & Co., Ltd., H. J.
Garnersound, Ltd.
Gilbert & Co., Ltd., C.
Gramophone Co., Ltd.
Itonia, Ltd.
Jaccard, L. E.
Johnson Talking Machine Co., Ltd.
Leibovici, J.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Margolin, J. & A.
Merrington Bros., Ltd.
Micro-Perophone & Chromogram, Ltd.
Murdoch Trading Co.
Paramount Gramophone Co.
Richardsons (R.M.L.), Ltd.
Rigby Bros.
Rose, Morris & Co., Ltd.
Ruhl (1922), Ltd., O.
Runwell Cycle Co. (Birmingham), Ltd.
Selecta Gramophones, Ltd.
Smith (Radio), Ltd., A.
Stockall, Marples & Co., Ltd.
Thompson, Diamond & Butcher.
Tyrela Gramophones, Ltd.
Unicfon, Ltd.
Wood, E. A.
Yagerphone, Ltd.

GRAMOPHONES (electric).

Apollo Gramophone Co., Ltd.
Automobile Accessories (Bristol), Ltd.
Balcombe, Ltd., A. J.
Bijou Radio Co.
Birmingham Sound Reproducers.
Bligh, S. W.
Bowley, J. W.
Colassi, W. L.
Columbia Graphophone Co., Ltd.
Custerson, R.
Edison Bell, Ltd.
Fletcher & Co., Ltd., H. J.
Gambrell Radio, Ltd.
Garnersound, Ltd.
General Electric Co., Ltd.
Gilbert & Co., Ltd., C.
Godfrey (Radio), Ltd., F. E.
Gramophone Co., Ltd.
Harlie, Ltd.
Hunter & Co., H. K.
Itonia, Ltd.
Jaccard, L. E.
Lawson & Raphael.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
London Elec. Co. (Sherbourne Lane), Ltd.

PRODUCTS SUPPLIED

McMichael, Ltd., L.
Maestrophone Radio Gramophone & Wireless Co.
Majestic Electric Co., Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Margolin, J. & A.
Merrington Bros., Ltd.
Mic Wireless Co.
Micro-Perophone & Chromogram, Ltd.
Murdoch Trading Co.
Paramount Gramophone Co.
Philips Industrial.
Poupard & Co., Ltd., C. Haddon.
Precision Electric, Ltd.
Radio Gramophone Development Co., Ltd.
Realistic Speakers.
Rhapsody-Twin.
Richardsons (R.M.L.), Ltd.
Savage, W. B.
Scott & Co., James.
Selecta Gramophones, Ltd.
Smith (Radio), Ltd., A.
Spiers & Browne.
Tannoy Products.
Tyrela Gramophones, Ltd.
Unicfon, Ltd.
Whetton & L. Gold, E. P.
Wood, E. A.
Yagerphone, Ltd.

GRAMOPHONES (portable).

Aladdin Gramophone & Accessories Co.
Apollo Gramophone Co., Ltd.
Appletons (Leeds), Ltd.
Baker & Co., Ltd., G. F.
Balcombe, Ltd., A. J.
Bijou Radio Co.
Bowley, J. W.
Cadisch & Sons, R.
Coppock, J. T.
Columbia Graphophone Co., Ltd.
Dual Motors, Ltd.
Dulcetto-Polyphon, Ltd.
Edison Bell, Ltd.
Fletcher & Co., Ltd., H. J.
Garnersound, Ltd.
Gilbert & Co., Ltd., C.
Gramophone Co., Ltd.
Itonia, Ltd.
Jaccard, L. E.
Leibovici, J.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Margolin, J. & A.
Merrington Bros., Ltd.
Micro-Perophone & Chromogram, Ltd.
Murdoch Trading Co.
Paramount Gramophone Co.
Portable Gramophone Co., Ltd.
Rex Gramophone Co.
Richardsons (R.M.L.), Ltd.
Rigby Bros.
Rose, Morris & Co., Ltd.
Ruhl (1922), Ltd. O.
Runwell Cycle Co. (Birmingham), Ltd.
Selecta Gramophones, Ltd.
Stockall, Marples & Co., Ltd.
Thibouville-Lamy & Co.
Thompson, Diamond & Butcher.
Tyrela Gramophones, Ltd.
Unicfon, Ltd.
Wood, E. A.
Yagerphone, Ltd.

HOME RECORDING APPARATUS.

Fay Home Recorders, Ltd.
Harris & Russell, Ltd.
Speakeasie Home Recorders, Ltd.

HORNS.

Aladdin Gramophone and Accessories Co.
Apollo Gramophone Co., Ltd.
Appletons (Leeds), Ltd.
Balcombe, Ltd., A. J.
Bowley, J. W.
Bradnam & Co.
Diehl, H.
Edison Bell, Ltd.
Film Industries, Ltd.
Fletcher & Co., Ltd., H. J.
Garnersound, Ltd.
Jaccard, L. E.
J. B. Mfg. Co. (Cabinets), Ltd.
Limit Engineering Co., Ltd.
Merrington Bros., Ltd.
Murdoch Trading Co.
Oppenheim & Co., Ltd. E.
Richardsons (R.M.L.), Ltd.
Savage, W. B.
Speakeasie Home Recorders, Ltd.
Wood, E. A.
Yagerphone, Ltd.

MOTORS (electric A.C.)

Aladdin Gramophone & Accessories Co.
Apollo Gramophone Co., Ltd.
Balcombe, Ltd., A. J.
Calvete, Ltd., I.
Collaro, Ltd.
Corona Engineering & Motor Co., Ltd.
Custerson, R.
Dual Motors, Ltd.
Edison Swan Electric Co., Ltd.
Electric Gramophones, Ltd.
Garrard Engineering & Manufacturing Co., Ltd.
General Electric Co., Ltd.
Gramophone Co., Ltd.
Harlie Ltd.
Jaccard, L. E.
Kolster-Brandes, Ltd.
Losonzci, E.
Lyons, Ltd., Claude.
McWhirr, Paterson & Co.
Manufacturers' Accessories Co. (1928), Ltd.
Siemens-Schuckert (Gt. Britain), Ltd.
Simpsons Electricals, Ltd.
Smith (Radio) Ltd., A.
Univolt Electric, Ltd.
Wood, E. A.
W.R.C., Ltd.

MOTORS (electric D.C.)

Aladdin Gramophone and Accessories Co.
Apollo Gramophone Co., Ltd.
Calvete, Ltd., I.
Custerson, R.
Dual Motors, Ltd.
Garrard Engineering & Mfg. Co., Ltd.
Gramophone Co., Ltd.
Kolster-Brandes, Ltd.
Limit Radio, Ltd.
McWhirr, Paterson & Co.
Manufacturers' Accessories Co. (1928), Ltd.
Overseas Trading Corporation.
Siemens-Schuckert (Gt. Britain), Ltd.
Smith (Radio), Ltd., A.
Univolt Electric, Ltd.
Wood, E. A.

MOTORS (spring).

Aladdin Gramophone & Accessories Co.
Apollo Gramophone Co., Ltd.
Balcombe, Ltd., A. J.
Collaro, Ltd.
Edison Bell, Ltd.
Elliott Radio Mfg. Co., Ltd.
Fletcher & Co., Ltd., H. J.
Garrard Engineering & Manufacturing Co., Ltd.
Hercus Mfg. Co.
Lissen, Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Richardsons (R.M.L.), Ltd.
Wood, E. A.

NEEDLE CUPS AND CONTAINERS.

Aladdin Gramophone & Accessories Co.
Apollo Gramophone Co., Ltd.
Balcombe, Ltd., A. J.
Beddoes, Ltd., J. G.
British General Mfg Co., Ltd.
British Goldring Products, Ltd.
Bulgin & Co., Ltd., A. F.
Diehl, H.
Edison Bell, Ltd.
Gilbert & Co., Ltd., C.

Harris, G. & R.
Jaccard, L. E.
Limit Engineering Co., Ltd.
Lissen, Ltd.
Losonzci, E.
Manufacturers' Accessories Co. (1928), Ltd.
Marks & Son, S.
Oppenheim & Co., Ltd., E.
Richardsons (R.M.L.), Ltd.
Tyrela Gramophones, Ltd.
Wendell Radio, Ltd.
Wood, E. A.

NEEDLES (fibre).

Daws, Clarke & Co.
British Homophone Co., Ltd.
Electrocolor Products, Ltd.
Gramophone Co., Ltd.
Lissen, Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Mellow Tone Co., Ltd.
Murdoch Trading Co.
Parlophone Co., Ltd.
Wood, E. A.

NEEDLES (steel).

Aladdin Gramophone & Accessories Co.
Allwood Blackband & Co.
Balcombe, Ltd., A. J.
British Homophone Co., Ltd.
British Needle Co., Ltd.
British Zonophone Co., Ltd.
Clarkes (Redditch), Ltd.
Columbia Graphophone Co., Ltd.
Crystalate Gramophone Record Mfg. Co., Ltd.
Edison Bell, Ltd.
Fletcher & Co., Ltd.
Gramophone Co., Ltd.
Guillaume & Sons, Ltd.
Itonia, Ltd.
Jaccard, L. E.
Lissen, Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Mellow Tone Co., Ltd.
Murdoch Trading Co.
Oppenheim & Co., Ltd., E.
Parlophone Co., Ltd.
Richardsons (R.M.L.), Ltd.
Runwell Cycle Co. (Birmingham), Ltd.
Stead & Co., Ltd., J.
Wood, E. A.

NEEDLES (semi-permanent).

British Homophone Co., Ltd.
British Needle Co., Ltd.
British Zonophone Co., Ltd.
Columbia Graphophone Co., Ltd.
Edison Bell, Ltd.
Electrocolor Products, Ltd.
Gramophone Co., Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Mellow Tone Co., Ltd.
Murdoch Trading Co.
Parlophone Co., Ltd.
Richardsons (R.M.L.), Ltd.
Wood, E. A.

PICK-UPS.

Amplion (1932), Ltd.
Apollo Gramophone Co., Ltd.
Balcombe, Ltd., A. J.
Bowyer Lowe & A.E.D., Ltd.
British Clarion Co., Ltd.
British Goldring Products, Ltd.
British Ideal Patents, Ltd.
British Lumophon, Ltd.
British Radiophone, Ltd.
British Zonophone Co., Ltd.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Celestion, Ltd.
Chorlton Metal Co., Ltd.
Colassi, W. L.
Collaro, Ltd.
Columbia Graphophone Co., Ltd.
Contal Radio, Ltd.
Cossor, Ltd., A. C.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Electric Gramophones, Ltd.
Garrard Engineering & Mfg. Co., Ltd.
General Electric Co., Ltd.
Gramophone Co., Ltd.
Harlie, Ltd.
Hustler, Simpson & Webb, Ltd.
Igranic Electric Co., Ltd.
Joseph, H.
Kolster-Brandes, Ltd.
Limit Engineering Co., Ltd.
Limit Radio, Ltd.
Lissen, Ltd.
Loewe Radio Co., Ltd.
Losonzci, E.
Lyons, Ltd., Claude.
Manufacturers' Accessories Co. (1928), Ltd.
Marconiphone Co., Ltd.
Oppenheim & Co., Ltd., E.
Parlophone Co., Ltd.
Philips Industrial.
Powertone Products.
Radio Gramophone Development Co., Ltd.
Ripaults, Ltd.
Rotor Electric, Ltd.
Siemens-Schuckert (Gt. Britain), Ltd.
Smith (Radio), Ltd., A.
Speakeasie Home Recorders, Ltd.
Varley (Proprietors, Oliver Pell Control, Ltd.).
Wendell Radio, Ltd.
Wood, E. A.
W.R.C., Ltd.

PICK-UP ARMS.

Bijou Radio Co.
British Ideal Patents, Ltd.
British Lumophon, Ltd.
British Radiophone, Ltd.
Bulgin & Co., Ltd., A. F.
Burne-Jones & Co., Ltd.
Celestion, Ltd.
Columbia Graphophone Co., Ltd.
Edison Bell, Ltd.
Edison Swan Electric Co., Ltd.
Electric Gramophones, Ltd.
Garnersound, Ltd.
Garrard Engineering & Mfg. Co., Ltd.
General Electric Co., Ltd.
Harlie, Ltd.
Igranic Electric Co., Ltd.
Limit Engineering Co., Ltd.
Limit Radio, Ltd.
Lissen, Ltd.
Loewe Radio Co., Ltd.
Losonzci, E.
Manufacturers' Accessories Co. (1928), Ltd.
Oppenheim & Co., Ltd., E.
Radio Gramophone Development Co., Ltd.
Radiomonic, Ltd.
Richardsons (R.M.L.), Ltd.
Varley (Oliver Pell Control, Ltd.).
Wendell Radio, Ltd.
Wood, E. A.
W.R.C., Ltd.

PLAYING DESKS.

Ad-a-Grams.
Apollo Gramophone Co., Ltd.
Bowyer Lowe & A.E.D., Ltd.
Gramophone Co., Ltd.
Lawson & Raphael.
Squire, Ltd., F.
Univolt Electric, Ltd.

RADIO-GRAMOPHONES (Spring and Battery).

Automobile Accessories (Bristol), Ltd.
Balcombe, Ltd., A. J.
Bligh, S. W.
Blue Comet, Ltd.
Bradnam & Co.
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Custerson, R.
Disque Cabinet Co., Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Electrical & Radio Products (1931), Ltd.

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Electrolines, Ltd.
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Hunter & Co., H. K.
Itonia, Ltd.
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Johnson Talking Machine Co., Ltd.
Lever (Trix), Ltd., Eric J.
Lissen, Ltd.
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Margolin, J. & A.
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Micro-Perophone and Chromogram, Ltd.
Murdoch Trading Co.
Paramount Gramophone Co.
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Rex Gramophone Co., Ltd.
Scott & Co., James.
Scott, Sessions & Co., G.
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Slektun Products, Ltd.
Smith (Radio), Ltd., A.
Smurthwaite, F. W.
Spiers and Browne.
Tannoy Products.
Thompson, Diamond & Butcher.
Wendell Radio, Ltd.
Wood, E. A.
Yagerphone, Ltd.
Yorkshire Radio Co.

RADIO-GRAMOPHONES (A.C.).

Aga-Radio.
Automobile Accessories (Bristol), Ltd.
Balcombe, Ltd., A. J.
Bell Piano Co., Ltd.
Birmingham Sound Reproducers.
Bligh, S. W.
Blue Comet, Ltd.
Bradnam & Co.
British General Mfg Co., Ltd.
British Ideal Patents, Ltd.
British Radio Gramophone Co., Ltd.
British Radiophone, Ltd.
Burndept, Ltd.
Burne-Jones & Co., Ltd.
City Accumulator Co.
Clarith Reproducers, Ltd.
Climax Radio Electric, Ltd.
Colassi, W. L.
Cole, Ltd., E. K.
Columbia Graphophone Co., Ltd.
Custerson, R.
Danipad Rubber Co., Ltd.
Dibben & Sons, Ltd., W.
Disque Cabinet Co., Ltd.
Dulcetto-Polyphon, Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
Electrical & Radio Products (1931), Ltd.
Electriclocks & Radio, Ltd.
Electrocet Radio Co.
Electrolines, Ltd.
Elliott Radio Mfg. Co., Ltd.
Epoch Radio Mfg. Co., Ltd.
Fallowfield, Ltd., Jonathan.
Fletcher & Co., H. J.
Gambrell Radio, Ltd.
General Electric Co., Ltd.
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Godfrey (Radio) Ltd., F. E.
Goodwin Radio, Ltd.
Gramophone Co., Ltd.
Hacker & Sons, H.
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Haynes Radio.
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Hunter & Co., H. K.
Itonia, Ltd.
Janes & Co., W. H.
Johnson & Phillips, Ltd.
Johnson Talking Machine Co., Ltd.
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Lissen, Ltd.
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Mains Radio Gramophones, Ltd.
Majestic Electric Co., Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Marconiphone Co., Ltd.
Margolin, J. & A.
Merrington Bros., Ltd.
Mic Wireless Co.
Micro-Perophone and Chromogram, Ltd.
Midgley-Leighton, Ltd.
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Scott Sessions & Co., G.
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Spiers & Browne.
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Tannoy Products.
Thompson, Diamond & Butcher.
Tunewell Radio, Ltd.
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Ultra Electric, Ltd.
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Wood, E. A.
Yagerphone, Ltd.
Yorkshire Radio Co.
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Automobile Accessories (Bristol), Ltd.
Balcombe, Ltd., A. J.
Bligh, S. W.
Blue Comet, Ltd.
Bradnam & Co.
British General Mfg. Co., Ltd.
British Ideal Patents, Ltd.
British Radiophone, Ltd.
Clarith Reproducers, Ltd.
Climax Radio Electric, Ltd.
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Cole, Ltd., E. K.
Columbia Graphophone Co., Ltd.
Custerson, R.
Danipad Rubber Co., Ltd.
Disque Cabinet Co., Ltd.
Dibben & Sons, Ltd., W.
Dulcetto-Polyphon, Ltd.
Eagle Engineering Co., Ltd.
Edison Bell, Ltd.
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Electriclocks & Radio, Ltd.
Electrolines, Ltd.
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Haynes Radio.
Hunter & Co., H. K.
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Jaccard, L. E.
Kestrel Radio Supply Co.

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Lissen, Ltd.
McMichael, Ltd.
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Rex Gramophone Co., Ltd.
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Scott Sessions & Co., G.
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Smurthwaite, F. W.
Spiers and Browne.
Tannoy Products.
Thompson, Diamond & Butcher.
Wood, E. A.
Yorkshire Radio Co.
Zimba Radio.

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Electrocet Radio Co.
Eon Vacuum Wireless Co.
Gramophone Co., Ltd.
Lever (Trix), Ltd., E. J.
Lissen, Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Merrington Bros., Ltd.
Micro-Perophone and Chromogram, Ltd.
Poupard & Co., Ltd., C. Haddon.
Precision Electric, Ltd.
Slektun Products, Ltd.
Wood, E. A.
Yorkshire Radio Co.

RECORDS (Standard).

British Homophone Co., Ltd.
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British Zonophone Co., Ltd.
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Edison Bell, Ltd.
Gramophone Co., Ltd.
Murdoch Trading Co.
Paramount Gramophone Co.
Parlophone Co., Ltd.
Richardsons (R.M.L.), Ltd.
Warner Brunswick, Ltd.

RECORDS (Flexible).

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RECORD ALBUMS.

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Aladdin Gramophone & Accessories Co.
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British East Light, Ltd.
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Columbia Graphophone Co., Ltd.
Gramophone Co., Ltd.
Murdoch Trading Co.
Richardsons (R.M.L.), Ltd.
Rondo Co., Ltd.
Thompson, Diamond and Butcher.
Wood, E. A.

RECORD CARRYING CASES.

Acme Album Service.
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British East Light, Ltd.
British Homophone Co., Ltd.
British Ideal Patents, Ltd.
Brown, A. A.
Columbia Graphophone Co., Ltd.
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Gramophone Co., Ltd.
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Lissen, Ltd.
Pearson Bros. & Co.
Richardsons (R.M.L.), Ltd.
Rondo Co., Ltd.
Thompson, Diamond and Butcher.
Wood, E. A.

RECORD CLEANING ACCESSORIES.

Aladdin Gramophone & Accessories Co.
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Electrocolor Products, Ltd.
Gramophone Co., Ltd.
Harris, G. and R.
Knopf, A.
Lissen, Ltd.
Record Autobrush Co.
Richardsons (R.M.L.), Ltd.
Wood, E. A.

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Disque Cabinet Co., Ltd.
Edward Doherty & Sons.
Fairfield Mfg. Co.
Fletcher & Co., Ltd., H. J.
Garnersound, Ltd.
Hyatt & Co., Ltd., J.
Itonia, Ltd.
J. B. Mfg. Co., Ltd.
Lissen, Ltd.
Lock, Ltd., W. & T.
Longley Radio Mfg. Co.
Merrington Bros., Ltd.
Murdoch Trading Co.
Osborn, C. A.
Pearson Bros. & Co.
Rondo Co., Ltd.
Shapland & Petter, Ltd.
Smith's Cabinets, Ltd.
Thompson, Diamond and Butcher.
Wood, E. A.
Yagerphone, Ltd.

RECORDING SYSTEMS.

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Green, A. W.
Murdoch Trading Co.
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Harlie, Ltd.
Imperial Cabinet Co.
Lissen, Ltd.
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Pearson Bros. and Co.
Reliance Mfg. Co. (Southwark), Ltd.
Smith (Radio), Ltd., A.
Wright & Weaire, Ltd.
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Aladdin Gramophone & Accessorie
Apollo Gramophone Co., Ltd.
Balcombe, Ltd., A. J.
British Goldring Products, Ltd.
British Homophone Co., Ltd.

PRODUCTS SUPPLIED

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Diehl, H.
Dulcetto-Polyphon, Ltd.
Edison Bell, Ltd.
Fletcher & Co., Ltd., H. J.
Garnersound, Ltd.
Gilbert, C. & Co., Ltd.
Harris, G. & R.
Jaccard, L. E.
Knopf, A.
Limit Engineering Co., Ltd.
Lissen, Ltd.
Losonzci, E.
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Micro-Perophone and Chromogram, Ltd.
Murdoch Trading Co.
Oppenheim & Co., Ltd., E.
Parlophone Co., Ltd.
Record Autobrush Co.
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Stockall, Marples & Co., Ltd.
Wood, E. A.

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Gramophone Co., Ltd.
Knopf, A.
Lyons, Ltd., Claude.
Wood, E. A.

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Fletcher & Co., Ltd., H. J.
Garrard Engineering & Manufacturing Co., Ltd.
Harris, G. & R.
Jaccard, L. E.
Knopf, A.
Lissen, Ltd.
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Murdoch Trading Co.
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Dual Motors, Ltd.
Edison Bell, Ltd.
Electric Gramophones, Ltd.
Fletcher & Co., Ltd., H. J.
Garrard Engineering & Manufacturing Co., Ltd.
Harlie, Ltd.
Itonia, Ltd.
Knopf, A.
Limit Engineering Co., Ltd.
Lissen, Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Murdoch Trading Co.
Richardsons (R.M.L.), Ltd.
Wood, E. A.

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British Homophone Co., Ltd.
British Ideal Patents, Ltd.
Contal Radio, Ltd.
Diehl, H.
Edison Bell, Ltd.
Garnersound, Ltd.
Gilbert, C. & Co., Ltd.
Graham-Farish, Ltd.
Harlie, Ltd.
Harris, G. and R.
Knopf, A.
Limit Engineering Co., Ltd.
Lissen, Ltd.
Losonzci, E.
Mains Radio Gramophones, Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Merrington Bros., Ltd.
Micro-Perophone and Chromogram, Ltd.
Oppenheim & Co., Ltd., E.
Perks & Co., H.
Radiomonic, Ltd.
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Sankey & Sons, Ltd., J.
Siemens-Schuckert (Gt. Britain), Ltd.
Spalton Electrical Stores, Ltd.
Wood, E. A.
W.R.C., Ltd.

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Edison Bell, Ltd.
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Lissen, Ltd.
Lyons, Ltd., Claude.
Postlethwaite, Bros.
Reliance Mfg. Co. (Southwark), Ltd.
Wood, A. E.

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Aladdin Gramophone & Accessories Co.
Apollo Gramophone Co., Ltd.
Balcombe, Ltd., A. J.
Blue Comet, Ltd.
British Homophone Co., Ltd.
Diehl, H.
Dual Motors, Ltd.
Edison Bell, Ltd.
Garrard Engineering & Manufacturing Co., Ltd.
Harlie, Ltd.
Jaccard, L. E.
Knopf, A.
Lissen, Ltd.
Losonzci, E.
Manufacturers' Accessories Co. (1928), Ltd.
Oppenheim & Co., Ltd., E.
Richardsons (R.M.L.), Ltd.
Rose & Son, Ltd., T. A.
Univolt Electric, Ltd.
Rose, Morris & Co., Ltd.
Wood, E. A.

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British Homophone Co., Ltd.
Diehl, H.
Edison Bell, Ltd.
Fletcher & Co., Ltd., H. J.
Garrard Engineering & Manufacturing Co., Ltd.
Knopf, A.
Lissen, Ltd.
Manufacturers' Accessories Co. (1928), Ltd.
Richardsons (R.M.L.), Ltd.
Rose, Morris & Co., Ltd.
Wood, E. A.

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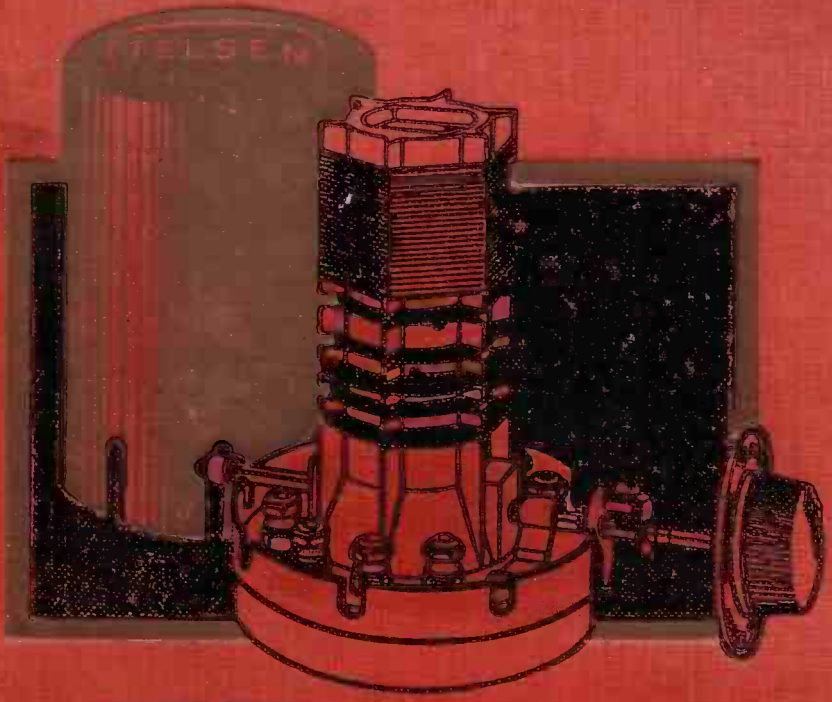

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