

WIRELESS

TONE—

and Lots of Volume, too



DE FOREST
Quality Valves

The only Valves with Bases of the Supreme Insulation ISOTANITE.

Co. Ltd.



The Set of a Hundred Refinements

The Pacific is master-built by master craftsmen. No other Set, no matter what price you pay, surpasses the crystal clear tone, the continuous & easily-controlled volume, the simplicity of tuning, the rigid construction, and the excellence of components.

The PACIFIC Radiophone

Do not make those classic set of idle talk. It is a fact. And it is important to note that "Pacific" Receivers in use in Queensland make it the city, in the suburbs, away in backblocks, hundreds of "Pacific" Radios bring families together, and giving the satisfaction. If you are interested or many owners who would gladly give you an unbiased opinion.

ask today for more particulars of the Receiver.

THE **Thomas Radio**

Two more Outstanding Successes!



Mullard

... Mullard products are in increasing demand. Let Mullard products be your guide to supply and better sales.

VICTORIAN & TASMANIAN DISTRIBUTORS
HOWARD ELECTRIC


AUSTRALIAN RADIO HISTORY

'As it happened'

compiled by Kevin Apps

FOR FARM OR TOWN


The World's Favourite



ASTOR Mickey Mouse

A.C. ELECTRIC MODEL - 3 Valve Superhet. A mild...
NEW BATTERY MODEL - operating on dry cells...
Complete with compact metal battery box.

FOR BETTER RECEPTION



The New AWA VALVE



AND FOR TOWN...
THERE IS NOTHING FINER THAN A
Stromberg-Carlson
532 or 632
Superheterodyne

OYES BROS. (Sydney) LTD.
111 CLARENCE ST., SYDNEY, N.S.W.

AUSTRALIAN RADIO HISTORY

"As it happened"

PREFACE

For the past five years I have been the editor of the newsletter/magazine of the local group of the Historical Radio Society of Australia, and in that time I have come across many interesting magazines, catalogues and articles relating to the history of radio and broadcasting in Australia.

This book is an attempt to put together some of this information. In order to present the history "as it happened" all the material is copied from it's original source apart from a few things for which I either, do not have the original or the original was in too poor a condition to use.

The original sources were:-

Newspaper clippings - source unknown
Homecraft's catalogues c 1923 & 1939/40
'Wireless' a handbook of instruction for the wireless enthusiast 1926
Wireless Weekly various issues
AWA Radio Guides of 1926 & 1928
The Australian Broadcasting Year Book of 1930
AWA Wireless Progress in Australia c 1930
Wireless Catalogue 1931, Edgar V Hudson
Radio Monthly magazine various issues
Television and Radio Review
The Radio Trade Annual of 1936
The Australian Official Radio Service Manuals
The Official Radio Trade-in Handbooks of 1947/8/9

Kevin Apps

A FEW "LETTERS TO THE EDITOR" FROM THE EARLY 1920's *(publications un-known)*

RADIO EXPERIMENTERS

Sir, - Permit me to place before your readers interested in radio the following, which to me is unfair. I have held an experimental license (receiving) under wartime regulations, when the fee was two pounds per year. On applying for a renewal, I am told by the chief manager of telegraph and wireless that he hopes that I will not regard it as in any way reflecting on my undoubted qualifications if I am required to obtain a broadcast-listener's license, but as such a license allows the facilities I desire for experiments, in addition to receiving broadcast programmes, it is regretted that my present license cannot be renewed. What I am writing about is that after experimenting, which means money and time, I am to lose my status as an experimenter, and to be classed as an ordinary broadcast-listener, who has in no way helped to bring radio into Queensland. Probably there will be no experimental licenses issued in Queensland. If they are, how are the authorities to discriminate? Hoping that old-time experimentalists will not let the matter drop, but will impress upon the authorities that they are entitled to an experimental license. - I am sir, etc.
RADIOIST, Auchenflower, November 13

WIRELESS SERVICE

Sir, - Is Queensland to be the last State to have a broadcasting station? A glance at the daily papers reveals transmissions in Sydney, Melbourne, Adelaide, Perth Auckland, Dunedin, and sometimes an American one. The nearest of these is over 600 miles away, and frequently they were all heard during the winter months by several experimenters in Queensland. But the summer months are different. The different conditions make it difficult and costly to get even Sydney, and so a great many wireless people are greatly disheartened. There are several amateur transmitters here, but they are limited to 10 watts output, and are very rarely featured in the Press announcements. And again, the New South Wales men on the land have the privilege to listen to weather, market and sports reports daily; ours must await the slowly moving mails, and many times storms are upon them without warning. Some little time ago a movement was afoot for the State Government to erect a class "B" station in Brisbane, but the idea seems to have been lost. It is a pity, for a great deal of good would result directly to the whole people, Government, farmers experimenters, traders, and the general public. Perhaps, in the rush of business incidental to the closing hours of the session, Mr. Gillies has held aside the scheme for a time, but he would earn the gratitude of a great number of people if he would operate even a medium-powered station to give the public of Queensland a wireless service. In the meantime, Queensland is allowing all the other States, except Tasmania, to lead her in the matter of "Wireless Service." Will Queensland be the absolute last? - I am, sir etc.. COSINE.
November 17 (1924?)

WIRELESS IN BRISBANE

According to many wireless enthusiasts, there will be quite a boom in wireless receiving in Brisbane as soon as a comprehensive system of broadcasting is inaugurated. The retailers of small wireless sets and parts have recently increased their stocks, and report a gradual growth in the sales of this class of apparatus. One amateur, who just purchased a crystal set for the purpose of experimenting, states that he sometimes picked up fairly distant messages, but that the times when the atmospheric conditions favored that very seldom occurred. He considered, however, that an arrangement could subsequently be arrived at whereby broadcasting could be received from other large centres, and rebroadcast here, thus enabling the public, soon as a powerful broadcasting station is set up, to draw on other cities and towns even with crystal sets. He was not aware if such a scheme would be feasible, but thought that if it were there would be a phenomenal rush for wireless receiving sets. The listening-in in Brisbane would, he considered, vary very largely in regard to the limit of the broadcasting programme that was made available.

RADIO DESECRATED

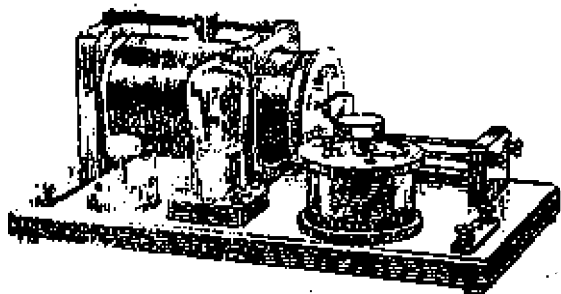
There is no doubt that wireless will be, if it is not now, the greatest attraction ever known (writes H.S.). The other night we were "listening-in"

We had just been treated to a flute solo, and were listening, most intently, for the next item. It was to be an orchestral performance. We all held our breaths. We could almost imagine them stringing up.

Then . . . What did we hear "Hot Pies!" "Hot pies!" Groans. What's the use of a Government if it cannot prevent hot pies being sold while we are "listening-in"

c 1923

Homecrafts P. H. MELROY. **211 SWANSTON ST. MELB.** MATERIAL FOR ELECTRICAL & MECHANICAL HOBBIES



Type L.C. Receiving Sets

All Sets listed on this page are similar in appearance to the One Valve Set illustrated, the only difference being the number of valves and equipment supplied.

Type L.C. Crystal Set.

This is a popular recommended Set for all Amateurs. It will receive Morse Telegraphy within a range of about 800 miles, and Speech and Music when the transmitting station is within about 20 miles. Mounted on polished base board is a Loose Coupled Tuning Coil, Detector, Fixed Condenser and necessary Terminals. All parts nicely Nickel-plated.

Price of Set as described £3/10/-.
Price of Set with Phones and Aerial Material Supplied £6.

Type L.C. Single Valve Set.

A simple Set to operate, and much more sensitive than Crystal Set.

This Set is exactly as illustrated; simple to operate. It is far more sensitive than the Crystal Set, and receives messages over greater distances. Further valves may be added to amplify the signals and increase the range, thus it makes a good set for those not desiring to invest in a large set at once.

Set as illustrated, comprising Loose Coupled Tuning Coil, Rotary Variable Condenser, Valve and Holder, Base Board. All metal parts Nickel-plated. Price, £8.

Additional Apparatus required—

Phones, 30/- to 45/-.

"A" Battery, 4V 40 A.H. Accumulator, 40/-,
or a 5V 40 A.H. Accumulator, 65/-.

"B" Battery, 32 Volt, 10/6.

Aerial Material, 10/-.

Type L.C. Valve Detector and Amplifier Set (Two Valves).

This is same as above, with the addition of an amplifier unit, which comprises another valve, valve holder, audio frequency transformer, rheostat, etc.

Weak signals are magnified with this set until they are clearly heard, and by attaching one receiver to our "Clear Speaker" Horn, the Head Phones may be dispensed with, and the signals and music enjoyed by all in the room.

Price of Set as described, £13/5/-.

Additional Parts, as for Single Valve Set, and an extra "B," at 15/6, as required.

Further Amplifier Units can be added to any of above Sets at £5/5/- per Unit. "B," to work same, 15/6 each.

Type H.C. Sets, with Honey Comb Coils.

Type H.C., Single Valve Set, comprising Triple Coil Stand and 3 coils, 2 Variable Condensers, Series-Parallel Switch, Valve, Valve Holder, Rheostat, etc., mounted on polished Ebonite Panel in polished Wood Cabinet.

Price, £12.

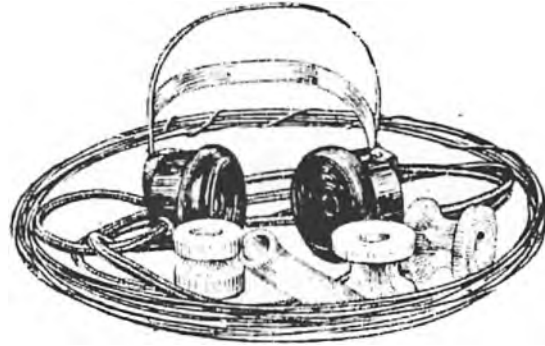
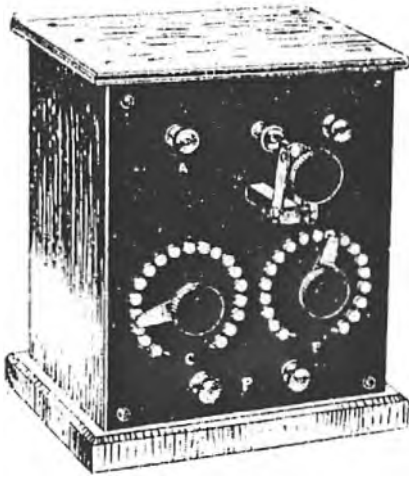
Some additional parts as Type L.C. are required.

Type H.C. Valve Detector and Amplifier, £17/15/-.

Further Amplifier Units can be added at £5/10/- per Unit.

c 1923

The "CABINET" Wireless Set.



The Cabinet Set illustrated is one of the most reliable and simple sets to operate; it will enable Morse messages sent from stations within 500 miles to be readily received, and music and speech comes in clearly within a radius of 15 miles. Within the cabinet is a tuner, with taps taken to two switches, which are mounted conveniently on the ebony panel, as shown. These switches give rapid and accurate tuning to cover all Australian stations. The Detector has supersensitive crystal, and is readily adjustable.

The whole in appearance and performance is unequalled, no batteries are required, and cost of upkeep is nil.

Price of Cabinet Set only £2/15/-
Price of Cabinet Set, with Phones and Aerial Material . . £5/5/-

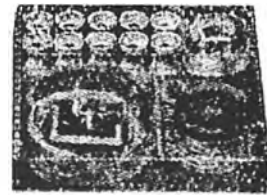
Complete Wireless Receiving Set for 60/-.

No Further Expense.

A simple, practical outfit from which satisfactory results are guaranteed. Can be installed and operated by anyone in about an hour. The set includes all essential parts, i.e.:-

Single Slide Tuning Coil, Crystal Detector, Receiver and Cord, 80ft. Aerial Wire, 6 Insulators, 1 Lead-in Tube, and 4 yds. Heavy Insulated Wire for connecting.

Price, 60/- complete. Postage, 2/-; Interstate, 3/8.



Secure Yours and make a Start NOW.

Wireless Set for Reception of

Music.

Speech

Morse.

Buy Your Set To-Day.

Have It Ready To-Night.

About one hour's work, and you may sit by the fireside and listen to the music, speech, and morse, which comes to you in a mysterious manner through the air. No code to learn; hear it spoken plainly.

The set includes all essential parts, connected ready for use, i.e.:- Loose Coupled Tuning Coil, Detector, Double Receivers, with headband and cord, Variable Condenser, 160ft. Aerial Wire, Six Insulators, and Instructions for obtaining best results.

Reception Range. 500 miles for Morse; 20 miles for Music and Speech.

Price, complete, £6/17/6.
Postage, 2/-; Interstate, 3/8.

1924

WIRELESS BROADCASTING

Commencing To-day

THE ASSOCIATED RADIO COMPANY OF AUSTRALIA LTD., 51-53 a'Beckett Street, Melbourne, Wireless Broadcasters, actual Manufacturers and Distributors of Wireless Receiving Sets, beg to announce the opening of their Melbourne Broadcasting Service this evening, Saturday, January 26th.

Experimenters are invited to listen-in, and CASH PRIZES of £5, £3, £2, and £1 are offered for the best written reports of the evening's Broadcasting. Reports will be received up to February 2nd, and will be judged by the Company's Directors, and the decisions published in the press of Saturday, Feb. 9th.

The Chief Secretary (Dr. Argyle) will open the Broadcasting service at 8 p.m.

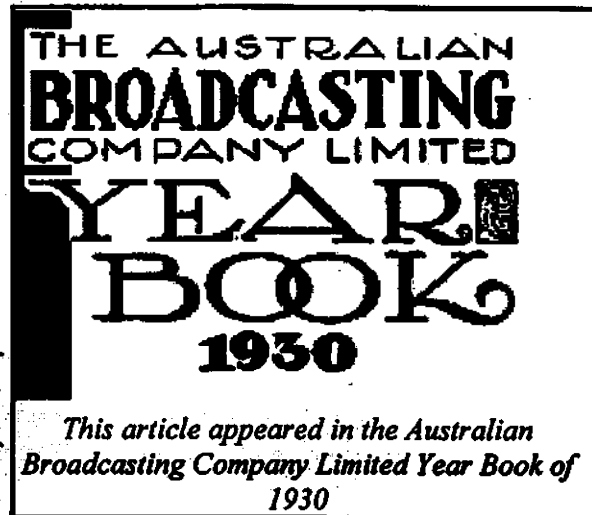
*A Vocal and Instrumental Programme by well-known Artists
will follow*

Tell Your Wireless Friends

THE HISTORY OF BROADCASTING IN AUSTRALIA

As in other countries, the broadcasting services in Australia had their beginnings in experiments - official, commercial and amateur. The first actual demonstration of transmission and reception of radiotelephony occurred in Melbourne at the Aircraft Exhibition held in June and July, 1920. The transmission was conducted at the headquarters of the Commonwealth Government Radio Service at Collins House, Melbourne, on equipment which had been loaned by the Air Force, and the reception was conducted in the Exhibition Building.

In August, 1920, a public demonstration was given by Amalgamated Wireless (A/asia) Limited at the Royal Society in Sydney, and in October of the same year a further demonstration was carried out by the Company at Queen's Hall, Federal Parliament House, Melbourne. Early in 1921 a series of weekly experimental broadcasts were carried out by Amalgamated Wireless (A/asia) Limited, Melbourne. In August of that year a further successful experiment was carried out when the Commonwealth Government Radio Service conducted tests of two-way radiotelephony between Tasmania and the mainland. Experimental transmission by commercial and amateur interests developed gradually in the next two years, the reception being confined entirely to radio enthusiasts in the official, commercial and amateur fields. Notable amongst the amateur transmissions were those conducted by Mr. Maclurcan, of Sydney, 2CM, and Mr. Culliver, of Melbourne, 3DP.



The Sealed Set Scheme

The first proposal for systematic broadcasting was made to the Prime Minister's Department by Amalgamated Wireless on 27/7/1922, when the Company indicated its desire to undertake a radio concert service in all States. On 1/11/1922 the Company formally applied for permission to establish the stations, but before any details for a comprehensive scheme were approved several other firms had intimated a desire to provide broadcasting services. Early in 1923 it was decided to consider the whole matter comprehensively, and on 24/5/1923 a conference of all interested parties was convened by the Postmaster-General in Melbourne. The conference unanimously decided upon a scheme which became known as the Sealed Set scheme, and as the Postmaster-General had promised the conference he would introduce any scheme put forward unanimously, the Department prepared regulations based on the conference proposals, but at the time the Department indicated a doubt as to the efficacy of the scheme. The regulations were issued on 1/8/1923, and among other things contained a provision that the station licensees could make their own charge for subscription by listeners who had sets tunable only to the wavelength of the particular station whose service was received.

The history of broadcasting in Australia written in 1930

Under the scheme the following stations supplied services:-

Station	Company	Service Commenced	Listeners Subscription
2SB later 2BL 2FC	Broadcasters (Sydney) Ltd.	13/11/1923	10/-
	Farmer and Company	5/12/1923	63/-
3AR	Associated Radio Company	26/1/1924	63/
6WF	Westralian Farmers Ltd.	4/6/1924	84/-

In addition to the Company's subscription, the Postmaster- General required the Company to collect a licence fee from each licensee.

This Sealed Set scheme was not a success between 1/8/1923 and 30/6/1924 only 1,400 listeners were licensed under the regulations. Considerable difficulty was experienced by the Department in dealing with applications for Experimental Licences. As many as 5,000 applications were received during that time from persons who could not be properly classified as experimenters. but who desired to listen to any station without restriction beyond a common licence fee.

"A" and "B" Stations.

Early in 1924 various suggestions for the amendment of the Regulations were made to the Department, mainly on the ground that it was desirable that any listener should be permitted to listen to any station without separate payment. The Postmaster-General received further representations from a conference which met in Sydney between 8/4/1924 and 14/4/1924, but it was found that the proposals were unacceptable, and the Department evolved a new plan and revised the Regulations which were issued on 17/7/1924.

The new regulations provided for the issue of two classes of broadcasting station licences-Glass "A" and Class "B" Two Class "A" licences were authorised for New South Wales and two for Victoria, mainly owing to the fact that the stations were already in existence in those States. In all of the other capital cities only one Glass "A" station was permitted, but the Regulations provided that the licensee of the Class "A" station or stations in the relative State should, if required, establish relaying stations for the purpose of serving distant country listeners.

The new system provided for Class "A" stations to be maintained by revenue received from licences issued to broadcast listeners, radio dealers and experimenters. The owners of Class "B" stations would not receive any such revenue and their services were to be maintained by revenue received from advertisements or from other sources. It was arranged that the licence fees Would be collected by the Postmaster-Genera l's Department - licences being obtainable at post Offices.

The Regulations required that the various broadcasting station licensees, Class "A" and Class "B" should make their own arrangements for the payment of any claims that might be made in respect of copyright or patents. The copyright payments by the Class "A" companies were practically standardised after a conference in 1925. It was agreed that the Companies should pay to the Australian Performing Rights Association ten per cent of the amount distributed to them by the Post Office from its licence fee collections. Different arrangements were made with the Class "B" stations, no standard basis being adopted.

The history of broadcasting in Australia written in 1930

Patent Royalty charges

Patent royalty charges were payable to Amalgamated Wireless (A/asia) Limited, the basis being that the Company should charge the Class "A" companies not more than 5/- per licence per annum. Other arrangements were made in regard to Class "B" stations. In November, 1927, when the Commonwealth Government agreed to pay Amalgamated Wireless a proportion of the listeners' fees, a new basis was introduced covering the use of the Company's patents, both in the Class "A" and Class "B" stations, and also in wireless receivers. The agreement provided that Amalgamated Wireless (A/asia) Ltd. should be paid 3/- per licence fee per annum.

The Class "B" stations were permitted to broadcast advertisements or other paid publicity without restriction by the Department, but the extent of advertising by the Class "A" stations was limited in the Regulations to a total period not exceeding 60 minutes per day. The licence period for a Class "A" or Class "B" station was five years from the date of issue.

The First "A" Licences

The schedule hereunder shows particulars of the Class "A" Licences issued under the 1924 Regulations:-

Call Sign.	Licensee.	Frequency KC.	Wave-length Metres	Power Watts (Anode)	Date of Expiry of Licence.
2BL (a)	New South Wales Broadcasting Co. Ltd.	855	*350	5,000	21/7/29
2FC (b)	New South Wales Broadcasting Co. Ltd.	665	*451	5,000	16/7/29
3AR (c)	Dominion Broadcasting Co. Ltd	620	*484	5,000	7/8/29
3LO (d)	Dominion Broadcasting Co Ltd	808	*375	5,000	21/7/29
4QG	Queensland Radio Service ..	760	*394.5	5,000	29/1/30
5CL	Central Broadcasters Ltd. ..	730	*412	5,000	13/1/30
6WF (e)	Westralian Farmers Ltd. ...	690	*435	5,000	21/7/29
7ZL (f)	Tasmanian Broadcasters Pty. Ltd	580	516	3,000	13/12/30

- (a) 2BL Licence originally issued on 22/7/1924 in name of Broadcasters (Sydney) Ltd.
- (b) 2FC Licence originally issued on 17/7/1924 in name of Farmer & Co. Transferred to 2FC Ltd. on 12/12/1927. Both stations amalgamated under ownership of New South Wales Broadcasting Co. on 14/8/1928.
- (c) 3AR Licence originally issued on 8/8/1924 to Associated Radio Co.
- (d) 3LO Licence originally issued on 22/7/1924 to Broadcasting Co. of Australia. Both stations amalgamated under ownership of Dominion Broadcasting Co. on 1/3/1928.
- (e) Service transferred to Postmaster General's Department on 20/12/1928 at request of company.
- (f) Originally issued to Associated Radio Co. on 14/12/1925. Transferred to Tasmanian Broadcasters Co. on 19/7/1927.

*2FC Original licensed wavelength, 1,100 metres, changed to 442 metres on 2/10/1926. changed to 451 metres on 1/9/1929.

*2BL Original licensed wavelength, 350 metres, changed to 353 metres on 12/5/1925. changed again to 350 metres in January, 1928.

*3AR Original licensed wavelength, 480 metres, changed to 484 metres on 12/5/1925.

*3LO Original licensed wavelength, 1,720 metres, changed to 371 metres on 1/7/1925. changed to 375 metres in January, 1928.

*4QG Original licensed wavelength, 385 metres, changed to 395 metres in January, 1928.

*5CL Original licensed wavelength, 395 metres, changed to 412 metres on 13/1/1928.

*6WF Original licensed wavelength, 1,250 metres, changed to 435 metres on 1/9/1929.

The history of broadcasting in Australia written in 1930

The "B" Class Licences.

The following Class "B" licences were also issued

Station	Licensee.	Power (Anode)	Fre- quency (Wlength)	Licensed	Service Com- menced.
• 2BE	Burgin Electric Co.	100	949 (316)	7/11/24	7/11/24
2GB	Theosophical Broadcasting Station Ltd. ..	3,000	949 (316)	13/5/26	23/8/26
2KY	Trades & Labour Council	1,500	1,070 (280)	20/5/25	31/10/25
2UE	Electrical Utilities Supply Co	250	1,024 (293)	7/11/24	26/1/25
(a) 2UW	Radio Broadcasting Ltd.	500	1,124 (287)	13/2/25	13/2/25
(b) 2HD	W. W. Johnston	600	1,415 (212)	1/12/24	27/1/25
2MK	Mockler Bros.	250	1,155 (260)	15/10/25	11/11/25
(c) 3DB	3DB Broadcasting Station Pty Ltd	500	1,179 (255)	18/10/26	21/2/27
8UZ	O. J. Nilsen & Co	500	930 (322)	6/2/25	8/3/25
4GR	Gold Radio Service ..	150	1,019 (294)	5/6/25	9/8/25
(d) 5DN	5DN Pty. Ltd	500	960 (313)	1/12/24	24/2/25
5KA	Sport Radio Broadcasting Co.Ltd.	1,000	1,199 (250)	26/8/26	25/3/27

* Licence not renewed. Station ceased operations on 6/11/1929.

(a) Licence originally issued to O. Sandell. Transferred to Radio Broadcasting Ltd. on 12/4/1928.

(b) Licence originally issued to H. A. Douglas. Transferred to W. W. Johnston on 21/2/1928.

(c) Licence originally issued to Druleigh Business and Technical College Pty. Ltd. Transferred to 3DB Pty. Ltd. on 1/6/1927. Acquired by the 'Herald' on 14/6/1929.

(d) Licence originally issued to E. J. Hume. Transferred to SDN Pty. Ltd.. on 31/7/1925.

A Proved Success

The success of the new scheme may be gauged from the fact that the listeners' licences increased from 38,000 in June, 1925 to 310,000 in July, 1929.

Notwithstanding the general success of this scheme, however, there were certain features in it which favoured some States more than others. For instance in Victoria, a much greater revenue was available for the Companies owing to the fact that 140,000 licences were issued. It was largely a matter of distribution of population. The cost of providing a service for a small population was almost as great as that for a much larger population, and the States of great extent of territory, such as Queensland and Western Australia, were more in need of relaying stations in the country districts than a small State like Victoria.

These and other factors relating to broadcasting led the Government to appoint in January, 1927, a Royal Commission to investigate broadcasting conditions throughout the States. The Commission made certain recommendations involving, among others, the pooling of a portion of the licence fees of all states with the object of guaranteeing a minimum revenue to the companies in each State. The Commission's report was considered exhaustively by the Government, and finally in October, 1927, a conference of all the Class "A" companies was called by the Prime Minister. The representatives were unable to agree on any common scheme, but the Government asked the Companies to consider the matter exhaustively with the object of arranging for co-ordination between the companies, so that the larger States could help the smaller States in providing a satisfactory service throughout the Commonwealth. Negotiations along these lines continued during the ensuing seven months, but in July, 1928, the Government decided that it was desirable to introduce a new scheme.

National Broadcasting Service

On 26/7/1928 the Government announced its intention to establish a National Broadcasting Service, whereby one organisation would cater for the National programmes for all States. The technical services of all States would be owned and operated by the Government, while the provision of programmes would be left to experienced entrepreneurs under contract. An advisory committee to assist the Postmaster-General in the matter was appointed, consisting of Mr. H. P. Brown (Chairman), Mr. J. H. Hammond, K. C., Professor J. P. V. Madsen, Hon. R. B. Orchard, and Mr. W. H. Swanton.

This Committee prepared a detailed scheme for the establishment of the National Service and the extension of the broadcasting service generally throughout the Commonwealth. The recommendation included:-

- (a) The establishment of a National Broadcasting Service in place of the Class "A" stations. The Postmaster-General's Department would undertake the provision and maintenance of the technical services of the stations, studios and the relaying circuits while the programme services would be let by tender to a programme company;
- (b) The continuance and extension of the existing system of Class "B" stations, the number, allocation and power of which would be decided by the Postmaster-General;
- (c) The establishment by the Postmaster-General's Department of a number of Class "C" stations. The programme time of these stations would be made available for the transmission of publicity programmes or programmes sponsored by large advertisers.
- (d) The broadcast listeners licence fees would continue at 24/- per annum, of which 12/- would be the maximum amount available to the Programme Contractor. Of the balance, 3/- would be paid to Amalgamated Wireless in accordance with the 1927 Agreement between the Commonwealth and the Company and the remainder would be retained by the Postmaster-General's Department to cover the cost of establishing and maintaining the additional stations, studios, relaying circuits, etc., and the cost of general administration in connection with licence records, etc.

In accordance with the Government's approval of the Advisory Committee's plan, action was taken concurrently by the Department:-

- (a) To acquire the plant of the existing Companies, so that the services would be continued without interruption.
- (b) To arrange for a contract for the provision of the programmes of the National Service; and
- (c) To arrange for the erection of additional subsidiary stations in country districts.

About this time the Company owning Station 6WF, Perth, informed the Department that they were unable to continue the service owing to the heavy losses that they had sustained, and were likely to sustain during the remainder of their licence period. They requested the Department to take over and continue the service. The Department purchased the plant and provided the service, including the programmes, from 20/12/1928 until the station was taken over under the National Broadcasting Scheme on 1/9/1929.

The history of broadcasting in Australia written in 1930

Stations come under the Government

As the licences of the four main stations in Sydney and Melbourne were due to expire in July/August, 1929, and as the Government wished to assist the pioneer companies by taking over their assets, if they so desired, the plants of the existing stations were acquired. At the same time tenders were called for plant for additional stations in accordance with conditions specifying plant of the most modern type.

Expiration of the various licences and utilised for the National Broadcasting Service. The Government had decided on this course, although it was recognised that considerable expenditure was needed in most of the stations to modernise the equipment and generally to improve the transmissions.

On 9/5/1929 tenders were invited for the provision of the programmes in accordance with specified conditions, and eight tenders were received. The combined tender of Union Theatres Limited, Fuller's Theatres Limited, and J. Albert & Son was accepted, and the tenderers formed the Australian Broadcasting Company, which Company entered into a contract with the Commonwealth for the provision of the programme services for a period of approximately three years ending in all States on 30/6/1932.

Listeners Licence Fees

The schedule hereunder shows the fees charged for broadcast listeners' licences from July, 1924, to the present time:-

Period	Fee (a)	Paid to Broadcasting Company	Retained by department for Administration
17/7/24 to 31/7/25	35/-	30/-	5/-
1/8/25 to 31/12/27	27/6	25/-	2/6
1/1/28 to present time	24/-	20/- (b)	1/- (3/- to A.W.A.) (c)

(a) These fees refer to listeners located in Zone 1, that is the territory within a radius of approximately 250 miles from Class "A" Station. Lower fees were charged for Zone 2 covering the territory between 250 and 400 miles radius, and lower still in Zone 3 outside the Zone 2 boundary. Since January, 1928, only two Zones are recognised Zone 2 including all the territory outside 250 miles from a Class A " station.

(b) From the date of the inauguration of the National Broadcasting Service in the various States, as mentioned already, the Australian Broadcasting Company receives 12/- per licence.

(c) An amount of 3/- is paid to Amalgamated Wireless (A/asia) Limited as patent royalty, under the Wireless Agreement Act of 1927. This payment commenced in November, 1927. Prior to that date the Company received patent royalty from the Class A Broadcasting Companies at the rate of 5/- per listener's licence.

The history of broadcasting in Australia written in 1930

From 1/8/1925 to 31/12/1927 the payment of the listeners' licence fees in two instalments of 15/- each was permitted; 2/6 being retained by the Department in respect of each instalment. Owing to difficulties which had arisen, the instalment system was discontinued on 31/12/1927.

Up till 31/12/1927, Dealer's Listening Licences, Special Licences and Temporary Licences were also issued, the fees charged and the departmental proportion being:-

	fee	Departmental Proportion
Dealer's Listening Licence	£5	£1/5/-
Special Licence	£10	5/-
Temporary Licence	£1	5/-

These licences were abolished on the introduction of the uniform licence from 1/1/1928.

The apportionment of a listener's license fee (24/- for Zone 1 and 17/6 for Zone 2) from the date of the inauguration of the National Broadcasting Service in each State is as follows:-

Programme Contractor	Zone 1 (24/-)	Zone 2 (17/6)
Australian Broadcasting Company)	12/-	12/-
P.M.G. Department (for administration and technical services)	9/-	2/6
Amalgamated Wireless (Patent Royalty)	3/-	3/-

THE POLICY OF THE AUSTRALIAN BROADCASTING COMPANY LIMITED

After five years of Broadcasting with the various "A" Class Stations under various systems of control, the Commonwealth Government decided the future policy must be one of general consolidation.

The National Broadcasting Service was then brought into being. and the Australian Broadcasting Company Limited was given the task of providing the programmes in every State, upon the expiry of control held by the various contractors, under the old system.

First 2FC Sydney then 3LO Melbourne, came under the new system, followed at short intervals by 2BL Sydney, 3AR Melbourne, 6WF Perth, 5CL Adelaide, and 4QG Brisbane, and, finally, 7ZL Hobart.

The establishment of Relay Stations in certain key centres is a gradual process for the future, and these will not be the subject of review in this Year Book.

Looking back over the first year of our stewardship we feel that it has been one of organisation, expansion and development. The keynote of our activities has been service to the public. We have endeavored to serve all interests, and while the complexities of administration spread over such a vast area as Australia has made our task difficult, nevertheless we claim that our first year's work has been successful. This assertion is not made in a spirit of self-complacence. We have not been free from criticism - no successful Broadcasting system ever will be - but the fact that we have not only retained the large clientele that came over with the establishment of the

The history of broadcasting in Australia written in 1930

National Service, but have increased the listeners in every State, is the best proof that our work has been approved by the listening public, who have appreciated the magnitude of our task of reorganisation.

First Year's Success

The first twelve months of the Australian Broadcasting Company's contract was one of the most difficult in the history of the Commonwealth. We had to face a very definite hostility to the new method of centralised control of Broadcasting, the natural disturbance by our taking possession of the Stations, and, above all, the severe financial depression. Then it was necessary to organise what was to be done under the new allocation of percentages of licence fees. Under the old contracts our predecessors had the control of both programmes and mechanical operations, and this gave them a far larger revenue to cover their programmes. They also received advertising revenue. The National Service placed the programmes only under our control, and the mechanical operations under the Postmaster-General's Department. In the allotment of proportions of the licence fee, it was necessary for the Government to cover the growth of its mechanical services together with the provision for the establishment of Relay Stations. This meant a lesser sum available for programmes. We believed, however, that with concentrated effort, success could attend our efforts with the amount available, and by carefully reorganising the work of each State the programme services gradually improved to a point where they can be said to be giving satisfaction.

Throughout the year, Mr. H.P. Brown, Director-General of Posts and Telegraphs, and his staff of officials, have given us every possible assistance and co-operation. Skeptics forecast constant friction under the system of dual control, but these critics have been confounded. The first year has been one of harmonious working, which should augur well for the future success of the National Broadcasting Service.

Our Objective - A Really National Organisation.

In undertaking the supply of Broadcasting programmes for the whole continent, it has been our objective to recognise that a National Service must know no State boundaries. We have met some criticism on this score, but those who make protest must realise that Broadcasting is to play a very big part in the future development of our empty spaces. By making available to our settlers in the back country some of the pleasures and services close to the doors of the more favoured dwellers in our cities and towns, we feel that we are making Broadcasting a truly National organisation.

From a financial point of view our first year has not been a profitable one, but this will not deter our policy of expansion in the future. It would have been possible for us to have created a surplus on the year's workings, but we decided to expend additional money in improved programmes instead. It should please listeners to know that although we have had to carry losing Stations in some of the smaller States, we have actually spent more money on programmes in every Station than the old controllers.

Confidence in the Future

We look to the future with confidence. We enter upon the new year of our contract with renewed diligence and zeal. We think those who have co-operated with us in the first year of our labours. We thank those who, while not seeing eye to eye with all that we have done, have still helped us with constructive criticism.

We ask listeners to remember that while individual items may not always please them, these are fulfilling the wants of someone else in the community.

If Broadcasting is accepted upon the generous basis that, like a newspaper, there are diversified interests to be served, then the second year of our activities will be even more pleasant than the first.

STUART F. DOYLE Chairman of Directors.

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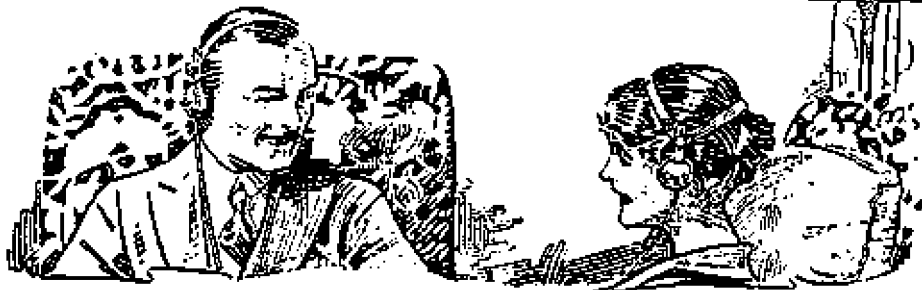
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"WIRELESS"

*A Handbook of Instruction
for the Radio
Enthusiast*



by

J. W. ROBINSON

(Director Queensland Radio Service, Station 4QG, Brisbane)

and

G. WILLIAMS

(Instructor, Marconi School of Wireless, Sydney)

First Edition

APRIL 1926

Wholesale Distributor:

A. McLEOD

General, Technical and Education Booksellers

107 ELIZABETH STREET, BRISBANE

Published by

THE READ PRESS LIMITED, Albert Street, Brisbane

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CHAPTER 19.

Broadcasting

A PEEP BEHIND THE SCENES.

It may safely be said that the advent of broadcasting was responsible for the phenomenal rise of the wireless movement throughout the world.

Prior to the days when wireless filled the ether with the voices of great orators, with the songs and instrumental selections of great artists, with news services and with market reports, the amateur wireless movement was comparatively unknown.

In various parts of the world small numbers of keen experimenters owned and operated private stations, but were compelled to rely on commercial or, perhaps, in one to two cases, on low powered experimental stations for reception.

When, however, wireless telephony was made possible, many people who had previously not taken an active part in the science were attracted by wireless, and with the establishment of broadcasting stations on a large scale, this number rapidly increased to hundreds of thousands.

Those who have studied the broadcasting movement from its commencement can never forget the tremendous boom witnessed in the United States of America, and which was followed closely by a similar boom in England. The radio industry suddenly became of national importance, and dozens of factories working continuously were totally unable to keep up with the extraordinary demand which set in for wireless sets, and more particularly for wireless parts.

Although it may at first sight appear strange, it is nevertheless quite true to state that the broadcasting movement created a whole host of experimenters. It has often been pointed out that the experimental movement was responsible for the creation of an interest in broadcasting, but this statement, although containing a big percentage of truth, is hardly totally correct. Experimenters certainly did the pioneering work, and later spread the good news regarding the possibilities of wireless telephony as applied to the broadcasting of speech and music, but it is just as true to state that the interest displayed in broadcasting by many people to whom wireless was a closed book was the forerunner of an even greater interest, an interest which refused to allow those people to be content with the mere securing of results from ready made sets, but compelled them to find out the why and wherefore of the working of their receivers.

Thousands of keen amateurs of to-day have started off on their radio work with a receiver purchased ready for the reception of telephony and at the time have not had any idea of progressing very far with an actual study of wireless.

Their natural curiosity has, however, forced them to find out just why speech and music transmitted from a point many miles distant are clearly audible in the telephones or the loud speaker in their own home, and from these preliminary inquiries they have delved deeply into the mysteries of radio, have mastered the meaning of inductance, capacity, periodicity, frequency, radio and audio frequency amplification, and many other terms which no doubt sound most formidable to the layman.

And this army of broadcast-made-amateurs is rapidly increasing every day. In Australia, private stations are being licensed in large numbers, and the amateur with a good working knowledge of wireless knows only too well how keen are some of the new experimenters who come to him for advice and assistance.

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" W I R E L E S S "

And in passing, it may be remarked that with hardly an exception the average amateur is never more pleased than when he is able to offer such advice and render such assistance to a keen beginner.

Broadcasting is without a doubt the most popular of all branches of wireless—the fact that it daily and nightly entertains such vast and world wide audiences is sufficient proof of the truth of this statement. It is questionable, however, whether in any other branch of the science so little is known regarding just how transmission is effected, or in more popular language how the whole business is "stage-managed" as is the case with broadcasting.

To many people the term "broadcasting" does not conjure up many difficulties. With a wave of the hand they dismiss it as quite a simple matter, a matter solved merely by the erection of a telephony station and the transmitting from it of programmes of speech and music, of orchestral items, of instrumental solos, and occasionally of full band concerts.

Needless to say such a conception of broadcasting is hopelessly incorrect.

The conducting of a broadcasting service is a highly specialised branch of wireless and demands just as much, if not more, care and attention to detail than the working of a large commercial station.

BROADCASTING IN AUSTRALIA.

During recent times broadcasting has been established very firmly in Australia, and several stations are now working daily and nightly in various parts of the Commonwealth. Programmes of speech and music, theatre items, popular concerts, news services, market reports, stock exchange information, racing news, and other utilitarian items are flashed with the speed of light to all parts of the Commonwealth.

Although some low-powered stations are at work in Australia, and are transmitting some excellent programmes over considerable distances, most of the "A" grade stations in the Commonwealth are now working on high power for the transmission of their programmes.

Use of high power has been made with the object of giving those in country districts many miles from the sending station the same quality of service as those in nearer districts with little extra cost for the installing of receiver.

In other parts of the world the population is large, and big cities are numerous. In America, for instance, broadcasting stations are scattered over the continent at many points, and even the merest novice with a small, cheap crystal set is able to receive speech and music from at least one of them.

In Australia, with vast expanses of territory sparsely populated, it would obviously have been unfair to the more distant dwellers to have erected stations incapable of transmitting programmes receivable by them without the use of highly complicated and very expensive receivers. The use of high power was thus decided upon as being the only means by which dwellers in all parts of the State in which the station was situated being ensured of receiving the programmes on comparatively moderately priced apparatus.

With a large station operating on a power of 5000 watts it is safe to assume that (except, of course, under special conditions) signals should be received anywhere within a radius of 300 or 400 miles on a two valve receiver, and that these signals should be quite loud enough to operate apparatus to enable several people to listen at the same time.

The consideration of these facts led to the construction of large stations and the installing of those stations of modern transmitters capable of working on a power of 5 kilowatts. The "carrying power" of the transmitter at 2FC, Farmers' Broadcasting Station, 3LO, Melbourne, and 4QG, Brisbane, may be judged when it is stated that reports of clear reception have reached the management from all the

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Australian States, from New Zealand, many of the Pacific Islands. 2FC was the first Australian station to transmit telephony across the Pacific from West to East and this feat alone speaks well for Australian wireless enterprise.

HOW BROADCASTING IS EFFECTED.

To successfully conduct a large broadcasting station, those in control are faced with three important sections into which the whole task may roughly be divided.

Firstly, the actual programmes of speech and music must be arranged and the concerts and entertainments which are to be broadcasted must be conducted just as is the case with the conducting of an ordinary platform concert.

Secondly, the sounds produced by artists, announcers, and all others participating in the concerts must be transformed into electrical currents and handled, and thirdly, these currents which represent the sounds must be radiated in the form of wireless waves.

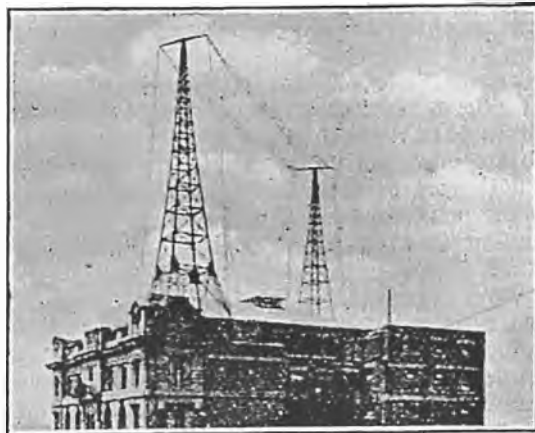
In some of the Australian stations the actual broadcasting gear is situated in the same building as the studios, but in others the studios are situated at a point some miles distant from the station and communication between the two is maintained by telephone lines.

Over these lines the currents from the studios are conveyed to the transmitter.

At Stations 2FC (Sydney), 2BL (Sydney), and 3LO (Melbourne), the studios and stations are separate, but at 6WF (Perth), and 4QG (Brisbane), the station and studios are in the same building.

There is of course a reason for the placing of studios and stations at different points in some cases. A broadcasting studio must of necessity be situated in the heart of a city. It must be quite easily accessible to artists, to prominent people who may visit it for the purpose of lecturing, and it must be within easy range of newspaper organisations and the centres of commercial activity.

The most central site is therefore the most suitable one for the studio.



The Aerial at 4QG.

Now, in many cases it is impossible on the ground of expense or owing to architectural difficulties to erect large station buildings and large masts and towers right in the heart of a city.

In the case of 2FC, 3LO, and 2BL, it was found more suitable to place the stations outside of the city area but at 4QG quite a large area of space was available for the erection of the station and it was possible to build large lattice steel towers on the same building to carry the aerial system.

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" W I R E L E S S "

More will be said at a later stage about the station buildings at 4QG.

THE BROADCASTING OF PROGRAMMES.

Let us consider for a little while just what is necessary before the programmes of speech and music which nightly delight thousands who "listen-in" reach the actual receivers.

We have already stated that the first section of the work comprises the holding of the concert in much the same manner as an ordinary platform concert.

This means a tremendous amount of administrative work at the studios.

Artists must be tested, and terms and conditions must be discussed with them. Repertoires must be compiled and special modern index and card filling system instituted so as to enable artists to be dealt with in a quick and businesslike manner. Lectures must be arranged, utilitarian sessions considered and arrangements completed between the broadcasting station and organisations, such as newspaper offices for the supply of news and others services.

The broadcasting manager must remember that he is catering for a vast audience, which includes people of all sorts of tastes and opinions. He must try to cater for everybody.

The ordinary concert manager who organises a certain sort of entertainment generally knows that those who attend it will be interested in the particular form of concert he places before them. The broadcasting manager has to cater for a mixed audience, and sometimes he finds it a difficult task.

The world's greatest need to-day seems to be for a broadcasting manager who can please everybody every day in the year!

Needless to say, the services of such a man, if discovered, will be invaluable to the station with which he is associated!

In addition to the preliminary work necessary in connection with the selection of artists, the programmes must be arranged and drafted in detail many days ahead.

Wireless is not confined to one small area, but covers immense distances. People in widely distant areas are therefore interested in the same programmes, and to cater for these people arrangements have to be made whereby detailed programmes are available for publication in the press.

It is interesting to note that at station 4QG the programmes are supplied to the Melbourne and Sydney wireless press so as to be in time to be published in detail some days before they are actually broadcast, and this means that full detailed programmes must be prepared and printed in quantity, and despatched from the station three weeks before those programmes are given.

The organisation needed to cope with the issue of programmes alone (and this task is a mere fleabite in the work in connection with a big station) is very extensive.

When a concert is broadcast the work has not been completed.

Careful logs have to be kept showing the titles of all musical works, the authors, the names of the singers, and the publishers of the music. Financial records have also to be attended to, and last, but by no means least, full and complete copyright returns have to be submitted to the owners of the copyright.

The broadcasting station is a hive of industry each morning, when a big staff is hard at work bringing all these records up to date.

It must also be remembered that the work at a station is continuous. There is no "letting up." The station is open day and night continuously, and whether it be a week day, Saturday, Sunday, Sunday, or public holiday, the work must go on as usual.

At 4QG the office system employed includes, a record of artists who approach the station, a record of artists' tests, a modern filing system for artists' repertoires, a systematised set of draft programmes,

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a studio log, a station log, an artists' card system, a systematised file of waiting artists, and the necessary accounts system.

In addition to this there exists, of course, the usual organisation for the controlling of a staff, and this is quite a complicated matter where the station works lengthy hours, and where various "watches" have to be worked day and night, and where the requisite amount of time off must be allowed each operator.

THE STUDIOS.

To return, however, to the actual broadcasting.

The studios in which the concerts are provided differ very greatly from an ordinary concert platform.

Situated right in the heart of a city it is first of all necessary that they be built in such a manner as to exclude all exterior sounds.

Obviously the listener would not care to hear a concert item punctuated by the clang of a tram bell or the rattle of a cab along the street. All these sounds must be kept out of the studios, and this is accomplished by building them in a special manner.

An outside wall of brick or concrete is built and is separated from an inside wall by an air space. Doors are all double and swing into special rubber pads which render them quite soundproof. An air pocket between the inner and outer doors makes for even more effective insulation.

The floors are not merely placed on ordinary joists but are partly strung from the walls and partly float on felt and sawdust. Thus the walking of those in the studios is not audible.

The ceilings are firmly secured, and are packed on the top with more felt and sawdust, and then carefully sealed down with a tin covering.

Thus, a room which is as near to being soundproof as it is possible to make it is erected.

Artists and the staff must, however, breathe, and a special system must be employed for the ventilation of the studio. In order to accomplish this special sealed and soundproof shafts convey air which is driven by a large fan and cooled by being driven through a cage in which water is being sprayed to the studios. Other soundproof vents allow the foul air to be carried away again. Thus, the first task in connection with the studio is accomplished, but there still remains another important piece of work to be carried out.

The small microphones which collect the sound waves and register them in terms of minute electrical currents are more sensitive than the human ear, and, this being the case, special precautions must be taken to see that the sounds produced in the studios are faithfully and clearly reproduced.

Any room will produce echoes or resonant effects, and a studio is by no means an exception to the rule. These effects would also be faithfully reproduced if special precautions were not taken to avoid such being the case. These special precautions take the form of the padding of the floors with felt, and the draping of the walls and ceilings with burlap which hangs loosely in pleats.

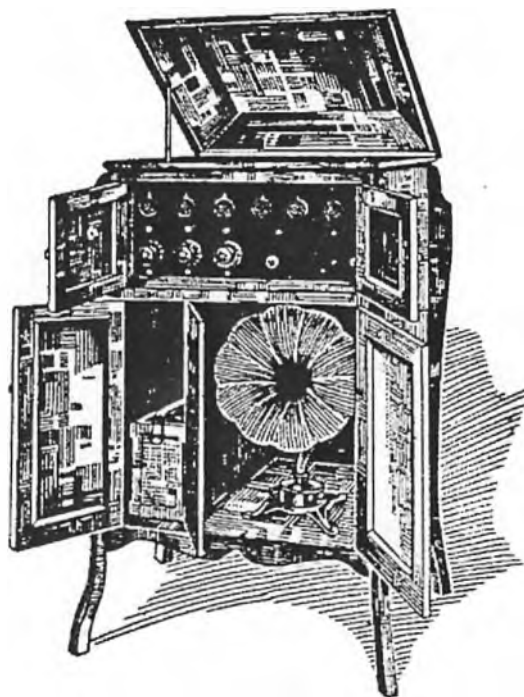
It is, of course, possible to "overdamp" a studio, and very careful experimenting over a period of weeks is necessary to determine to just what extent the walls should be draped. An over-damped studio will result in a deadened sort of reproduction, and an "under-damped," if we may coin the word, will give an "echoing" effect.

ACTUAL STUDIO WORKING.

The actual working of a studio is very interesting to the outsider. Each member of the service has, and knows, his own particular task, and must carry it out with strict attention to detail. No time must be lost, an interval of even one minute between items without an announcement being made seeming an age to the listener.

When all is ready, and those who are to participate in the item which is to be rendered, are in the studio, the announcer signals

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" W I R E L E S S "

through a double plate glass window to the engineer on duty in the instrument room, which adjoins the studio. A moment later he sounds the warning, "On the air," and then throws in a small switch which connects the microphone to the instruments in the control room. The microphone is, of course, placed suitably in the studio and is fitted with a cord to which is attached a plug, which makes contact with a jack in a small panel on the wall.

The throwing in of the microphone switch automatically lights three little red pilot lamps. One of these glows over the engineer's table in the control room, and so warns him that the necessary contact has been made; another glows inside the studio and warns those inside that they are "on the air"; and the third glows outside of the studio doors and warns those outside not to enter.

These pilot lamps are necessary for it must be remembered that every sound uttered inside when once the station is working is carried broadcast through miles and miles of space.

When the switches are in, the announcer steps to the microphone and announces the item. At a signal from him the music starts and, with the speed of light, into the homes of thousands, goes the broadcast music.

THE CONTROL ROOMS.

Let us next consider just what happens when the minute currents which are delivered by the microphones reach the control room.

Perhaps we should have explained that in the Western electric type of microphone, which is used extensively in broadcasting studios, a small diaphragm is packed on each side with carbon granules. To these granules a slight current of about 20 milliamperes is applied. When the sound waves strike the diaphragm they cause it to vibrate, and these vibrations vary the pressure on the carbon. The variation of the pressure results in a variation of current. Thus the variations in current which are delivered to the control room may be said to represent the actual sound waves transformed into electrical pulsations.

These currents are, however, too weak to handle, particularly if they are to be carried by land line to the transmitting station. They are carried, therefore, to a special power amplifier and boosted so as to be easily dealt with. Were an attempt to be made to push them across the line to the station they would not go very far, but would soon be absorbed in overcoming the resistance of the lines.

After being amplified, however, they are quite capable of forcing their way out to the station. The amplifying panel contains the necessary instruments for making final and accurate adjustments; rheostats control the current on the filaments of the valves and delicate meters give visual indications of the fact that the valves are functioning properly. A special rheostat enables the operator to control the amount of current on each side of the microphone, and so to "balance" it properly.

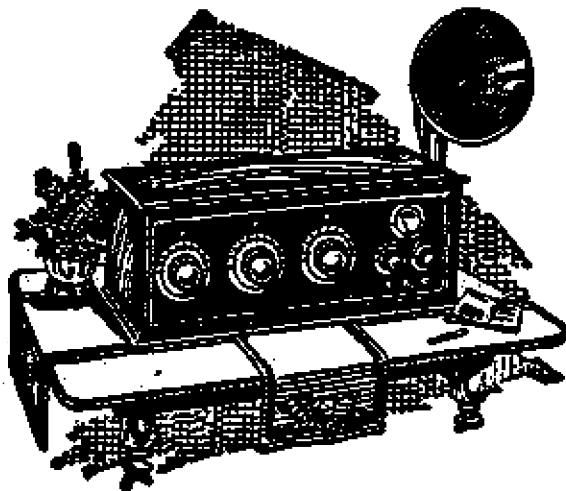
The actual control of the apparatus is, however, centred in a potentiometer which may be said to act as a throttle and control the actual output of "boosted current" from the panel. This current is stepped down by a small transformer, is carried by the land line to the station, and after being stepped up again by another small transformer, is taken straight to the grids of the modulator valves. In stations where the apparatus is right at the studio the action is the same except that the microphone currents are passed over a few yards of wire to the transmitter instead of over a few miles.

The control room contains, of course, more than merely the panel.

The valves in the amplifier need current for both filament and plates. The filaments are supplied by a bank of storage batteries. They are generally duplicated and a charging board is fitted with an ingenious system of switches which renders elaborate connections unnecessary. The pulling of a switch from one position to another puts the bank of accumulators either on charge or on discharge. As there

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EXCEPTIONAL SELECTIVITY in being able to cut out interferences from Stations whose wave lengths are only a few metres apart.

LONG DISTANCE RECEPTION is remarkably powerful.

SIMPLICITY OF TUNING—A wave length chart and book of instructions is supplied with every Neutrodyne, and the 3 dial readings are always the same for a given wave length; e.g., to tune in on a wave length of 350 metres, set each dial at No. 32.

CABINET—The G.N.2 is finished in a beautiful two tone walnut. A panel "A" and "B" Battery Voltmeter enables a constant check to be kept on Batteries.

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are two or more banks one lot may always be charged while the other is working.

The plate current is supplied by a bank of accumulators also, and tests must be made with care, and also very frequently—one faulty cell will ruin the output from the station.

An official receiver and an amplifier suitable for working loud speakers must also be installed, and a network of inter-service telephones completes the equipment.

THE STATION.

When the microphone currents from the studio arrive at the station they are delivered straight to a group of modulator valves which impinge them on oscillations created by the generator tubes.

Exceptionally high voltages are employed, the plate potential on some of the valves being more than 10,000 volts. Great care must be exercised, because the high frequency currents would inflict serious injuries on an engineer who happened to disregard them either deliberately or through carelessness.

Portion of the power needed to operate the valves in some cases is generated by a small alternator, and the rest is drawn from ordinary mains and stepped up to a high voltage by transformers. All current filaments are lit by alternating current, and the plate current is rectified by a group of large rectifying valves and afterwards smoothed out. A more detailed description of a big station is given later.

BROADCASTING FROM OUTSIDE SOURCES.

Broadcasting from outside sources is somewhat more difficult than is the case with studio items, but is carried out in much the same manner.

When it is desired to broadcast, say, a theatre programme, a microphone is placed near the front of the stage. Doubtless many readers who have attended a theatre lately have noticed the small instrument standing near the footlights—a small portable amplifying panel, similar to the one in use in the control room, is placed in the basement of the theatre, and the sound collected and delivered to it in terms of electric currents is boosted and then despatched by a land line to the studio control room.

If it is powerful enough to be carried direct to the station it is switched straight out, but if it requires further boosting it is passed through the control room amplifier, boosted up again, and then delivered in the usual manner to the station.

A special telephone loop goes from the theatre to the studio control room, and the management and operators at both points are enabled to keep in close touch with each other.

At the studios all items are listened to by wireless. Receivers are operated in the manager's office and in the control room, and a check on the transmission is thus kept.

At times when an operator at the theatre is controlling the output direct, a receiver in the control room is worked, and the sound produced is delivered via the loop telephones to the theatre and heard by the theatre operator, who is thus able to listen by wireless to the performance of which he is controlling the transmission.

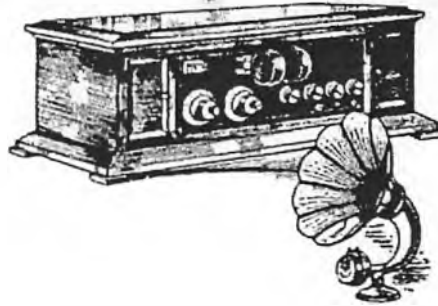
Strict attention to detail, and the closest and heartiest co-operation between all branches of and also all members of the service can alone make for the successful running of a broadcasting station.

If the reader will try to visual just what lies behind the next programme he receives, then his reception of it should be all the more pleasing.

1926

A Hand Book for the Radio Enthusiast.

Overells' Famous 3 Valve Set



Sydney, Melbourne, Adelaide, and Hobart recently received with good Loud Speaker volume.

A wonderful feat to say the least. So scientifically constructed are our "PHOENIX" SETS that this performance is possible with any of these 3 Valve Sets. This 3 Valve Set is mounted in a highly Polished Cabinet, and built of HIGH-GRADE PARTS THROUGHOUT.

This fact is worth noting, as we could very easily lower the price by using inferior parts; but it is quality that gives satisfaction to the purchaser.

Simple and easy to manipulate. With all Accessories and Loud Speaker.

Dull Emitter Valves. PRICE, £27/10/-

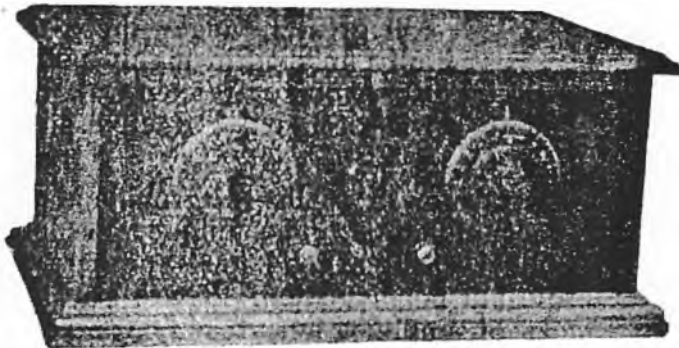
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S. & G. 3 and 5 Valve Receiver

with Aerial coil
loose-coupled
note simplicity of panel
with only two controls



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Electrical and Radio Engineers,
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Radio Products manufactured in
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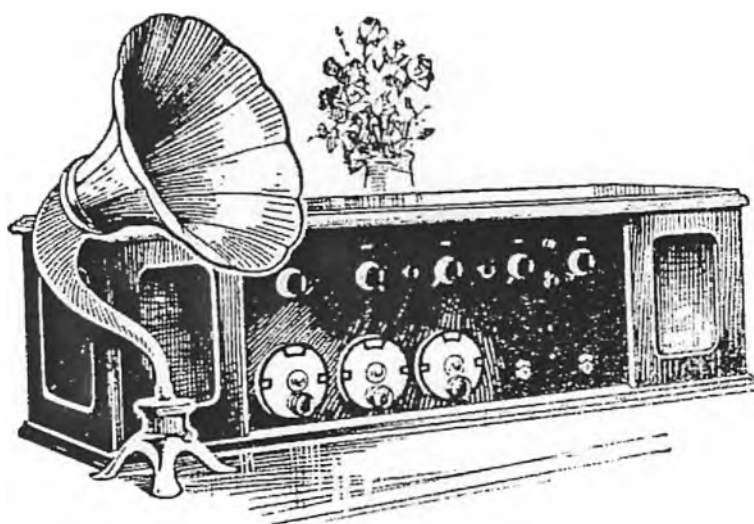
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The Set of a Hundred Refinements

The Pacific is master-built by master craftsmen. No other Set, no matter what price you pay, can surpass the crystal clear tone, the enormous but easily-controlled volume, the simplicity of tuning, the rigid construction, and the excellence of components.

The PACIFIC Radiophone

We do not make these claims out of idle talk, but from actual facts. And it is important to note that there are more "Pacific" Receivers in use in Queensland than any other make. In the city, in the suburbs, away out in the lovely backblocks, hundreds of "Pacific" Radiophones are entertaining families nightly, and giving their owners absolute satisfaction. If you are interested we can refer you to many owners who would gladly give you their honest and unbiassed opinion.

Write us to-day for more particulars of this Supreme Receiver.

**THE
Thomas Radio Coy.**

Builders and Vendors of Reliable Radio Apparatus,
ADELAIDE STREET, BRISBANE.

1926

" W I R E L E S S "

4QG, BRISBANE.

A Modern Broadcasting Station.

It is impossible in a book of this nature to give a detailed description of all broadcasting stations. All stations differ in many respects, and if stations generally were described, certain remarks which would apply to one would not apply to others.

In order to give the radio enthusiast some idea of just what a big broadcasting station is really like, however, a description of one large station will be given. For this purpose 4QG, Brisbane (The Queensland Radio Service) will be referred to.

Station 4QG, Brisbane, is situated on the roof of the State Insurance Buildings, George and Elizabeth Streets, Brisbane, and is a landmark for many miles around. At 4QG the whole of the buildings necessary for the carrying on of a broadcasting service are grouped under the one roof, there being no distant control of the transmitting apparatus as is the case in some of the other Australian broadcasting stations.

The whole of the buildings are of concrete and comprise administrative offices, reception hall, studios, instrument room, laboratories, and workshops.

The State Insurance building is eight stories high, and an elevator service from its main street entrance carries the visitor to the main vestibule of 4QG. From this the offices of the Director, Chief Engineer, Inquiry and General Offices open up. An arched door leads to the main reception hall, which is built in the form of a double cross, and measures 56 feet by 56 feet at its widest points. This hall is tastefully decorated with moulded plaster, and is capped by a large moulded plaster dome supported by fluted pillars. The floor is of inlaid Queensland silky oak, and the whole hall has a very handsome appearance.

From the hall two studios, one a large one and the other smaller, open up. Each studio is built of double concrete walls, with an air space between. Floors and ceilings are packed with felt and sawdust, thus making the studios quite soundproof. Thus, a rehearsal may go on in one studio while actual transmission is effected from another: The larger of the two studios is naturally lighted with double sound-proof windows.

From the reception hall, a corridor leads to the main instrument room in which the transmitter is housed. This is a large, airy, concrete room with a high roof, well lighted, and (as is the case with the studios) artificially ventilated. Laboratories, workshops, and staff bathrooms open off the station. At two corners of the building two self supporting steel towers, each 100 feet in height, have been erected to support the aerial system.

When transmission is in progress at 4QG, either of the two studios is used according to requirements. The use of two studios enables large delays to be avoided between items, especially where, say a band follows a solo item of some sort. When such a programme is broadcast the solo is given in the smaller of the two studios, and during its progress the band is arranged in the larger. A quick change from one studio to the other prevents any great amount of delay.

HOW TRANSMISSION IS EFFECTED.

The broadcasting of an item from the station necessitates a great deal of careful attention, to detail on the part of the staff on duty. The microphone suitably placed in the studio reproduces the sound waves in terms of minute pulsating electrical currents, and these are carried via conductors to the main station building.

The transmitting equipment is of Australian design and manufacture, and is of very handsome appearance. It is built on the unit principle, but at the same time has the main controls handily situated on one panel so that the engineer in charge may make his main adjustments when starting up without having to walk across the room.

1926

The Mecca of Radio Amateurs—



Call 'most any day of the week and you will see and hear a group of wireless amateurs discussing their problems over The Thomas Radio Coy's counter. These chaps know just where to come for reliable material. They know that our range is wide, the prices are reasonable, and above all we understand and can help them solve their problems. Make our store your radio headquarters!

"PACIFIC" Home Assembly Sets

Complete with all material, circuits, and instructions for building sets at home along the lines of the now famous and wonderful PACIFIC. Anybody can assemble those sets. It's great fun—and you'll save pounds because you cut out assembling costs in our workroom. Write to-day for one of these popular sets. **NOTE THE PRICES**, and remember everything is included to make the set ready for listening in.

One Valve Home Assembly Set—
£6/15/- complete.

Two Valve Home Assembly Set—
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Three Valve Home Assembly Set—
£12/15/- complete.

Our guarantee stands behind all material sold, and remember that you have full access to our free assistance service.

*Make
Our
Store
Your
Headquarters!*

*We
Serve
by Mail,
too!*

The Thomas Radio Coy.

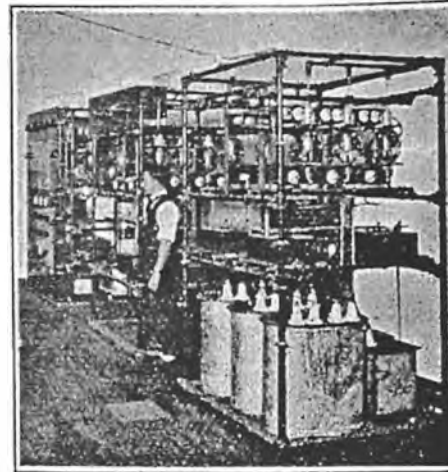
Builders and Dealers in Reliable
Radio Apparatus,

ADELAIDE ST. (under Watts Cafe), BRISBANE

1926

A Hand Book for the Radio Enthusiast.

The equipment in the station consists of a speech amplifying panel, sub-modulator, modulator, rectifier, main oscillator unit, master oscillator, and the necessary inductances.



The Rectifier Unit.
Photo showing the Rectifier, Modulator and Oscillator Units.

When the microphone currents from the studio reach the station they are delivered to the speech amplifying panel, which boosts them to the required strength, and then delivers them to the sub-modulator. This panel is really an amplifier, which further builds them up and passes them on to the grids of the main modulator valves.

It is not possible to rigidly follow the microphone currents right through until they are placed on the air, because, while they are being handled by the modulator panel other important functions are being carried out in the station by other pieces of apparatus.

The system of transmission comprises the master oscillator or "drive system," and is a system by means of which wireless waves are created by a master panel and then amplified at a radio frequency by a much larger panel known as the main oscillator. This system has the effect of enabling a constant wave length to be maintained. If it were not used, it would be very difficult to maintain the station on a definite wave length, because the swinging of a down lead from the aerial in heavy weather would cause a great variation of wave length.

Power is supplied to Station 4QG from the Electric Light Company's mains. This current is three phase and is at a potential of 415 volts. It is stepped up from large transformers which may be seen at the bottom of the photograph of the rectifying unit. A system of tapped auto transformers enables the degree to which this current is stepped up to be controlled by the operator, and thus provides one means for the regulation of power output from the station.

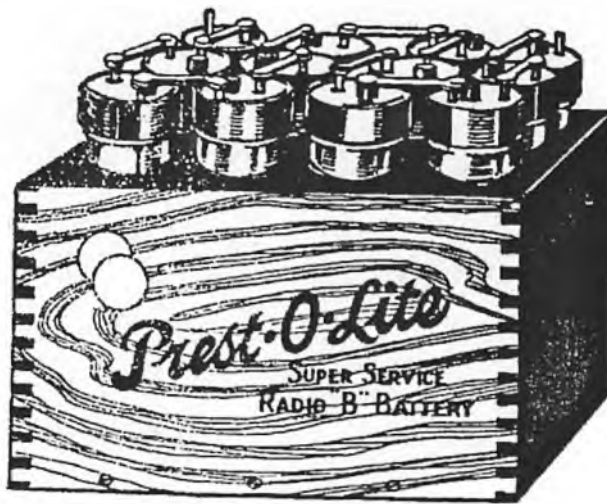
The alternating current, after being stepped up, is rectified by a bank of six valves which may also be seen in the top portion of the rectifier. It is then smoothed out by special condensers and by a smoothing choke. The rectifier unit at 4QG is capable of supplying continuously 24 kilowatts of current. The current supplied by it is used for feeding the high tension to the plates of the valves in the master oscillator, main oscillator, and modulator panels. The complete rectifying panel has at times been jocularly referred to by the engineers of 4QG as the Station's "B Battery eliminator" and it is doubtful whether a more suitable term for it could be found.

1926

" W I R E L E S S "

The Soul of the Set!

It's the Battery that gives life to your set! The quality and endurance of that life depends entirely on the Battery itself. That's why experts and experienced amateurs always insist on Prest-O-Lite Super-Service Batteries both in "A" and "B" Types.



12 Cells 24 Volts
PREST-O-LITE Batteries are known for their Quality and Courteous Service behind them.

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Also the Famous
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Your Set surely deserves the best, and Prest-o-Lite costs no more than ordinary batteries!

Our Expert Will Advise You!

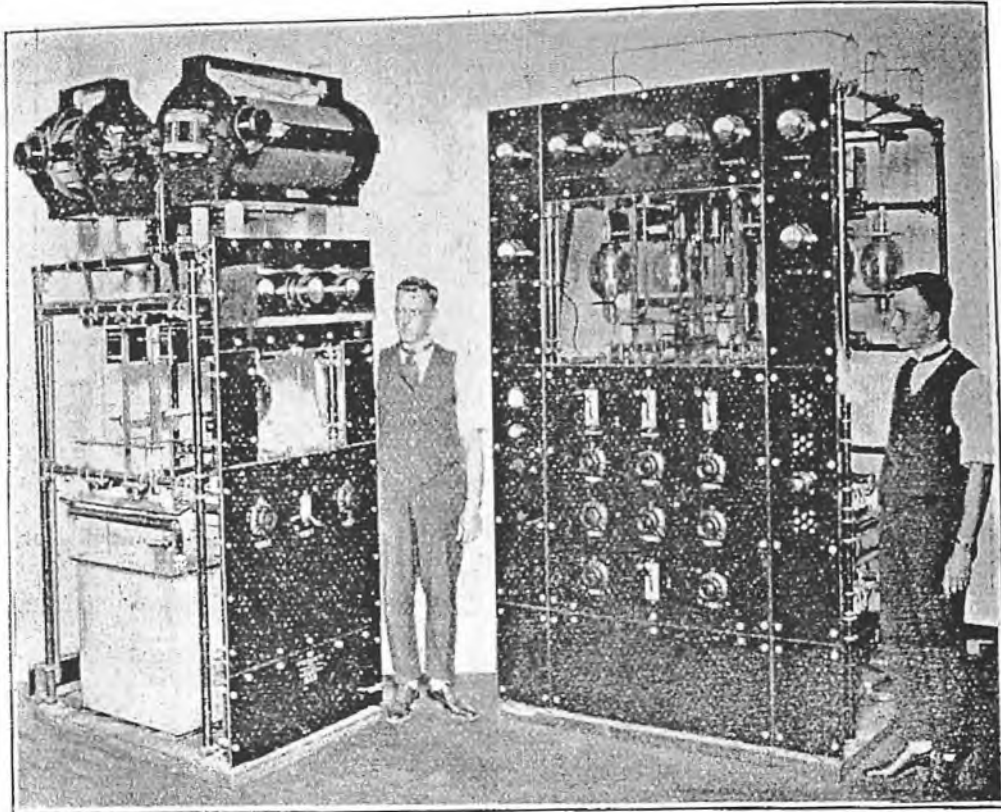
If you cannot call write for Address of Nearest Dealer

Queensland Motors Ltd. ADLAIDE ST.
BRISBANE
Service Station - WICKHAM ST., VALLEY

1926

" W I R E L E S S "

The master oscillator alone has a normal power of 3 kilowatts, and is so designed that the power input can be considerably increased. The photograph of this unit which is set out in this chapter shows the



The Master Oscillator Unit.

The Main Oscillator Unit.

power condenser at the bottom and the various inductances on the top. This, in conjunction with the tuning units, form the oscillatory circuit, and in this circuit, the master oscillator produces continuous oscillations.

The main oscillator panel is the most imposing piece of apparatus in the whole station. On it is placed the main control switchboard, from which the voltages on all parts of the apparatus in the station may be handled.

It is interesting to note that the total power input when the whole plant at 4QG is in operation on maximum power is in the vicinity of 23 kilowatts. Of this about 7½ to 8 kilowatts represents the power in the aerial. This power has enabled large distances to be covered, and numerous reports of reception on a crystal at distances of more than 1000 miles from the station have come to hand.

Control of 4QG is effected both visually and audibly. The engineer on duty listens-in at the station and hears the whole of the programme, and, in addition to this has, from his seat at the control table, a clear view of quite a host of meters connected in various portions of the circuits. These metres advise him just how each piece of apparatus functions. One of them in particular is his greatest guide. It is so connected that a needle will indicate the coming of any distortion just a second or two before that distortion arrives.

All the valves at 4QG develop great heat, and it is necessary therefore to cool them while the station is running. To enable this to be done a special system of pipes is included in all panels, and a blower motor situated in a room adjoining the station blows a stream of air through these pipes on to the valves.

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Australia's Best Radio Journals

The
**QUEENSLAND
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A bright weekly of 16 pages containing the detailed programmes in advance from 4QG, 2BL and 3LO. Also contains artists photos and helpful hints, etc.

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Four*



SET— ONLY Price £19

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No Other Station—Never Mind How Powerful or Near—Will Interfere !!

THIS IS NO EMPTY BOAST. COME AND HEAR IT YOURSELF.

Choose your own accessories—we offer two suggestions:—

Instrument only	19 0 0
Five Coils, four U.V. 201A or A.W.A. 109	
Valves, Bias Battery, 4½ volts	5 10 0
Set with Coils, Valves, and Bias Battery ..	£24-10-0
Fitted with highest quality equipment, including two Ever Ready 60 volt batteries, one Amplion Dragon Loud Speaker, pair Brandes matched tone 4000 ohm phones	15 10 0
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Every Genuine
R·C·A
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U.V. 200
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Get the Best from your
Receiving Set

USE RADIOTRONS

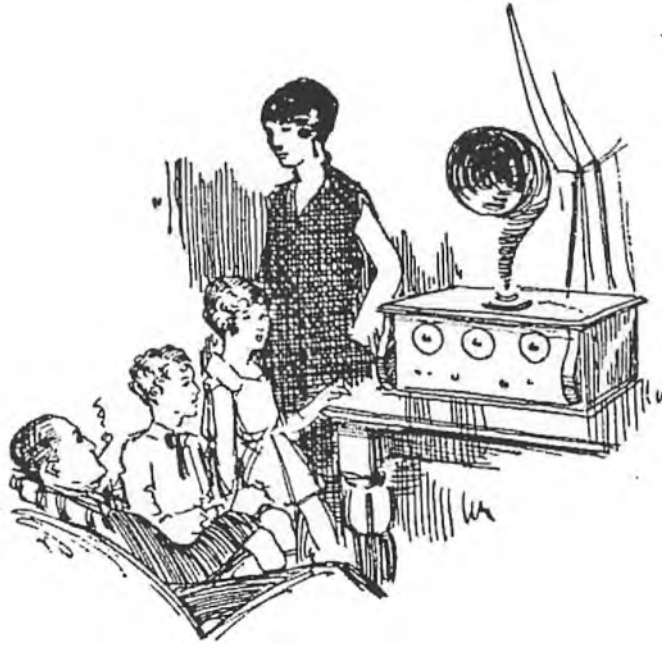
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RICO-DYNE

5 Valve Set

This Set is the greatest value in Receiving Sets in Australia. It is lower priced, yet more efficient, than many other Sets of equal size.

The patented "Rico" parts make it possible to offer at the low price such an attractive and efficient instrument.

Price £24

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Phone 6143

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Announcing
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A Receiver of Unusual Ability and Construction

The "Simplex" is a pleasant surprise to all who hear it. Its round, full and mellow tone—its handsome finish—its ease of operation have earned for it a very fine reputation.

We are proud to put our name on these receivers. We build them—and thus we KNOW that only the best and most expensive components are assembled by highly skilled mechanics. Notwithstanding these advantages The "Simplex" are no dearer than other sets.

Write or Ring Ipswich 491 now.

One Demonstration Will Convince You

Let us prove this set to you by actual demonstration. If you live within the precincts of Brisbane or Ipswich we will be happy to give you a free demonstration.

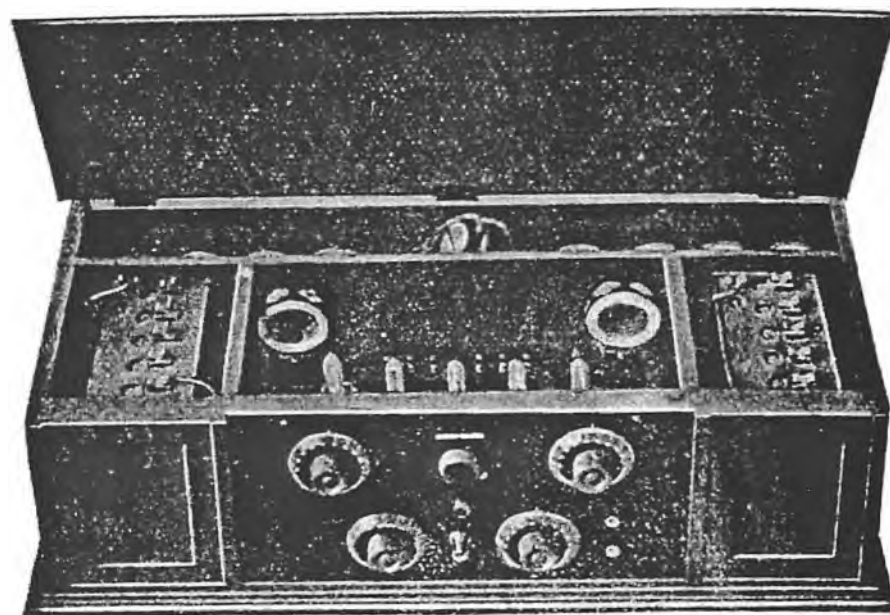
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Radio Dealers and Electricians

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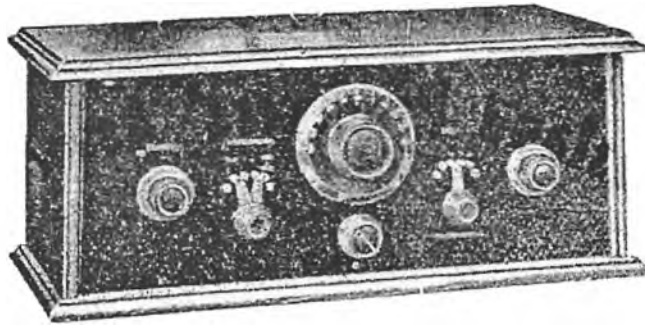
International Radio Co. Ltd.

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UNITED SELECTIVE THREE, complete with dry Batteries, Atlas Loud Speaker and full Aerial Equipment.

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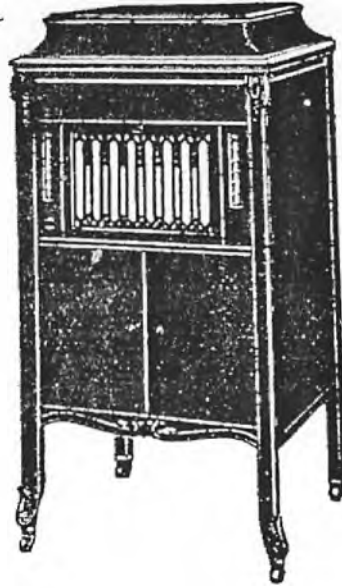
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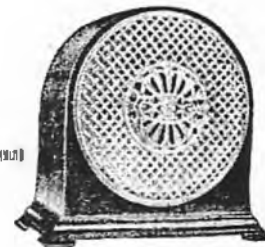
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In Polished Dark Mahogany.
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A full size, well designed, well balanced and exceedingly efficient Loud Speaker, with the Amplion Hall-mark, for five pounds, ten shillings.

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Ads. of Amplion (Australia) Limited, Melbourne and Sydney

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'About Wireless' notes of interest
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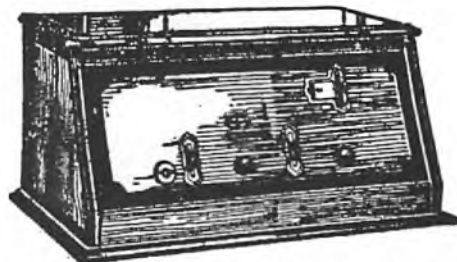
CROSLEY RADIO



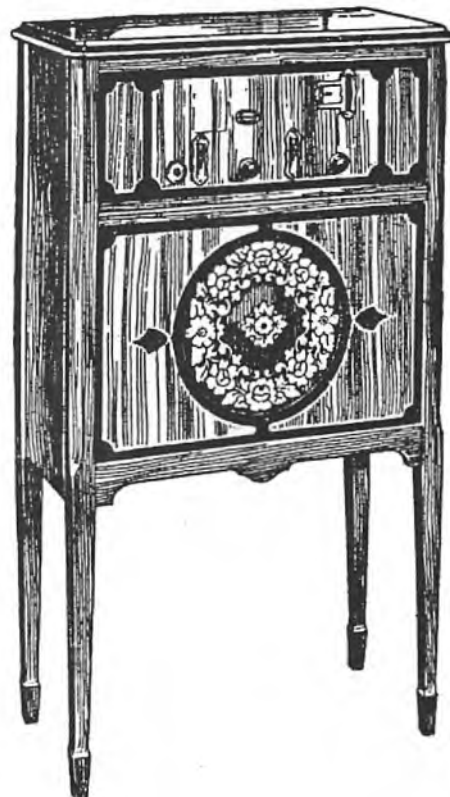
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Radio Guide

1926 & 1928

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"Wireless House," 167 Queen Street, Melbourne

King and King Chambers, Queen Street, Brisbane

Bower's Building, Charles St., Adelaide

Australasia Chambers, Wellington, N.Z.

A.W.A. RADIO GUIDE

Broadcasting

Few sciences have made such a wide appeal, have attained such amazing popularity, and have developed to such a degree in so short a space of time as has Broadcasting.

The first actual broadcasting concert was demonstrated by the Marconi Company in June, 1920, and among the artists was Dame Nellie Melba, whose voice was heard a considerable distance across the Atlantic and in many parts of Europe.

The second important broadcasting demonstration was given at the Imperial Press Conference, Ottawa, 1920.

In the same month, August, 1920, Mr. E. T. Fisk, Managing Director, Amalgamated Wireless (Australasia) Ltd., gave a public demonstration of wireless broadcasting in Sydney to an audience of more than one hundred at a meeting of the Royal Society of New South Wales.

In October of the same year he arranged a complete public broadcast concert in the Queen's Hall, Federal Parliament House, Melbourne, to an audience of some hundreds of people. This was the third largest public demonstration of broadcasting that had taken place in any part of the world. In January, 1921, a weekly broadcast programme was transmitted from Melbourne by A.W.A., and was heard by experimenters and others at distances up to 1000 miles.

In the design and construction of broadcasting transmitters, and the erection and organisation of broadcasting stations in Australia, Amalgamated Wireless has played a significant part. During the last few years the Company has installed powerful broadcasting transmitters at 2FC, Sydney, 3LO Melbourne, 5CL Adelaide, 6WF Perth, and 4QG Brisbane. The quality of transmission and range of these stations is equal to, if not better than, the largest overseas broadcasting stations.

It should be a source of pride to Australians to know that the whole of the design and manufacture of this complicated and highly technical equipment was carried out at the Radio Electric Works of Amalgamated Wireless (A/sia) Ltd., Sydney, by Australians, several of whom were specially sent by the Company to Europe and America to investigate the very latest developments in this phase of radio engineering.

During the past year great activity and many technical advances have taken place in broadcasting. Additional stations have been opened in several States, and the programmes of all stations have been still further improved.

Two particularly important happenings were the completion of the Queensland Government Broadcasting Station at Brisbane, which was brought up to full power during the year, and the station accommodation, studios, and offices in the city were completed and opened by the Premier in April.

Farmer's broadcasting station at Sydney, 2FC, was transferred from its temporary site at Willoughby into specially built accommodation at the Sydney Radio Centre, Pennant Hills. This new and up-to-date station was officially opened by the Right Hon. W. M. Hughes, P.C., K.C., at the end of March.

Station 2BL, owned by Broadcasters (Sydney) Ltd., was also moved to a new site at Coogee, new equipment was installed, and the power of the station was brought up to 5 kilowatts.

Two well-known Class B stations are now operating in Sydney, namely, 2KY, conducted by the Sydney Labour Council at the Trades Hall; and 2GB, operated from Adyar Hall, Bligh Street, by the Theosophical Broadcasting Company.

A.W.A. RADIO GUIDE

Broadcast Receivers.

BROADCASTING, from the point of view of the listener-in, has made rapid progress during the past few years. From being an experimental science it has developed along sound lines, and is now a stabilised industry. Engineering difficulties as regards transmission have gradually been overcome, while the broadcasting companies with experience of this class of entertainment to guide them have thrown their energy and resources into the task of providing more varied, interesting and better quality programmes. The novelty appeal of listening-in has been replaced by a demand set up for instruments that will faultlessly reproduce the broadcast items. Receivers have improved not only in tonal qualities, but also in compactness, appearance, and simplicity of operation.

Thousands of people throughout Australia listen-in nightly on A.W.A. Radiola Receivers. The available range represents the most comprehensive series of broadcast receivers sold in Australia. A.W.A. sets are designed and manufactured under the supervision of qualified wireless engineers with extensive experience, not only in the design of Broadcast Receivers, but also the construction of Broadcast Transmitting Stations, ships' wireless Stations, and other types of wireless apparatus.

Before a particular type of Radiola is put on the market, it is subjected to many stringent tests under practical operating conditions, and after going into production, each Receiver has to withstand the rigid tests put upon it by the Company's Testing Department, both as regards the quality of manufacture itself and its performance. It can be truthfully said that a Wireless Receiver, like a chain, is no stronger than its weakest part, and in this regard the Company utilises only the best quality tested components, thereby ensuring standard quality throughout. That the Company guarantees each receiver to be free from any manufacturing defect whatsoever for a period of twelve months after sale is adequate proof of this statement.

After-sales service is an important factor in buying a receiver, and this is a service A.W.A. takes every opportunity of improving, for it is recognised as a very important part of the Company's sales organisation. Upon it has been built much of the good will and prestige that the Company enjoys.

In every part of New South Wales there is an Authorised Radiola Dealer who will give reliable advice and service to prospective and actual buyers of Radiolas.

A.W.A. RADIO GUIDE

THE RADIOLA CRYSTAL SET.

This highly efficient Crystal Set is contained in a handsome maple cabinet, and only needs connection to aerial and earth systems to be ready for use.



The crystal and spiral contact wire are enclosed in a glass tube, which protects them from dust and dampness and ensures permanent adjustment.

The use of variable inductance coupling ensures selectivity and freedom from atmospheric disturbance.

The tuning coils are interchangeable, so that by using coils of suitable values any required wave-length may be obtained.

The operation of the controls is simplicity itself.

Price, complete with headphones, £3/12/6.

THE RADIOPHONE.

The Radiophone is a two-valve receiver designed for the reception of radio broadcasting.

The set is very simple to operate.

The necessary controls and adjustments have been reduced to a minimum.

It can be operated by merely turning a dial, and once it is switched on, you can remain seated in an easy chair for the rest of the evening, and listen to a varied entertainment without further effort.



The Radiophone is self-contained, and only needs connection to an aerial and earth system, and the attachment of a pair of headphones and batteries, to be ready for immediate use.

Throughout the whole apparatus, every detail of design and construction has been studied with that thoroughness which characterises all the Company's products, in order to give perfect rendering of all music and speech.

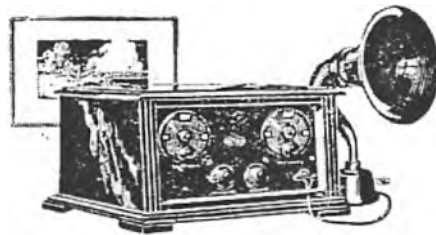
Price, complete with Amplion loud speaker, £14/12/-.

A.W.A. RADIO GUIDE

THE RADIOLA IV.C

An Entirely New Broadcast Receiver featuring a four-valve regenerative circuit having only two controls.

Wave-length range 200-550 metres.



A four-valve receiver of melodious reproduction, long range, and extremely simple of operation, at a price which represents unparalleled value.

The circuit comprises one stage of radio frequency amplification, detector, and two stages of audio-frequency amplification.

The tuning has been simplified considerably by means of improved vernier controls which are fitted to the instrument.

Exceptional amplification is provided by using A.W.A. audio-frequency transformers.

The valves used are the world-famous Radiotrons 201A and A.W.A. 101A, which are interchangeable with the Radiotron UX109 and A.W.A. 99X valves.

Housed in an attractive cabinet of specially selected walnut with full piano finish.

The set can be operated by means of dry batteries, and is thus specially adaptable for

use in the country, where an accumulator charging plant is not always accessible.

One filament control is provided, thus simplifying the operation of the set.

A jack and plug connection is used for the telephones or loud speaker.

The Radiola IV.C, though selling at a popular price, maintains the high prestige of the Radiola line of broadcast receivers. It incorporates the same sound radio engineering principles and faithful workmanship.

A.W.A. supremacy in production of broadcast receivers has been achieved by its concentration on turning out flawless musical instruments reproducing broadcast music and entertainment with amazing clarity.

Price, complete with Amplion Loud Speaker, from £28/5/-.

A.W.A. RADIO GUIDE

Radiola 6 Valve and 8 Valve Superheterodyne Receivers.

The introduction of the Radiola Super proved an outstanding development in the manufacture of Broadcast Receivers for Australian conditions.

Never before had a Receiver been available featuring such remarkable selectivity, long range, ease of control, and realistic reproduction.

The superheterodyne principle is recognised by the foremost Wireless Engineers throughout the world as being the highest development in the art of receiver design. This principle makes possible the assembly in a small metal container of all the vital parts of the set.

After assembly the container is filled with insulating compound, which permanently protects the components from damage, interference or variation. Such a Receiver forms an ideal broadcast Receiving Instrument, which can be guaranteed to give consistent performance and every possible satisfaction.

Receiving conditions in Australia are different from those in any other part of the world. In this country the great majority of "Listeners-in," especially those residing in the country, require a Receiver which will give long range interstate reception with the utmost simplicity of control and freedom from breakdown. In these essentials the Radiola Super stands supreme.

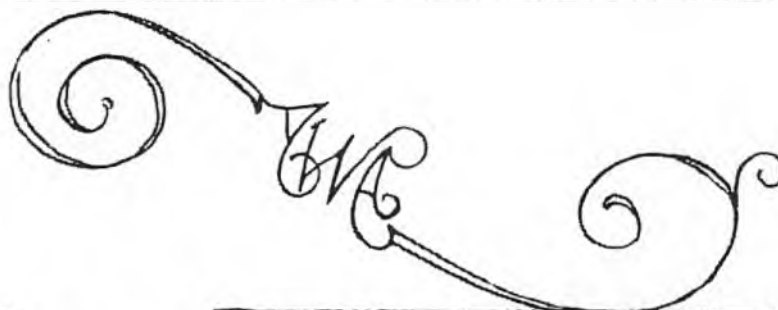
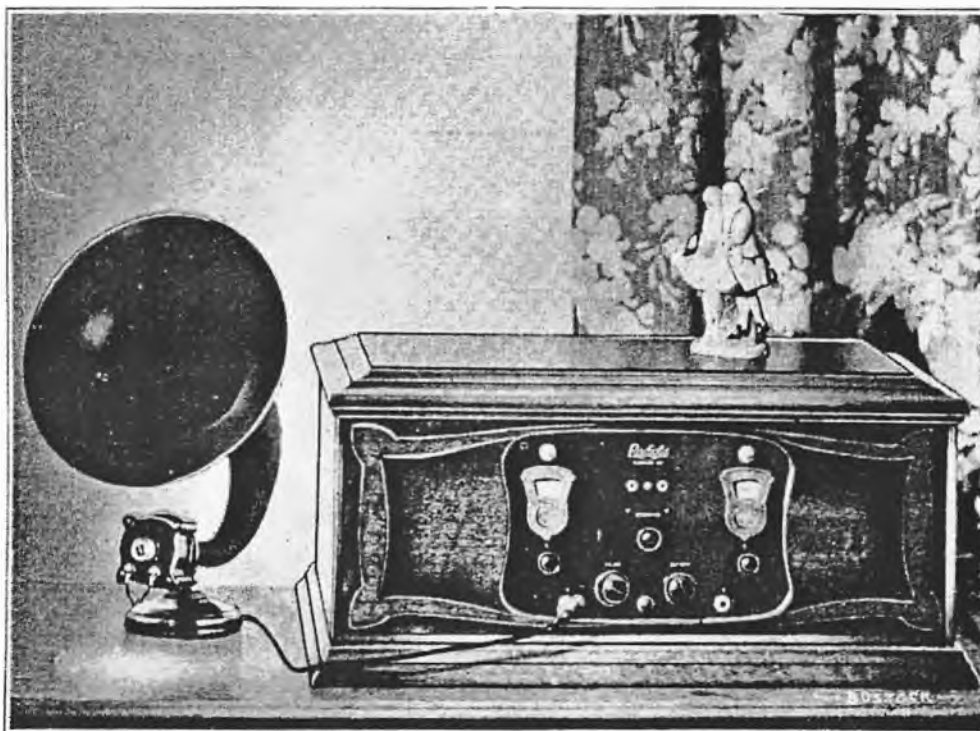
The purchaser of a Radiola Super is always a satisfied listener-in. Whether living in the City or Country he has no difficulty in receiving programmes from the other States. He does not find reception spoilt by interfering stations, as frequently occurs with many receivers now on the market. He obtains complete satisfaction from the day the set is installed and knows that through our extensive system of local Service Stations any difficulties arising will be promptly remedied.

The phenomenal success of the Radiola Super indicates the widespread demand in Australia for a Receiver of this type. Mass production and modern manufacturing facilities have now made it possible to make available a complete range at prices from £45 to £120. This remarkable price range brings a Radiola Super Receiver within the reach of every purse.

The New -AWA- VALVE

The advertisement features a central vacuum tube valve with a glass envelope and a metal base. The glass envelope has a circular logo with 'AWA' and '101X' below it. The base has a similar logo. To the left and right of the central valve are two other valves, each with a glass envelope and a metal base. The left valve has a logo with 'AWA' and '99X' below it. The right valve has a logo with 'AWA' and '99X' below it. The background is dark with several white lightning bolts radiating from behind the valves. At the bottom, the text 'For Greater Range!' is written in a bold, stylized font.

For Greater Range!



The "Radiola" Standard 6.

A Six-Valve Broadcast Receiver, using the Super-heterodyne principle of reception, which combines maximum volume and ultra-selectivity with long range and ease of control.

A.W.A. RADIO GUIDE

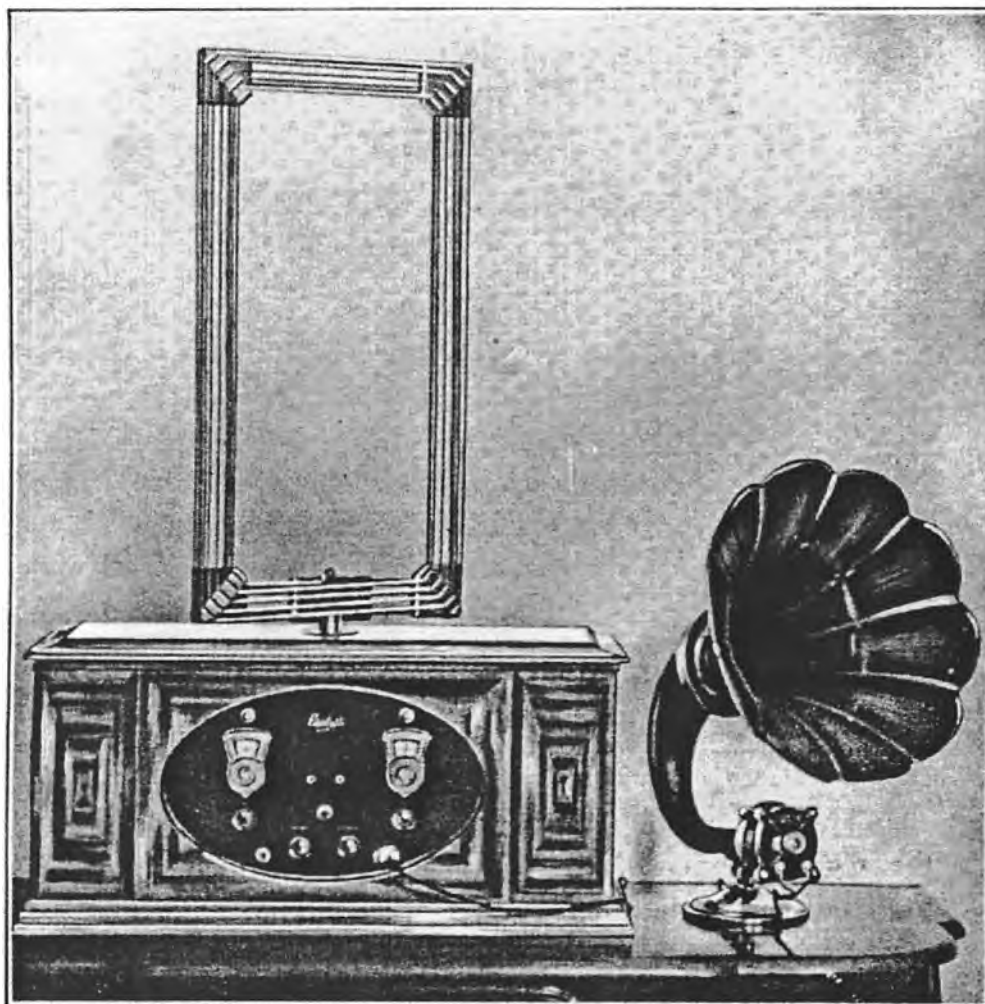
RADIOLA STANDARD SIX.

The Radiola Standard Six, designed for use with an outdoor aerial, is a six-valve receiver employing the Super-heterodyne circuit, generally recognised as a most effective arrangement where long-distance reception and entire freedom from interference by other stations is desired.

The receiver itself is housed in a maple cabinet with Duco mission finish, ample space being provided for accommodating both "B" and "C" batteries.

Tuning control is reduced to two station selectors, the readings on which are visible through openings in the oxidised metal facings on the panel.

Special features are simplicity and economy of operation. Four Radiotron UX-199 general purpose valves are used for detector and radio-frequency amplification, and the new Marconi DEP.410 power valves for audio stages. Both valves are of the economical dull-emitter type.



The "Radiola" Senior 6.

A Six-Valve Super-heterodyne Receiver, fitted with loop-aerial and housed in a laminated maple cabinet with artistically veneered sloping front. A high-grade Receiver, guaranteed to give Interstate reception on loop; with aerial, can give long-distance daylight reception.

A.W.A. RADIO GUIDE

RADIOLA SENIOR SIX.

A Six-Valve Super-heterodyne Receiver, fitted with loop aerial and housed in handsome laminated maple cabinet with artistically veneered sloping front. The oval-shaped panel accommodates all controls. Two latest design station selectors show dial readings in illuminated panel "windows."

Jacks provided for using either five or six valves as required.

High-Tension and Bias Batteries housed in cabinet.

Designed for use with Radiotron UX-199 and Marconi Economy Valves, thus reducing battery consumption.

Has special fitting, enabling "filament checking" Voltmeter to be used.

A high-grade Receiver guaranteed to give Interstate reception on "loop." Can be used with aerial for long-distance daylight reception.

A.W.A. RADIO GUIDE

Radiola Super 6.

A Six Valve Superheterodyne Receiver—the Radiola Super is operated with a loop aerial and needs no earth connection; while the controls have been reduced to a minimum, consistent with effective tuning, simplicity of operation and high efficiency.

The impression of exceptional craftsmanship conveyed by the simple lines, the admirable proportions and the artistic finish of the Tasmanian Fiddleback Blackwood Cabinet is quickly confirmed on hearing the exquisite tone quality.

The charm of faithful radio reproduction, combined with the ease of being able to tune in distant stations at will—positive selectivity—plus admirable proportions and elegant design, make the Radiola Super a scientific radio receiver of exceptional merit and a piece of furniture that will harmoniously grace the most artistically furnished home.

The Cabinet houses all batteries. Jacks provided for using either 5 or 6 valves as required.

Its curved front accommodates two exceptionally efficient drum control station selectors.

Designed for use with new A.W.A. 99 X Valves or Radiotron UX 199 Valves, thus reducing Battery consumption.

Has special fitting enabling battery checking Voltmeter to be used.

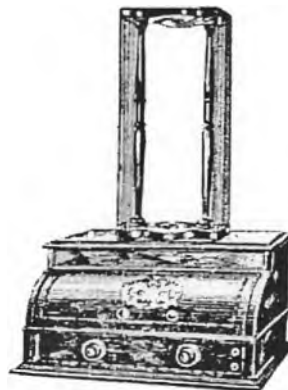
Fitted with revolving loop aerial with which good interstate reception can be obtained.

PRICE: Table Type, complete with all accessories and Amplion Loud Speaker, £90

Floor Cabinet Model with Built-in Amplion Loud Speaker, £120.



Radiola Super 6.
Floor Cabinet Type.



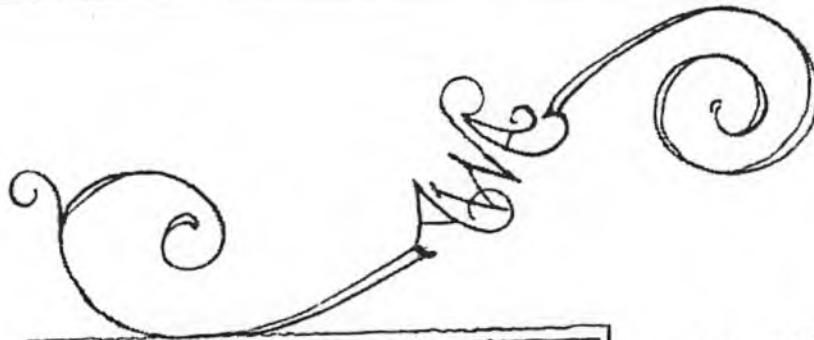
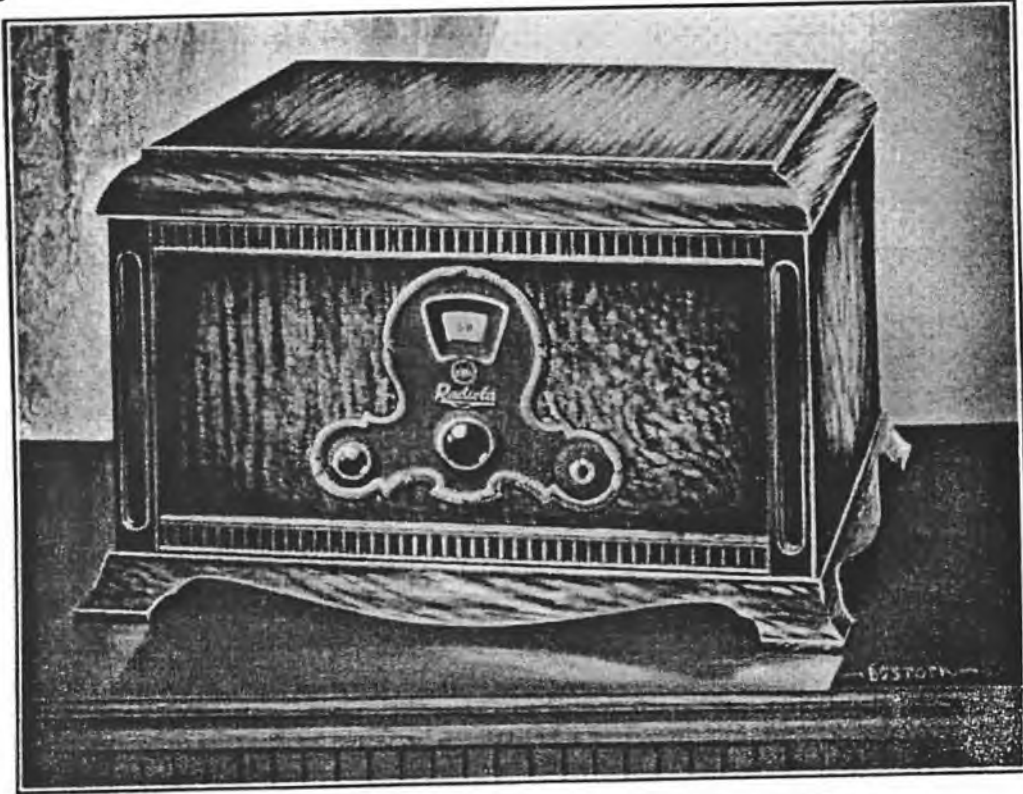
Radiola Super 6.
Table Type.

AMPLION

The Natural Tone Loud Speaker

Amalgamated WIRELESS Wireless
(Australasia) Ltd.

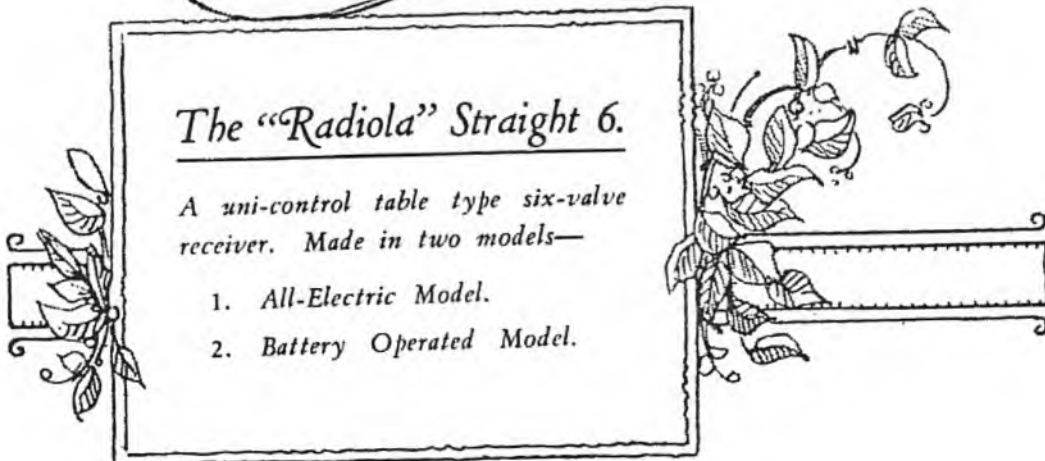
The advertisement features a dark, grainy background. At the top, the word 'AMPLION' is written in large, bold, white capital letters. Below it, the tagline 'The Natural Tone Loud Speaker' is written in a white, cursive script. An arrow points from the tagline towards a circular speaker grille mounted on a wall. The speaker is positioned in front of a large, arched window with a grid pattern. In the foreground, a dark silhouette of a person is shown from the back, sitting in a chair and listening towards the speaker. At the bottom of the advertisement, the text 'Amalgamated WIRELESS Wireless (Australasia) Ltd.' is printed in a stylized font, with 'WIRELESS' in a smaller font and a logo between the words 'Amalgamated' and 'Wireless'.



The "Radiola" Straight 6.

A uni-control table type six-valve receiver. Made in two models—

- 1. All-Electric Model.*
- 2. Battery Operated Model.*



A.W.A. RADIO GUIDE

THE RADIOLA STRAIGHT SIX.

A Uni-control Table Type Six-Valve Receiver.

Made in two models:—

1. All-electric model, operated from electric light or power socket.
2. Battery operated model.

The Table type Cabinet is extremely artistic and pleasing in appearance, and houses all the Batteries for the Battery operated set or the power pack for the All-electric Model.

Stations are "tuned in" by means of the single control.

The Set incorporates the new A.W.A. "Ideal" Distortionless Transformer and the new A.W.A. Logarithmic Condenser.

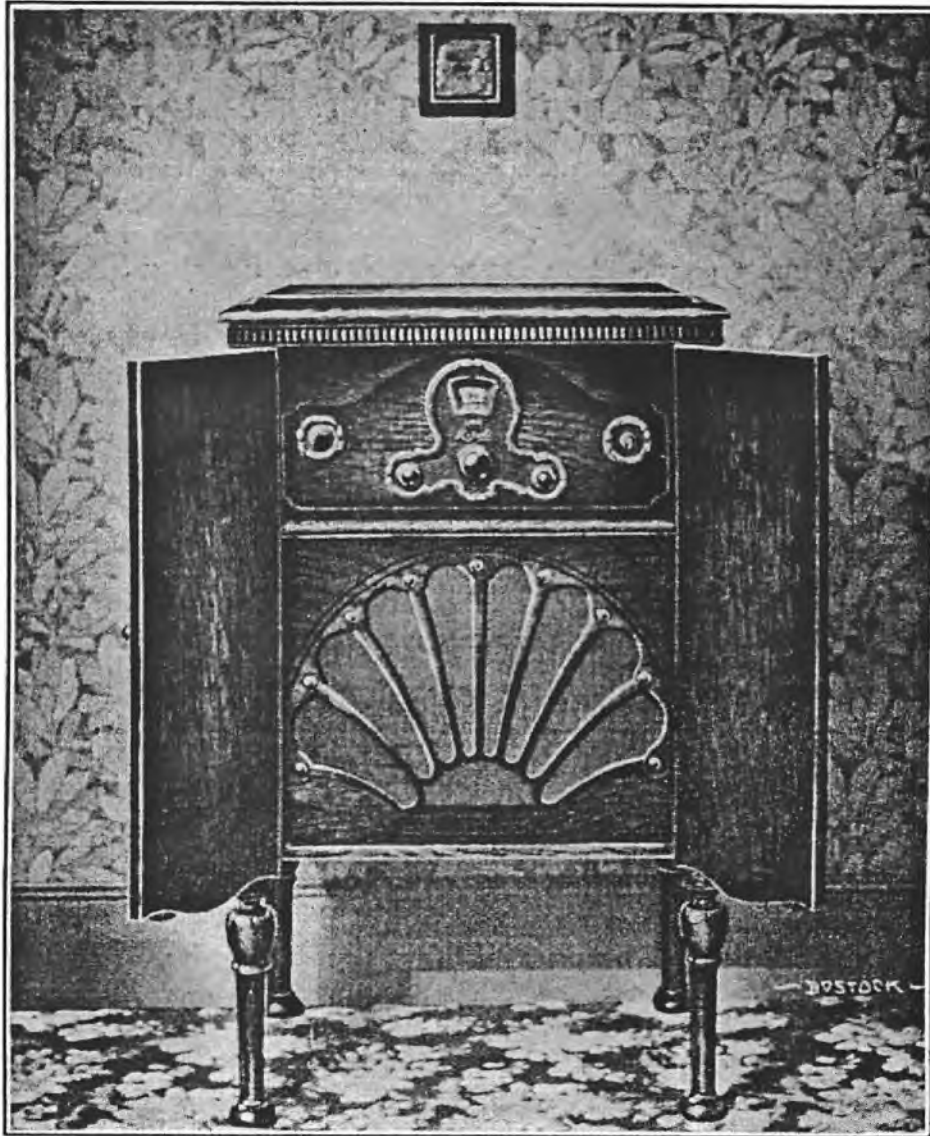
The Battery Operated Model is equipped with Marconi Economy Valves.

Based on modern practice, the operating mechanism is encased in a metal chassis.

In the All-electric Model, the special power pack takes the place of the A, B and C Batteries used in the battery operated model.

The illuminated Dial provides a novel feature.

The perfect mellowness of tone and full volume of this super instrument will make an appeal to the most cultured musician, whilst its high efficiency and ease of control ensures popular approval.



The "Radiola" Screened 6.

A magnificent uni-control six-valve, figured maple floor cabinet receiver, of exceptional performance. Made in two models—

- 1. All-Electric Model.*
- 2. Battery Operated Model.*

A.W.A. RADIO GUIDE

THE RADIOLA SCREENED SIX.

A Six-Valve Uni-control Floor Cabinet Receiver.

Made in two models:—

1. All-electric Model, operated from the electric light or power socket.
2. Battery operated model.

The beautifully grained maple floor cabinet is of graceful proportions and harmonious design.

In addition to a built-in Amplion Cone Loud Speaker, the Cabinet contains provision for housing the power pack for the All-electric Model or batteries for Battery Operated Model, making the receiver self-contained.

The Set incorporates the new A.W.A. "Ideal" Distortionless Transformer and new A.W.A. Logarithmic Condenser.

The Battery Operated Model is equipped with Marconi Economy Valves.

Based on modern practice the operating mechanism is encased in a metal chassis.

In addition to an illuminated Station Selector dial, volume and intensifier controls are also provided.

The perfect reproduction of the Radiola Screened Six, its full volume, natural tone, ultra-selectivity and simplicity of operation, are such as to mark a new standard in Broadcast Receivers.



The "Radiola" Super 8.

A magnificent eight-valve Super-heterodyne Broadcast Receiver, with enclosed loop and concealed Amplion Loud-Speaker, with two tuning controls. The beautiful "Sberaton" floor cabinet is a superb example of the craftsman's art.

A.W.A. RADIO GUIDE

THE RADIOLA SUPER EIGHT.

A magnificent, entirely self-contained Eight-Valve Super-heterodyne Receiver of the most modern and efficient design, with concealed loop and enclosed Amplion Cone Loud Speaker.

In rare beauty and brilliancy of performance, the Radiola Super Eight is a product worthy of A.W.A. Leadership.

The beautiful "Sheraton" Floor Cabinet, finished with ribbon-grained West African Mahogany, is a superb example of the craftsman's art—a piece of exquisite furniture that will enrich your home.

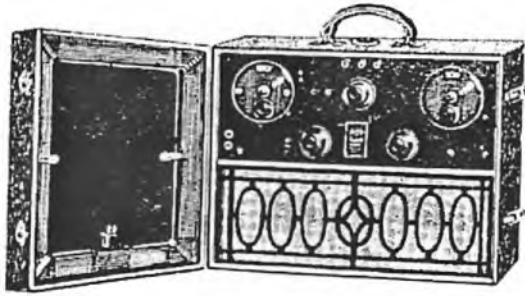
Every facility and improvement devised by modern research has been incorporated in this Radiola, which is an outstanding achievement in Broadcast Receiver design.

Extreme selectivity ensures a complete freedom from interference by unwanted broadcasting stations.

The A.W.A. Radiola Super Eight is designed for long-range Interstate reception and perfect reproduction. It is an example of a receiver of utmost efficiency going hand-in-hand with artistic appearance.

A.W.A. RADIO GUIDE

The Portable Radiola Super.



Broadcasting concerts and dance music for the picnic—the motor-boat outing—motor car tour—or the week-end house party.

It works everywhere — mountain, sea, or city.

Just take it where you wish, set it down, adjust the loop aerial, turn a dial or two, and entertain the party with

dance music from the best city orchestras, or listen to the latest news items and sports results.

Tunes in Sydney, Melbourne, Brisbane, Adelaide and other stations without the use of an aerial.

The Six-Valve A.W.A. Portable Radiola Super is an entirely self-contained instrument, incorporating the operating mechanism, battery equipment, loop aerial and Amplion Loud Speaker.

Reception of Broadcasting Concerts from the other States at Loud Speaker Strength on loop guaranteed.

Interference from unwanted stations entirely eliminated.

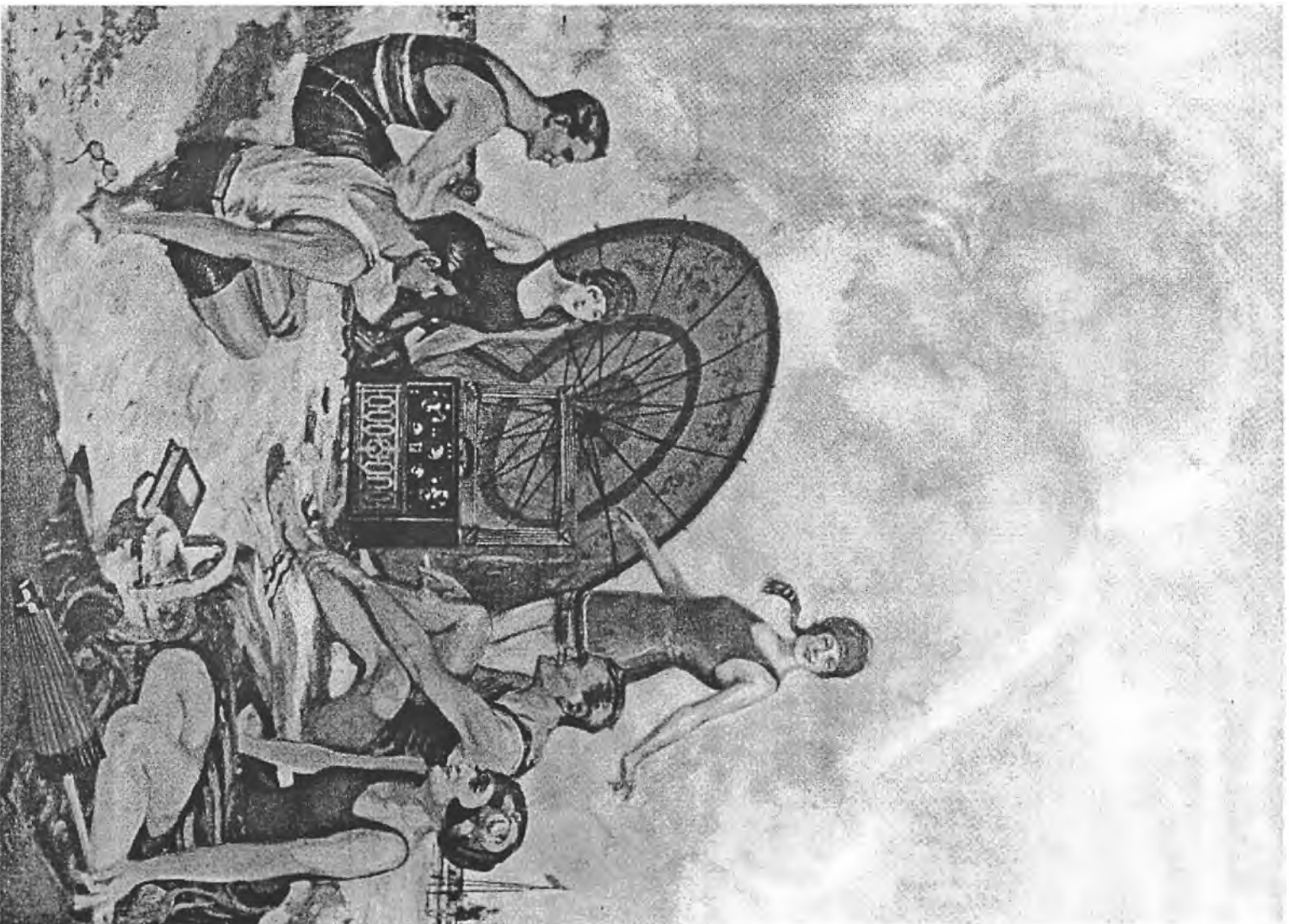
Enclosed in handsome leather-covered case, with handle for carrying. Adaptable for outdoor or indoor use.

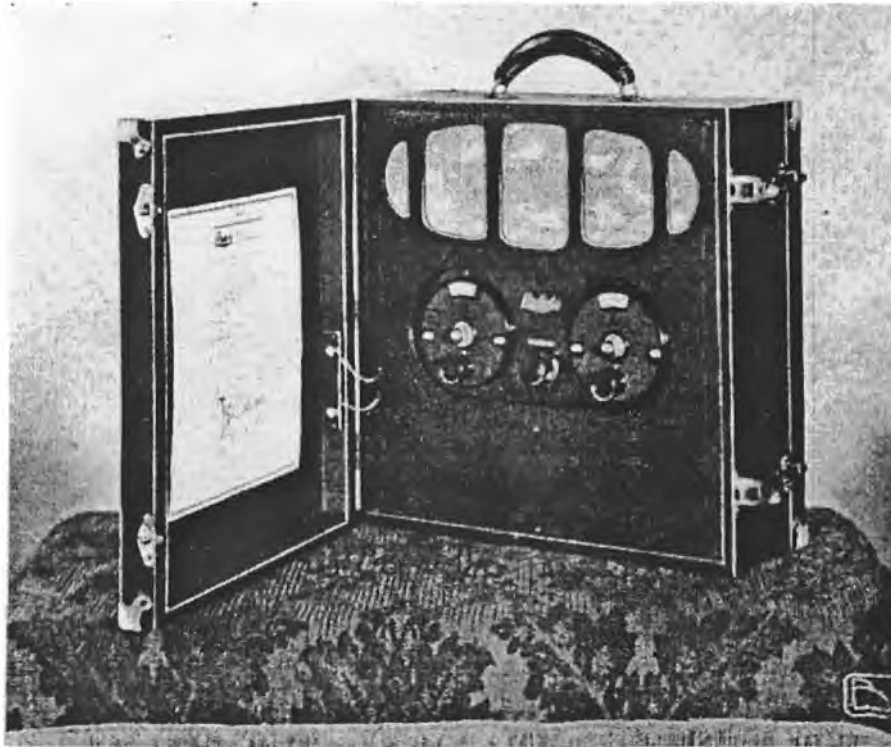
It combines the fine essentials of good reception, fidelity of reproduction, volume, selectivity, distance and ease of operation.

Always ready, reliable and efficient, the Portable Radiola Super provides the last word in summer entertainment.

Price, complete with Enclosed Amplion Loud Speaker, £75.

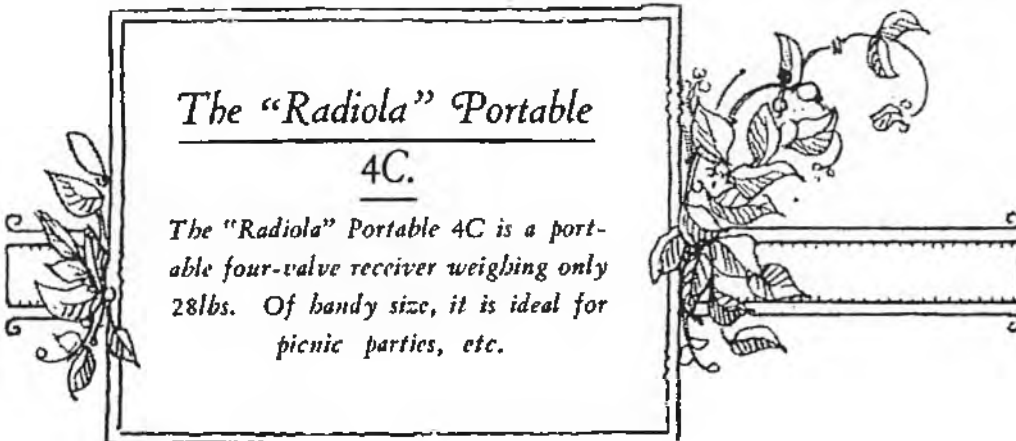






The "Radiola" Portable
4C.

The "Radiola" Portable 4C is a portable four-valve receiver weighing only 28lbs. Of handy size, it is ideal for picnic parties, etc.



A.W.A. RADIO GUIDE

A NEW PORTABLE RADIOLA.

Amongst the new types of receivers to take their place on the Australian market is the Radiola Portable "4C," designed and manufactured by A.W.A.

With the exception of the aerial loading coil, the circuit design of this model Radiola is identical with the well-known table model Radiola 4C.

Two-volt valves are operated by a non-spillable two-volt accumulator, while the tuning controls are reduced to two station selectors. A filament switch is operated by the hinged lid of the cabinet itself, which makes it impossible for the valves to be alight when the cabinet itself is closed.

The cabinet, measuring $15\frac{1}{2}$ x $15\frac{1}{2}$ x 7 inches, is covered with black embossed leatherette, and highly-polished nickel-plated hinges, locks, and corner stampings, give the receiver a particularly attractive appearance. The weight of the complete receiver is 28lbs.

The loop, which is incorporated in the hinged lid of the receiver, is employed as an aerial loading coil when the instrument is used in conjunction with an outside aerial for long-distance reception.

This type of receiver will undoubtedly command a great deal of the attention of prospective set-owners, who, amongst other requirements, will find the "Portable Radiola" an acceptable and entertaining addition to the equipment on motor trips, picnics, and so forth.

A.W.A. RADIO GUIDE

Choice of a Receiver.

The object of these notes is to give the prospective purchaser an idea of the capabilities of the more common types of wireless receiver on the market to-day.

The Superheterodyne Receiver.—This type incorporates the very latest ideas in receiver construction. It will receive interstate stations on the loud speaker without aerial or earth, even in close proximity to a local station. These advantages are not possessed to the same extent by any other type of receiver.

The Neutralised Receiver.—This receiver, like the superheterodyne, will bring in all interstate stations at loud speaker strength, but in the majority of cases an outside aerial is required for interstate reception. Being very selective, it will receive interstate stations when locals are working, but not to the same degree as the superheterodyne.

Tuned Radio Frequency Receivers having Four or Five Valves.—These receivers are excellent for interstate reception on the loud speaker, provided that they are not installed too near a broadcast station. Receivers of this type are especially suitable in country districts where there is no local station in the near vicinity.

Two and Three Valve Receivers employing no High Frequency Amplifying Valves.—This class of instrument will give excellent loud speaker results from local stations, it does not possess the required degree of sensitivity to tune in distant stations as the four or five valve set, but is quite suitable for country districts where there is no local station in the near vicinity.

Crystal Receivers.—Whilst the crystal cannot compete with the valve, either in the matter of range or selectivity, it is an ideal receiver for anyone desirous of receiving local stations only at head phone strength. Its chief recommendation lies in the fact that no batteries or valves are required. Thus the initial cost is the only cost.

A.W.A. RADIO GUIDE

Crystal Receivers.

The Crystal Receiver employs the simplest of all wireless circuits, it is easy to build and simple to operate, and its upkeep costs are practically nil. It will give good headphone strength up to twenty or thirty miles away from a high powered broadcasting station provided that a good aerial is used. Its chief disadvantages as compared with the Valve Receiver, may be summed up as follows:—It will not successfully operate a loud speaker, and it is rather difficult to tune out undesired stations. Furthermore, most types of crystals require frequent adjustment, which, in addition to the aforementioned interference, rather tends to mar the enjoyment of the programme. Interference, however, may be greatly reduced by carefully following these instructions—Pay particular attention to the aerial and earth, as recommended previously in these pages. Bear in mind that both signal strength and interference increase in proportion to the height of the aerial. Decreasing the height will reduce interference to a greater extent than signal strength. Therefore city dwellers should keep their aerials as small as possible, consistent with comfortable reception.

Before building a receiver, select a circuit employing both aerial and secondary coils tuned by variable condensers. These two coils should be kept as far apart as possible when interference is experienced. This will make the tuning sharper, but interference from undesired stations will be reduced.

The crystal proper plays a very important part in the reception of wireless signals. Briefly, it converts the feeble alternating currents into unidirectional impulses, permitting these to have an audible effect in the headphones.

Crystals may be divided into two distinct classes. The first type, commonly known as "perikon" combinations, require a second crystal to be in contact with them. The second class are those crystals requiring a metal contact. Crystals such as tellurium and zincite; zincite and copper pyrites; zincite and bornite come under the first class. The perikon combinations are not popular amongst broadcast listeners, so we will pass on to the second type without further mention of them. In the second class there are galena, iron pyrites, carborundum, molybdenite and silicon. Both silicon and carborundum require a steel contact; galena will work equally well with gold, silver, brass or copper contacts. Carborundum is the most reliable crystal, but it requires a 3-volt battery and a potentiometer for successful operation. Galena, whether synthetic or natural, is one of the most popular crystals. It is extremely sensitive, but it requires a very light contact with the cat's whisker, and therefore is liable to be easily thrown out of adjustment. However, the synthetic types of galena do not suffer from this defect to the same extent as do the natural types. Crystals should on no account be handled with the fingers. If they become insensitive they may be cleaned by immersing them in alcohol for about ten minutes, and then allowing them to dry.

Headphones used in conjunction with crystal sets should be of the high resistance type (3,000 or 4,000 ohms), and when two or more pairs are used they should be joined in parallel. In order to join two or more pairs in parallel, take one phone tip from each pair of phones and securely fix them to one of the phone terminals of the receiver. The remaining tips are connected to the other phone terminal. Finally, when using several pairs of headphones, make quite sure that they are all of the same resistance, otherwise the lower resistance telephones will have more than their share of the current.

A.W.A. RADIO GUIDE

Installing a Receiver in Your Home.

Let us assume that you have erected your aerial, following the directions as far as possible laid down in these notes. A small table should now be procured and placed as near as possible to where the aerial lead-in enters the room. The receiver is placed on this table and the valves fitted into the sockets.

The filament lighting battery whether dry cell or accumulator and often referred to as the "A" battery, should then be connected to the receiver, taking care that the "+" and "-" terminals of the accumulator go to their respective "A+" and "A—" terminals on the receiver. The positive terminal of the "A" battery is either marked "+" or else it is painted red. The battery switch and the filament rheostat are now turned on for a moment to make quite certain that the valves light up.

Next connect up the bias or "C" battery (if used), and finally the high tension battery, also referred to as the "B" battery. In both cases great care must be taken to ensure that these batteries are connected up the right way round, that is, the "+" battery terminal to the "+" terminal on the receiver for that particular battery.

Having completed this, join up the aerial and earth leads to the receiver, plug in the phones or loud speaker, switch on the filament battery and turn the filament rheostat until the valves are burning at the required brilliancy. One of the local stations should now be tuned in with the variable condensers, and the filament control given a final adjustment.

Having made yourself familiar with your receiver, turn your attention to the loud speaker. The actual position of this instrument in the room often has a great bearing on the quality of the reception. Apart from keeping the speaker away from the set, its position in the room must be found by experiment. Sometimes better results are obtained with the loud speaker high up, whilst in other cases a low position is found preferable.

A.W.A. RADIO GUIDE

The Earth System.

A considerable number of broadcast enthusiasts go to a lot of trouble in erecting their aerials, with a view to obtaining the best possible results, but they totally neglect their earth circuits. This is probably because the earth connections, unlike the aerial, are buried and out of sight, and therefore more or less forgotten. The earth circuit is every bit as important as the aerial, and this point cannot be emphasised too strongly.

The efficiency of the earth circuit depends upon three things:—

First, upon the nature of the soil in which the earth plate is buried, and its degree of moisture. Second, upon the size of the plate or waterpipe which is buried in the soil, and the way in which the earth wire is connected to this plate; and, lastly, upon the length and total area of the wire or wires connecting the receiver to the earth plate or waterpipe.

The percentage of moisture plays a most important part in the satisfactory reception of signals, especially when a crystal set is used.

Moist soil is far more suitable than dry sandy soil, and for this reason the earth plate, whenever possible, should be buried in a spot where the soil is permanently moist. There is always a certain degree of moisture around the roots of trees and bushes, and, of course, in the vicinity of a garden hose, and advantage should be taken of this. In very dry weather a few buckets of water thrown over the spot where the earth plate is buried will usually improve the reception of signals.

When an earth plate is used instead of a waterpipe, it should consist of a sheet of galvanised iron about 4 feet x 2 feet. The strands forming the earth wire should be untwisted for a distance of two feet, and each strand carefully soldered to the sheet at well-spaced points on one 4ft. edge. This completed, the plate is buried edgewise, the edge to which the wires are soldered being uppermost, just deep enough to cover this edge.

When a waterpipe earth is used, it is most important to solder the earth-wire to the pipe as near the point where it enters the ground as possible. If this is not done, reception may be seriously affected by the joints in the piping. As an alternative method to soldering the earth wire to a waterpipe (which is not always an easy job), a special clip fitted with a terminal to take the wire may be purchased and clamped to the waterpipe. This method is quite satisfactory, provided that the pipe and inside of the clamp are periodically cleaned with emery cloth and wiped with a dry cloth.

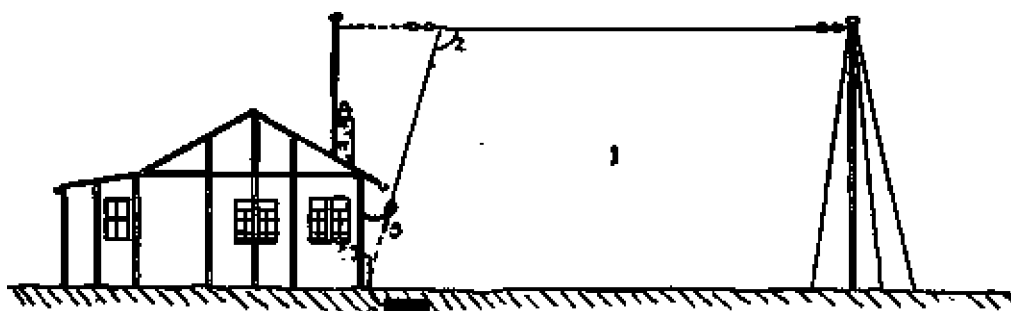
The comparative results obtained with the plate and waterpipe earth may be summed up as follows:—A waterpipe earth is superior to a galvanised iron plate in dry, sandy soil, but the plate earth is preferable where the soil is fairly moist, such as in a garden, etc. If in doubt which earth to adopt, make comparative tests with the waterpipe, and earth plate, and compare the results. The earth plate nearly always wins where a waterpipe is situated at a distance from the receiver.

The wire connecting the receiver to the earth plate must be kept as short as possible. 7/20 gauge aerial wire, which consists of seven strands of No. 20 gauge copper wire, is the best type to use, but for all practical purposes 3/20 gauge will serve as well. It is not necessary to insulate the earth wire unless it is of undue length, and it may be fixed in position round the walls with staples. Needless to say, the receiver must be so placed in the room that the earth wire is as short as possible.

Gaspipes should on no account be used for earthing the receiver on account of the risk of fire and explosion. This method, apart from being most unsatisfactory, is prohibited by the Fire Underwriters' Rules.

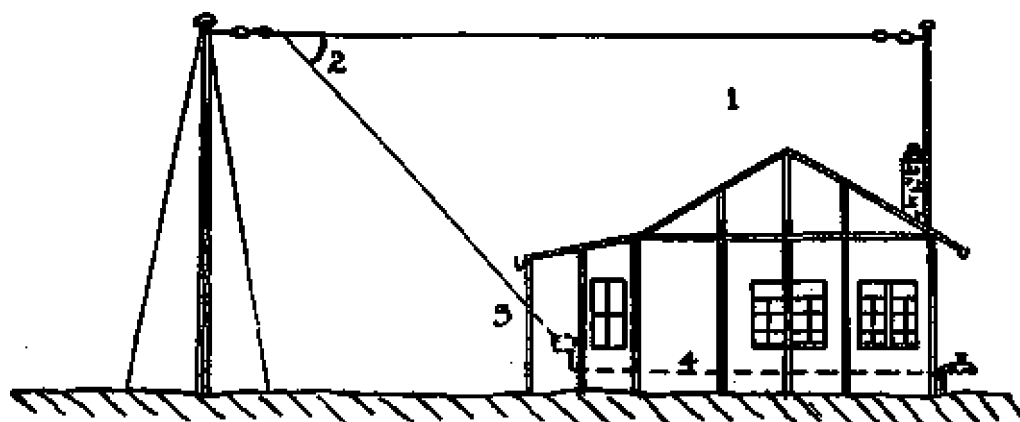
A.W.A. RADIO GUIDE

Good and Bad Aerials.



POINTS TO NOTE IN FIG. 1.

1. Clear space underneath the aerial.
2. Down lead does not bend back under the horizontal portion.
3. Bottom of down lead guyed to keep it well away from roof of building.
4. Short length of cable going to earth plate.



POINTS TO NOTE IN FIG. 2.

1. House underneath the aerial.
2. Down lead bends back under the horizontal portion.
3. Down lead not guyed at base.
4. Long length of cable going to earth.

A.W.A. RADIO GUIDE

Aerials.

One of the first considerations that arises in connection with the erection of an aerial for broadcast reception is as to whether a long or short aerial is the more suitable.

Both types possess certain advantages and disadvantages, and the final selection depends to a large extent upon the type of receiver used.

A long aerial, while increasing the range of the receiver, reduces its degree of selectivity. (A receiver is said to be selective and non-selective according to whether it can or cannot tune out undesired stations when listening to a certain transmission).

A short aerial, on the other hand, will not have the picking-up qualities of a long one, on account of its short length, but with this type it is a simple matter to tune out undesired stations.

Therefore, if you use a crystal receiver, a long, high aerial is necessary, one that is capable of picking up the maximum amount of energy; but if you possess a valve set, a short aerial will be more suitable. Country listeners require a longer aerial than do city dwellers, because they are generally situated at a fair distance from a broadcasting station.

Before erecting an aerial, bear the following points in mind:—

An inverted "L" aerial (an aerial having the down lead to the receiver located at the extreme end of the horizontal portion) is more suitable than a "T" aerial (one having the down lead in the exact centre).

The efficiency of an aerial increases with its height.

The height of an aerial is not the distance from the horizontal wire to the ground, but the distance from the horizontal wire to the nearest grounded object directly underneath it, whether a roof or a tree.

A single wire aerial is just as efficient as the double wire variety.

A good average length for the wire is 100 feet for a crystal, and 50 to 75 feet for a valve receiver, this distance being measured from the far end of the aerial to the receiver terminal.

It is not a good plan to join up several pieces of wire to make up the correct length, it being far better to use an unbroken wire. When this cannot be avoided, the joints should be carefully soldered.

3-20 gauge bare copper wire is excellent for receiving aerials. This wire can be obtained in lengths of 100 feet from most wireless dealers.

Readers should note that these notes are of a purely non-technical nature. It is fully appreciated that the average set owner is out to get the best results with the minimum amount of trouble and expense, but there are certain points which he must thoroughly grasp if he wishes to get the very best results in return for the money he has laid out on his set.

A good aerial is a very important factor in the successful operation of a receiver, and while the majority of aerials are above reproach, it has been noticed that a large number could be considerably improved upon.

A poor aerial usually possesses one or more of the following defects:—

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The horizontal position of the aerial is only a few feet above the roof of the house. This seems to be rather a common practice, which in many cases could be remedied by taking the end of the aerial to a pole or tree as far distant from the house as possible up to a distance of 60 or 70 feet, and securing the down lead end to the highest portion of the roof or to a chimney.

The down lead runs too close to the walls of a building. This may be rectified by reducing length of the horizontal portion of the aerial to the extent of four or five feet at the down lead end. To do this, it will be necessary to increase the length of the halyard connecting the down lead end of the aerial to the roof by a similar amount. This will keep the down lead of the aerial clear of side of building. An alternative method is to use a piece of wood 4 or 5 feet long, one end of which is secured at right angles to the top of the wall. An insulator is secured to the other end, through which the aerial down lead is passed.

Portion of the aerial wire is in close proximity to, or brushes against, the branches of a tree. A great many people attach the far end of their aerials to a tree. This is an excellent plan, provided that the end of the aerial wire is kept at least six feet away from the branches. This is done by securing an insulator to the end of the aerial wire and tying a suitable length of sash or other cord to the insulator. Of course, no part of the cord should actually touch the aerial wire, otherwise the insulator becomes useless. The other end of the cord should be either tied to the highest available branch of the tree, or, if the cord is of sufficient length, it may be passed over this branch and made fast to the trunk within hand reach. When a wooden pole is used for supporting the aerial, the end of the wire may be as near as two feet to the pole, but this distance should be doubled when a steel mast is used.

The aerial must be suitably insulated at the point where it enters the house—special lead-in insulators being sold for this purpose, by nearly all radio dealers.

The wire between the lead-in insulator and the receiver must be kept as short as possible, and on no account must any portion of this wire touch the walls unless it is well insulated. Bare wire, kept well away from any surrounding objects, is far more satisfactory, though perhaps not quite as neat, as insulated wire fixed to the walls.

These notes would be incomplete without mention of the Fire Underwriters' rules, which stipulate that a lightning arrester, operating at a maximum potential of 500 volts, shall be provided when an outside aerial is used. This arrester must be located as near as possible to the points where the aerial and earth wires enter the building. It may be placed either inside or outside the building, but, in the latter case, the instrument should be protected from the weather. To instal a lightning arrester, a wire is soldered to that portion of the aerial down-lead nearest the arrester, the other end being securely joined to one of the arrester terminals. The remaining terminal is fixed to the earth wire in a similar manner. The former lead must, of course, be kept clear of all obstacles, as this wire forms part of the aerial. Lightning arresters may be obtained from most radio dealers—detail instructions being supplied with each instrument.

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Low Tension Accumulator.

Low tension or filament accumulator batteries, as they are sometimes called, are used for lighting the valve filaments. They vary from 2 to 6 volts, and have an ampere hour capacity of from 20 to 80 ampere hours, according to the type and number of valves used.

The capacity of an accumulator is measured in ampere hours; an accumulator is said to have a capacity of 40 ampere hours when it can deliver one ampere for 40 hours or .5 amps for 80 hours. Thus, supposing a receiver is using 4, UX201-A valves; the total current consumed will be .25 amps x 4, or one ampere. Theoretically, a 40 ampere hour battery would supply this receiver with the necessary current for 40 hours, but practically the utmost limit would be 35 hours.

It is a good plan to recharge the battery after it is about three-quarters discharged, in this case 30 amphours.

These rules apply equally well to charging. In the case of a 40-amphour battery, supposing it is charged at 4 amps rate as indicated by the battery charger ammeter, four amps for 10 hours will give 4 x 10 or 40 amphours, and theoretically at the end of this period it will be charged. However, it will probably require an additional period to completely charge it, as no accumulator will absorb all the energy put into it. When charging accumulators, always adhere to the charging rate stipulated by the makers. This rate is usually written on the side of the battery, and it is approximately one-tenth of the capacity of the cell. Thus, a 30-amphour battery should be charged at three amps rate, and towards the end of the charging period (when gassing commences), this rate may be reduced to half the normal rate. The condition of the battery may be determined by the gravity of its electrolyte, this gravity being measured by means of a hydrometer. When charged, a cell will show a gravity of from 1,220 to 1,250, according to the density of the acid used. It should never be allowed to fall below 1,175, as indicated by the hydrometer, without recharging.

A few points to remember in connection with accumulators—

- (1) Do not leave the battery in a discharged state for any length of time.
- (2) Do not charge at a higher rate than that stipulated by the makers.
- (3) Do not overcharge the battery.
- (4) Do not add acid unless certain that some of the electrolyte has been spilt.
- (5) Do not allow an accumulator to discharge below its safe limits, as shown by the hydrometer.
- (6) Keep the plates covered with electrolyte by topping the battery with distilled water, until the level is half an inch above the top of the plates.
- (7) Keep the accumulator lugs clean with emery cloth; a slight trace of vaseline on all terminals and connecting strips will prevent corrosion.

A word of warning to those who intend mixing their own electrolyte. Always add the acid to the water, never add water to acid.

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The High Tension Battery.

The majority of broadcast listeners use dry cell H.T. batteries in preference to the accumulator type.

Dry H.T. batteries require practically no attention. However, when possible they should be kept in a cool, dry place, as under these conditions they have a longer life. Small type H.T. batteries, whilst being very satisfactory for one and two-valve sets, are not economical for 3, 4 and 5-valve receivers, it being far cheaper to use the heavy duty type for all receivers employing three valves and over. Admittedly they are double the cost of the smaller batteries, but they last more than twice as long.

The H.T. battery need not be discarded until signals are too weak to receive in comfort, or until unpleasant noises develop in the loud speaker. Do not confound these noises with static. The best test is to disconnect the aerial, and if the noises still persist the trouble may be put down to either used-up batteries or a bad or faulty connection inside the receiver.

Dust should not be allowed to accumulate on the tops of the batteries, as it may cause a certain amount of current leakage in time.

With regard to the voltages applied to the various stages in a receiver, full instructions invariably accompany the valves. These few notes may not be amiss.

Radio Frequency Stage.—From 45 to 80 volts H.T. should be applied according to the type of valve used.

Detector Stage.—Here a lower potential is required of from $22\frac{1}{2}$ to 45 volts.

Low Frequency Stage.—Sixty to ninety volts will be found correct for the first stage, and 90 to 150 for the last stage. In both cases a suitable negative bias or "C" battery must be used.

For resistance coupled amplifiers a higher voltage is necessary to compensate for the potential drop across the resistance. This should vary between 120 and 200 volts according to the ohmic value of the resistance.

When connecting two H.T. batteries up in series, in order to increase the total voltage, join the negative terminal of one battery to the negative terminal of the receiver, and the positive terminal of the same battery to the negative terminal of the second battery. The positive terminal of this battery is now joined to the positive receiver terminal.

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The Bias Battery.

The bias battery consists of a small 4½ volt dry cell, which is connected in the grid filament circuit of the amplifier valve or valves.

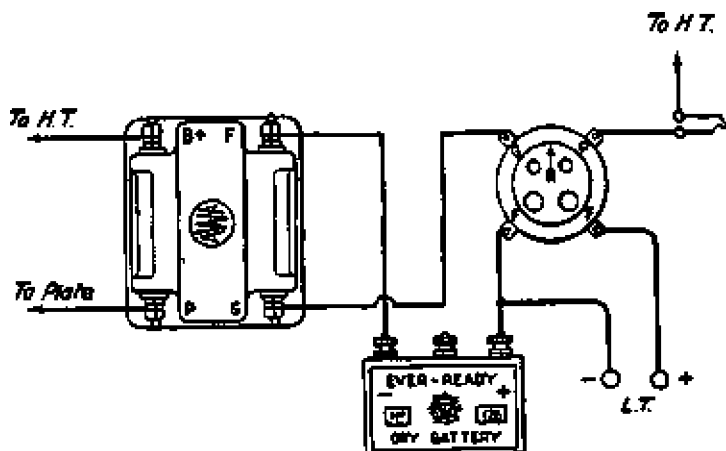
The object of this battery is twofold.

Firstly, it causes the valve to operate on the straight portion of its characteristic curve, thereby eliminating distortion due to grid current, etc.

Secondly, it effects considerable saving in the high tension battery in that less current is used. This will in no way lessen the sound in the loud speaker, as it is not the actual amount of current which produces the sound, but the variation of that current.

The amount of bias varies with the amount of H.T. voltage applied to the valve, and also with the type of valve used. It varies from 1½ volts to 40 volts. The reader is advised to carefully follow the instructions issued with the particular valve he has purchased.

The diagram shows the correct method of connecting up a bias battery to a receiver. It will be observed that the positive terminal of the bias battery is connected to the negative filament terminal, the negative bias terminal being joined to the filament terminal of the transformer. These same rules apply in the event of two amplifier valves being used, the only extra connection being from the "F" terminal of the second transformer to the negative terminal of the bias battery.



A.W.A. RADIO GUIDE

The Loud Speaker.

The loud speaker plays a very important part in the successful reception of broadcast programmes, because, no matter how efficient and costly the receiver may be, if the speaker fails to fulfil its function satisfactorily the results at the best will be poor.

There are two causes which are liable to produce unsatisfactory results in loud speaker reception. The receiver occupies the first heading with the following list:—

1. Working the receiver too near the oscillation point.
2. Poorly-designed transformers in the receiver.
3. Inter-action between transformers.
4. Unsuitable valves.
5. No grid bias battery.
6. Incorrect value of H.T. battery.

Any of these defects will result in squealing or distortion in the loud speaker.

Faults associated with the loud speaker proper come under the second heading, and they are usually due to inferior makes of instruments. Here, again, it is urged that only the very best brand of speaker (such as the Amplion) should be used, as it is a waste of money to go to the expense of a really good set if an inferior speaker is attached to it. Inferior loud speakers usually proclaim themselves by their inability to handle loud volume without distortion or by a tinny rendering of the speech or music.

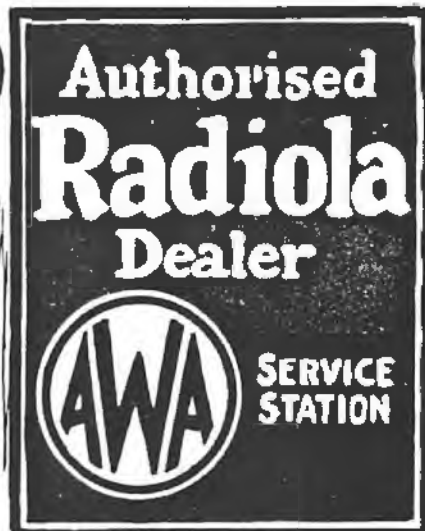
Very often a small fixed condenser varying between .0005 and .002 M.F.D. capacity placed either across the output receiver terminals or across the terminals of the speaker will considerably improve reception. The exact value of this condenser must be found by actual experiment.

Don't forget to connect the speaker to the receiver the right way round. One of the speaker terminals is marked with a "+", and this should be connected to the positive lead (+) of the H.T. battery. The other terminal is marked "-", this going to the plate lead of the valve socket. Failure to comply with these instructions will eventually demagnetise the loud speaker.

Finally, it should be borne in mind that improved reception invariably results when the loud speaker is kept away from the receiver by a distance of a few yards. This is because the sound vibrations emanating from the speaker cause the electrodes inside the valve to vibrate in unison. As a result of this, inter-action between the speaker and the valves takes place, resulting in strange noises.

To Country Clients—
We can Arrange to Supply
Radiola's through the Nearest
Authorised Radiola Dealer
who will give Expert Advice
and Service

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for this
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*The
A.W.A.
Symbol of Service
is a Guarantee to
you of
PERMANENT
SATISFACTION.*

A.W.A. RADIO GUIDE

The A.W.A. Servicing Set.

A suitable servicing set has become definitely the most essential part of the equipment of the Competent Radio Dealer. The Amalgamated Wireless (A/asia) Limited believe that in producing the "Radiola" Servicing Set, they have presented to the Servicing Dealer the most comprehensive and, at the same time, the most keenly-priced Radio testing instrument available on the market to-day.

The A.W.A. "Radiola" Servicing Set is designed primarily to provide in compact form the apparatus necessary for the location of faults in Radio Receivers.

With receivers provided with two or more dials, searching for stations not shown on a Calibration Chart is generally a lengthy and tedious business. The oscillator of the Service Tester provides the means of setting the receiver for these stations, and may, of course, be used to test the receiver when stations have closed down or are out of range.

It may also be used as a wave meter to determine the wave length of stations which cannot be otherwise identified.



The A.W.A. Servicing Set.

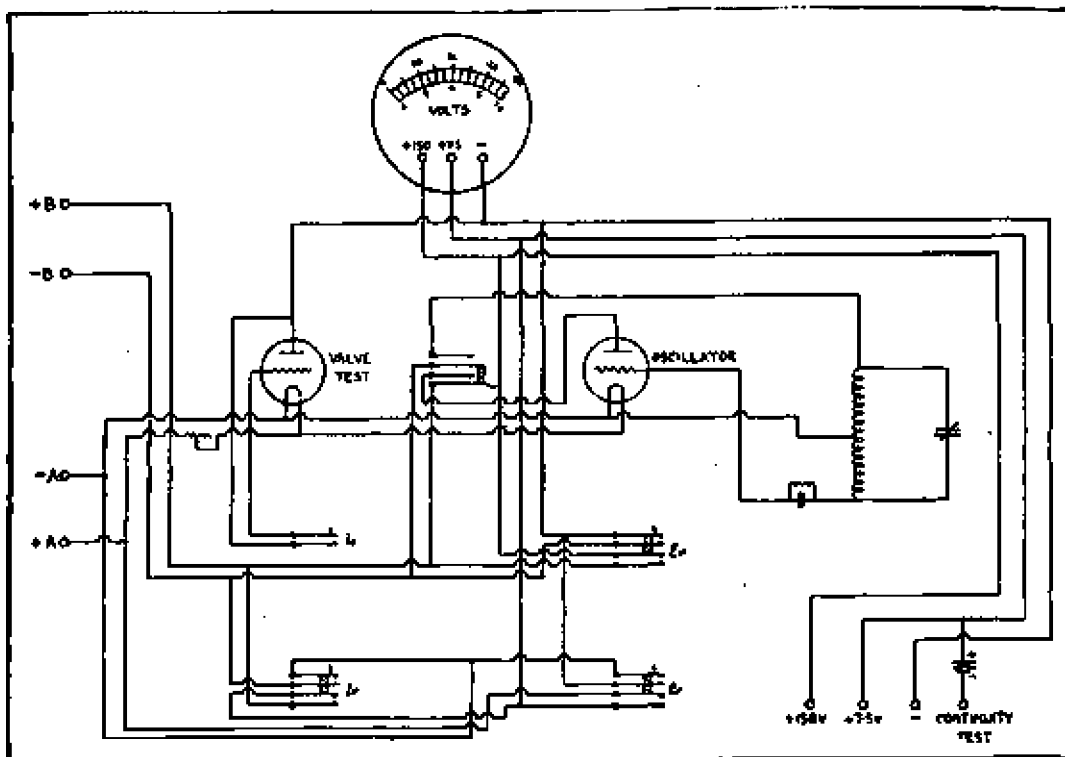
THE SET INCORPORATES.

- (a) Testing apparatus for measuring the normal plate current and emission of valves.
- (b) Testing apparatus for checking the continuity of circuits.
- (c) Testing apparatus for measuring the voltage of "A," "B" and "C" batteries; and
- (d) A calibrated modulated oscillator to enable receivers to be tested out without relying on the transmitting stations.

If used carefully, the modulated oscillator should prove a great assistance to the dealer, for it enables preliminary tests to be carried out; and since by tightening the coupling between oscillator and receiver the signals can be made very strong, there can be no doubt as to whether the receiver is sensitive enough to pick up the signal. If when the coupling is very tight the modulated note cannot be picked up on the receiver, it is an indication that there is a fault in the set-up or in the receiver itself.

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The A.W.A. Servicing Set.



Circuit Diagram of A.W.A. Radiola Servicing Set.

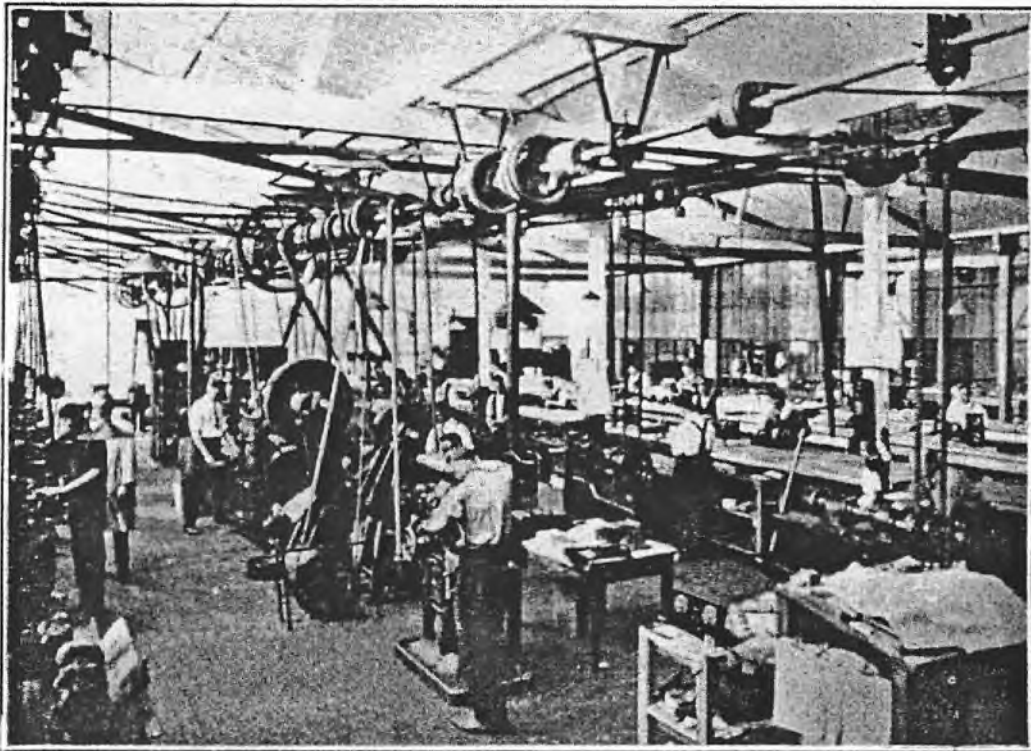
WORKING INSTRUCTIONS.

1. Turn the switch to the oscillator position.
2. Connect a 45V. "B" battery to the + B and - B terminals.
3. Connect a 4V. "A" battery to the + A and - A terminals.
4. Plug an A.W.A.99X valve in the oscillator socket.
5. Press Ef and adjust the battery control to 3V. on the meter.
6. Press Ep and check the "B" voltage to see that it has full value.
7. Set the condenser scale to the reading on the calibration chart in the lid for the wave-length it is desired to test the receiver on.
8. Couple the oscillator to the receiver by placing it near the earth lead of receiver

if an aerial and earth are being used, or near the loop of loop-operated receivers. The coupling coil of the oscillator is in the position shown by the arrow, and the arrow should point towards the earth lead or loop. It is desirable to keep the oscillator some distance away from the receiver, so that it does not couple into the coils of the receiver instead of the loop or earth lead.

9. Rotate the selector dials until the high-pitched note of the oscillator is heard in the loud-speaker or 'phones. After a little practice it will be found that once the modulated note of the oscillator is picked up, a better indication of the sensitivity of the receiver can be formed by weakening the coupling; i.e., increasing the distance between oscillator and loop.

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Section of Machine Shop—A.W.A. Radio-electric Works, Sydney, where all classes of wireless transmitting and receiving apparatus are made.

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RADIO ACCESSORIES

Accumulators.

"Three Star" Special Radio Batteries in Solid Moulded Ebonite Containers.

TYPE M. E. C.



Type M.E.C.

These Batteries, which are the product of very careful research and strenuous tests are rated at their Actual Capacities, and not the misleading ignition capacity.

This Battery is ideal for wireless work, owing to the extra thick plates, made to give a steady flow of current, which will ensure a perfectly clear reception, free from objectionable noises. The grids, which are very robust, are specially designed to retain the active material and to obviate buckling.

The special Ebonite Separators allow a free circulation of the Electrolyte, and do not deteriorate with use.

The terminals are provided with grease cups, which protect them against corrosion, thus obviating faulty contact.

This type is fitted with extra large vents, which facilitate filling and permit easy access of the hydrometer tube when testing the Specific Gravity of the Electrolyte.

These Batteries will give the best possible results under the most stringent conditions.

The Solid Moulded EBONITE Containers are tested at a pressure of 20,000 volts, no inter-cell leakage is possible, and they will give satisfaction under all climatic conditions.

"THREE STAR" BATTERIES ARE BRITISH MADE.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

High Tension and Low Tension Accumulators.

"Three Star" High Tension Wireless "B" Battery.

TYPE H.T.X. 20.

In radio there is a tremendous and often confusing variety of parts and accessories, and everyone must eventually make his own particular choice. But there are certain aids to better reception which are gradually beginning to meet with the approval and patronage of the majority. And it is certainly the verdict of the majority that really counts. Amongst these we would name the accumulator type of "B" Battery.

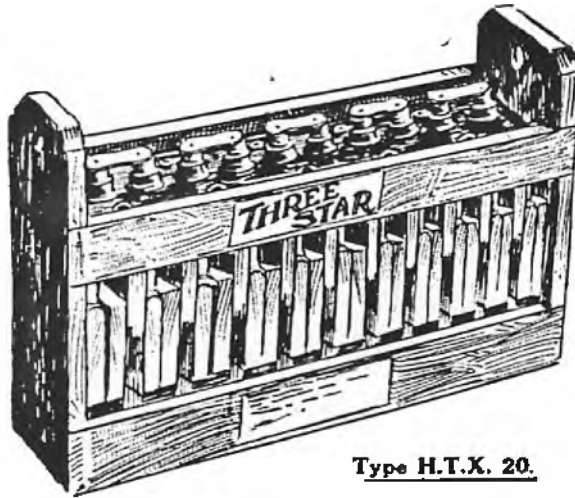
Such a "B" Battery is for the duration of its charge a source of almost constant supply. It has a negligible internal resistance, so its entire available current is at your disposal and is free from the intervention of internal resistance that so often detracts from—and shortens the life of—many other types of high tension voltage. And when that charge is exhausted it does not have to be discarded as a dead loss; it merely requires recharging—either at home or at the nearest service station—to be as good as new, and probably better.

A new High Tension Accumulator "B" Battery on the Australian market is the 3 Star Type HTX 20. It is a splendid high-grade product of English manufacture and will be welcomed by amateurs and owners of broadcasting receiving sets. The special points of this battery are as follows:—

The container is of moulded glass, thereby eliminating the use of separators, and is fitted into a polished wood crate.

The plates are of special design and extra thick, and need only recharging once in three months, or when the specific gravity of the Electrolyte falls to 1.100. It is supplied in a dry charged condition and requires only the addition of pure sulphuric acid, specific gravity of 1.250. It is then ready for use, but a refreshing charge should be given within the first month. Provision is made on this battery for "two volt" tappings, thereby giving the experimenter a wide range of voltages.

VOLTAGE 20 volts, per unit.
CAPACITY 2,500 milli-ampere hours.
OVERALL DIMENSIONS . . Length, 2 1/2 in. x 10 in. wide x 4 5/16 in. deep.



Type H.T.X. 20.

"Three Star" Low Tension "A" Battery

TYPE D.E. CELL.

In appearance they are exceptionally sturdy with their containers made of stout moulded glass, with glass separators as part of the container lasting of course for practically all time.

Fitted with two non-corrosive terminals with Bakelite tops, clearly distinguishable, in so far as polarity is concerned, by means of red and black discs mounted under the terminals. The container is also clearly marked with both the acid level and the polarity of the plates which are visible through the container. The top is filled in with moisture-proof and acid-proof pitch with vent-hole for addition of electrolyte, and supplied with a celluloid stopper pierced with a small hole for allowing gas to escape. The plates themselves are exceptionally thick, and in the case of the larger type cell the positive is of greater size than the negative so that due allowance is made for the action on the positive plate. Briefly outlined the following particulars are supplied in connection with these filament cells:—

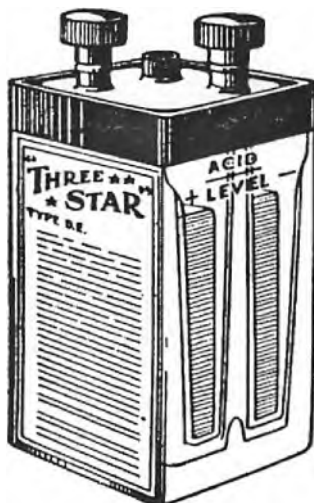
Type DE20, 2 volts.

Normal charging rate 1 amp.
Maximum discharging rate 1 amp.
Capacity (intermittent) 20 ampere hours.

Type DE45, 2 volts.

Normal charging rate 1 amp.
Capacity (intermittent) 45 ampere hours.

These cells are supplied in a charged condition and only need the addition of pure sulphuric acid, 1.250 Sp.G. After filling, the cell should be allowed to stand for about twenty-four hours, and it will then be ready for use. It will retain its charge for approximately three months and needs re-charging only when the Sp.G. falls to 1.100. Directions which are simple and easily understood are attached to every cell.



A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

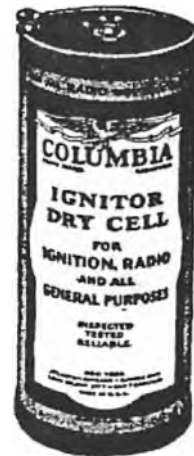
Batteries (Dry). Columbia.

COLUMBIA DRY CELL RADIO "A" BATTERY.

1½ Volts.

The COLUMBIA Ignitor Dry Cell is particularly suitable for supplying current to the filaments of dry cell valves. Specially prepared ingredients give this dry cell superior qualities for this exacting service. Sustained voltage under load and quick recuperative abilities make it supreme in Radio service, and repeated tests have proved the COLUMBIA Ignitor to be the best and most economical radio dry cell obtainable for supply of current for filaments.

When connected in parallel, the voltage of the cells remains the same as the voltage of a single cell, but the total current required by the radio set is equally divided among the cells so connected, so that the drain on each cell is not excessive, thereby greatly prolonging the life of all the cells. Weight, 2lb. 1oz.



COLUMBIA 22½-VOLT "B" BATTERY, No. 4766.

For Use with Soft Detector Valves.



On account of its large size cells and consequently longer life, it is by far the most desirable 22½ volt "B" Battery made. Contains 15 cells, giving 22½ volts. Six Fahnestock Spring Clip Connectors giving variable voltages from 16½ volts to 22½ volts in 1½ volt steps make it the best battery for soft detector valves.

Length 6½in., Width 4½in., Height 3½in. Weight 4lb. 10oz.

COLUMBIA 22½-VOLT BIAS BATTERY, No. 4768.

This battery can be used as a "C" Battery, or as a "B" Battery in portable sets.

It is especially designed for Bias work in conjunction with power valves. Provided with four screw terminals giving negative voltages of 4½, 16½, and 22½, of horizontal dimensions, it measures 4 1/16 inches long by 2 9/16 inches wide and 2½ inches high.

Weight, 1lb. 9oz.



COLUMBIA 45 VOLTS "B" BATTERY,

No. 4772,

Vertical Type.

Contains the same number of cells and is of the same voltage and service capacity as No. 4767, yet, due to its vertical construction, it occupies less than half the table space of the No. 4767.

Three Fahnestock Spring Clip Connectors provide voltages of 22½ and 45 volts. Length, 8 3/16 inches; Width, 3½ inches; Height, 7½ inches; Weight, 9 pounds.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

“B” Batteries (Dry) Columbia.



COLUMBIA 45 VOLTS “B” BATTERY, No. 4767,

Especially made for use on all sets having not more than four valves using 45 volts or 90 volts with a “C” Battery, or three valves at 90 volts without a “C” Battery. Contains 30 cells, and is provided with seven Fahnestock Spring Clip Connectors, giving a range of voltage from 16 volts to 22½ and a 45 volt tap. It can, therefore, be used for both the detector and amplifier. Length, 8 inches; Width, 6½ inches; Height, 3 1/16 inches; weight, 8 pounds 11 ounces.

COLUMBIA “LAYERBILT”

Extra Heavy Duty No. 4486, 45 Volt, Vertical.

This Heavy Duty Battery, of entirely new construction, is made of flat layers of elements compressed one against the other so that every cubic inch inside the battery is completely filled with electricity-producing materials. This new construction ensures longer life, greater power, and far better tone reception. Essential for the economical operation of heavy current circuits.

Length, 8 3/16 inches; Width, 4 7/16 inches; Height, 7 3/16 inches; Weight, 15 lb. 1 oz.



COLUMBIA “C” OR GRID BATTERY.

No. 4771, 4½ Volt.

This COLUMBIA “C” Battery, equipped with three Fahnestock Spring Clip Connectors, contains three large Radio cells giving 4½ volts.

The use of a “C” Battery prolongs the life of the “B” High Tension Battery, and improves the quality of sound reproduction.

Length, 4 inches; Width, 1½ inches; Height, 3 inches; Weight, 14 oz.



The Advantages of Large Cells in “B” Batteries.

Every dry cell is merely a container of stored up electricity, and obviously the larger the cell the more electricity it will hold. It is also true that larger cells cost less in proportion to the amount of electricity stored up in them than smaller cells, therefore “B” Batteries made of large cells last longer and cost less per hour of service than “B” Batteries made of smaller cells.

Columbia “B” Batteries are made of cells larger than those customarily employed, and this fact, together with the high quality of materials and workmanship used in the construction of Columbia batteries, insures longer life and lower “B” Battery operating cost.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Batteries (Dry) Ever-ready

The new EVER-READY 45-volt HEAVY DUTY "B" Battery is made up of 30 large cells in moisture-proof containers, with positive screw terminal taps at 18, 24, 30 and 45 volts. Heavy Gauge Zinc Containers, High-grade Chemicals, perfectly balanced and the whole efficiently insulated, ensures long life and noiseless reception warranted to give service.

The new EVER-READY 45-volt SUPER SERVICE "B" Battery is similar in design to the above listed Heavy Duty Battery, but the cells are of the same size as those contained in our well-known and popular No. 126 EVER-READY "C" Battery, but of even sturdier built and more powerful output capacity. They have been specially designed to withstand the heavy current drain imposed by the use of Multi-valve Sets.

Used in conjunction with the EVER-READY No. 126 "C" Battery, they represent a most economical Radio Battery Service.



W.P. 60-Volt.

Dimensions: 5½ in. x 5 in. x 3-1/16 in.
60 volts, with Tappings at 18, 24, 30,
42 and 60 volts.



W.P. 40-Volt.

Dimensions: 5½ x 3½ in. x 3-3/16 in.
42 volts with Tappings at 18, 24, 30 and
42 volts.

Greatly improved reception is obtained both as regards volume and tonal qualities when an EVER-READY No. 126 is used, and, moreover, the life of "B" Batteries is considerably prolonged thereby, as considerable reduction is effected in the current taken from the "B" Batteries when valves are correctly "biased" according to their maker's instructions.



No. 126.

3-15/16 in. x 1½ in. x 3½ in.
4½ volts, with tappings at 1½, 3 and 4½
volts.

MADE IN
AUSTRALIA



Type H.D. 45-Volt.

Dimensions: 8 in. x 6½ in. x 3½ in.
45 volts, with tappings at 18, 24, 30 and
45 volts.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Batteries (Dry) Ripaults.

Self-Regenerative Type.

50% LONGER LIFE.



In the many types of dry battery the internal resistance is very high and increases rapidly whilst the battery is in use, consequently there is a quick voltage drop and comparatively slow recuperation.

Ripaults have now succeeded in eliminating these disadvantages, and as the result of research work are able to introduce the SELF-REGENERATIVE Battery.

Internal resistance has been overcome and the capacity output and life has been increased to a degree hitherto thought impossible.

In addition to the normal capacity illustrated above, these Self-Regenerative Batteries can also be supplied in larger capacities, as the increasing use of Power valves has rendered larger capacity types of H.T. Batteries essential for good results.

Ripaults Batteries have behind them the vast experience of the famous firm of "LECLANCHE"—the pioneers of Electrical Batteries, whose name is quoted in every text book.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Amplion Carboncels.

The special feature of the Carboncel is the total absence of any chemical depolarising mixture in the carbon element. The cell is of the carbon-zinc-sal-ammoniac type, the action of which produces, as is well known, ammonia and hydrogen. These gases are collected in extremely porous carbon blocks the special construction of which enables them to remain perfectly dry, in spite of their immersion in the electrolyte, so that the gases generated can mix freely inside the blocks with the oxygen of the air.

The Carboncel thus belongs to the class of primary cells which use the air as depolariser, but its superiority lies in the great porosity of the carbons, which renders possible a very rapid circulation of the gases.

The result is that the Carboncel is capable of producing very heavy currents, such as have been never before obtained from other primary cells of similar description. On the other hand, the E.M.F. is maintained practically constant during discharge on a given external resistance provided that the size of the cell is adapted to the ohmic value of this resistance.

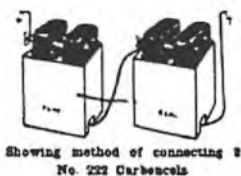
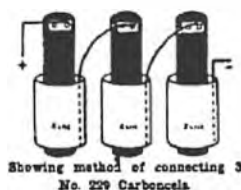
The Main Characteristics of These Cells are:

1. Output three times greater than can be obtained from Leclanche Cells of equal size.
2. Constant voltage as well as intermittent discharge.
3. Very slight evaporation of the electrolyte, even in hot climates.
4. Greatly reduced maintenance costs.
5. Low price per ampere hour.

How to Select Carboncels.

To get the fullest advantages from Carboncels it is essential that the correct type be used. It should be remembered that the voltage maintained by the cells decreases as the output increases. For example: Using a No. 222 cell (normal voltage 1.45), if the drain is 0.2 amp. the maintained voltage is 1.2; if 0.3 amp. the voltage is 1.15; if 0.5 amp. the voltage is 1.1, and if 1.0 amp. the voltage is 0.96 volt. Carboncels are not suitable for multi-valve sets in which the drain is greater than 1 amp.

Sketches showing how cells are connected together.
(Outer containers removed.)



No. 222.

N.B.—Before connecting cells up, see that the end of the wire, which is fastened to the terminal screw, is freed from all braid or other insulating material.

"Carboncels" Wet Type.

Voltage 1.45

Type No.	Size Overall, (Hgt., Wdth., Dpth.)	Wt. (lb.)	Charge (lb.)	Int. Resist. (ohm.)	Normal Output.	Cap. A.H.
222	9½ x 7½ x 6½	10	2½ to 3	0.025	1 amp., 8 hours daily. 2 amps. for short periods. 10 amps., 5 secs., 100 times daily.	500
229	10½ x 5 x 5	6½	11b. 5oz.	0.2	0.3 amp., semi-continuous.	300



No. 229.

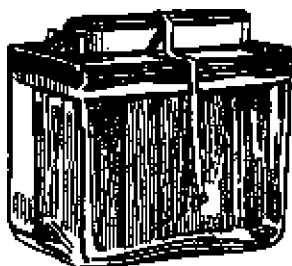
A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Batteries.

Darimont Primary Batteries.

The Ideal Battery for use where no charging facilities are available.



Exhaustive and prolonged research has led to the development of a primary cell having the following characteristics:—

- (1) It gives a constant current at a satisfactorily high E.M.F.
- (2) The current may be used with equal advantage intermittently or continuously.
- (3) The cell is easily recharged when exhausted.

The difficulties due to effusion have been overcome in the DARIMONT CELL, here described.

In this cell two liquids are used, separated by a porous pot, but the liquids are such as to form a semipermeable membrane in the pores of the porous pot, and therefore diffusion is negligible.

The excitant, which is called HEMIPOROGENE, is a viscous emulsion with sodium chloride as the main electrolyte; the depolariser, called RADIOGENE, is a solution consisting largely of ferric chloride. Both liquids are inodorous. The zinc chloride which is formed when the cell is in action remains in solution, and the ferric chloride becomes reduced. The terminal voltage remains very constant because depolarisation is rapid and complete, and because the internal resistance does not vary to any considerable extent.

The cell consists of a container made of glass, in the centre of which is the porous pot. The space between the top of the container and top of the porous pot is filled in with a special sealing compound, which holds the carbon plates and porous pot in position. The porous pot contains the Hemiporogene and zinc plate; it is closed by a loose cover having a hole in the centre, through which the lead terminal strip from the zinc is passed.

Summary of Characteristics.

- (1) The E.M.F. is 1.6 volts.
- (2) The internal resistance varies but little.
- (3) The terminal voltage is well maintained on continuous discharge.
- (4) There is no trouble from diffusion of the liquids.
- (5) There is no smell nor crystallisation of salts.
- (6) The chemicals used are neither objectionable nor dangerous.
- (7) There is no loss of zinc on open circuit.
- (8) Easily and inexpensively recharged.
- (9) Minimum attention and maintenance.
- (10) The cell may be used continuously or intermittently.
- (11) Not damaged by short circuit. (No buckling or sulphating.)

RECHARGING CELLS.

The cell is recharged by simply renewing the Hemiporogene and Radiogene (which are supplied in quantities suitable for the purpose), together with zinc. These three constituents are so proportioned that they all require renewing at the same time.

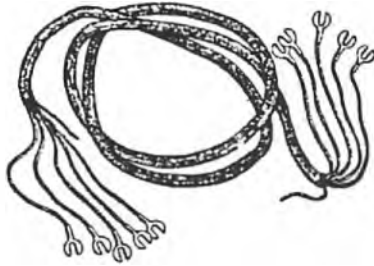
Add Hemiporogene (3 pints) to porous pot and Radiogene (6 pints) to glass container.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Battery Accessories.

"A & B" BATTERY CABLE.



A 5-cord covered battery cable used for the purpose of connecting the "A, B and C" batteries to a Radio Receiver. The cords are all coloured to permit easy identification, and eliminate all possibility of wrong connections. Lugs are fitted on either end to permit easy connection.

These Battery Cables are also supplied with 5 or 7 cords, where the use of a power valve is required, to permit the additional High Tension and Bias.

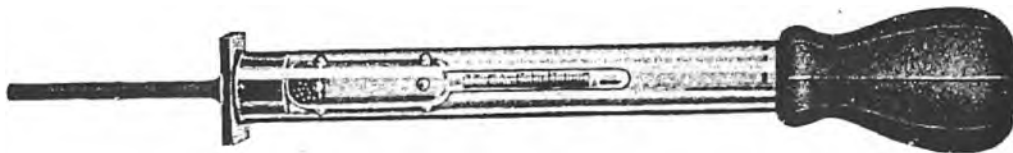
"A" BATTERY CLIP.

A solidly constructed metal clip with heavy lead coating, specially designed for use with accumulator storage batteries. The sulphuric acid used in accumulators is very destructive to most metals, but the heavy lead coating on this type of clip renders it practically immune.



BATTERY TESTER.

This is a device for testing the specific gravity and condition of both A and B accumulator batteries. A rugged and serviceable instrument equipped with patented square float. No more protruding prongs to break off. Strongest float made. Accurate co-ordination between float and barrel assures quick action and prevents sticking and leaning. For further details see article on "Care of Accumulators."



Sturdy Special Hydrometer.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Battery Chargers.

The Westinghouse Electric Co. "Rectox" Trickle Charger.



This is a product of the Westinghouse Electric Company, which eliminates bulbs, acids, chemicals, vibrating points, or any parts that may wear out, deteriorate, or cause trouble—Rectox is small, compact and noiseless.

This Rectox battery charger has been designed to meet the popular demand for a trickle charge rectifier for use in connection with the radio "A" storage battery. This charger will charge a 6 volt radio "A" storage battery at a rate of approximately 0.8 amperes, continuously or 4 volt batteries at 1.2 amperes. The use of the Rectox outfit as a charging device will also enable radio set owners to use a lower capacity battery, in view of the fact that energy is constantly being

put out by the operation of the set. In fact, batteries of low ampere hour capacity are recommended.

OPERATION.

The ease of operation of this charger is one of its principal points as no attention whatsoever is necessary. It is merely necessary to connect the battery to the charger by means of short copper wires, and then plug the A.C. lead into any convenient light socket. The connection of the A.C. supply line automatically starts the Rectox operating, and it will continue to do so until the A.C. supply is again interrupted. The Rectox is particularly adapted for use in connection with the several types of control switches now being placed on the market by various manufacturers.

CONSTRUCTION.

This trickle charger consists principally of a suitably designed transformer and rectifying element completely enclosed in a cast aluminium case. The Rectox is very sturdily constructed. However, it is very light, weighing but $5\frac{1}{2}$ pounds. The over-all dimensions of the Rectox are approximately $3\frac{1}{2}$ x $5\frac{3}{8}$ x $5\frac{3}{8}$ inches, and it will readily be seen that the charger can be placed in a very small space.

The rectifying element above mentioned consists of copper discs or washers, one side of which has been treated at high temperature to collect a coating of copper oxide. These discs are separated from each other by a lead washer to furnish good contact.

The Rectox is finished in standard maroon enamel, which makes it a very neat-looking and attractive piece of apparatus. The D.C. terminals are mounted at one end of the outfit, plainly marked so that there is no chance of error in connecting them to the storage battery. A suitable length of A.C. lead terminating in a standard attachment plug completes the assembly description of this charger.

ADVANTAGES.

The chief point for the Rectox is that it contains no bulbs, chemicals, liquids, or vibrating points to wear or get out of order. The Rectox makes use of the new copper oxide principle of rectification recently introduced by the Westinghouse Company, and is a great advance in the art of rectifier manufacture. The life of the rectifying elements is practically unlimited; therefore the first cost is the only cost in view of the fact that there will be practically no replacements.

Once installed, there is absolutely nothing to give trouble and therefore the Rectox never requires attention. This charger has been provided with a two-winding insulated transformer, which prevents re-radiation and also prevents burning out radio tubes or other radio parts if the Rectox is connected to the battery while the set is operating.

All parts being enclosed, it is entirely safe to handle and operate and there is no danger of it overheating or overcharging the battery. With it in operation, satisfactory radio reception is insured, as the battery is always fully charged.

ECONOMY OF OPERATION.

The fact that the Rectox has no parts to consume current in heating makes it a very efficient and economical charger to operate, in comparison with other designs. It costs but a few pence per day to operate the Rectox continuously, as it takes very little power from the supply line.

A.W.A. RADIO GUIDE

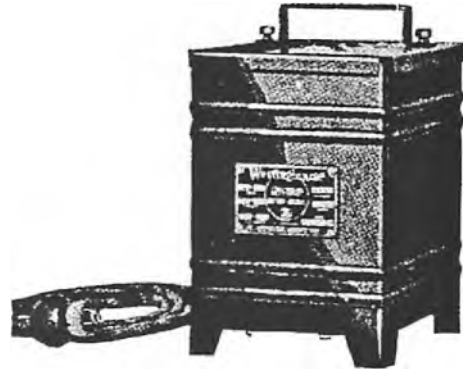
RADIO ACCESSORIES—Continued.

Battery Chargers.

The Westinghouse "Rectigon" Charger.

In order to meet the needs of the radio enthusiasts as well as the automobile owner a new design of Rectigon with a number of special features has been developed.

It will charge any combination of lead storage "A" and "B" batteries required for the radio set as well as a three or six-cell automobile battery. This wide range has been obtained without penalty to the automobile application. There are several distinct advantages over the older design.



OPERATION.

Complete instructions for the operation of the Rectigon are included on the instruction card furnished with each outfit. Due to the fact that an insulating transformer is used instead of the auto-transformers supplied with previous outfits, it is unnecessary to disconnect the radio batteries from the receiving set during the charging period. There is absolutely no chance of getting a short circuit to ground through the receiving set with the resulting tube destruction.

Charging Range.—This Rectigon will charge one or two cells of Radio "A" battery at approximately $1\frac{1}{2}$ D.C. amperes, or from three to six cells of Radio "A" or automobile battery at the approximate D.C. current rates of 2 amperes to three cells and $1\frac{1}{2}$ amperes to six cells, and intermediate current rates to intermediate number of cells. Batteries having a greater number of cells may be charged in sections. Also the provision for charging one or two cells will enable the user to fully charge one or more low cells without overcharging the others.

When connected for "B" battery charging, the outfit will deliver from 0 to $\frac{3}{4}$ ampere to a range of 11 to 48 cells of lead storage "B" battery. Different sizes of lamps are used to vary the charging current. A table giving the size of lamp, number of cells and charging current is included on the instruction card. An equivalent number of alkaline cells can also be charged at the same rate of D.C. current.

Economical.—The cost of charging batteries with the Rectigon is very low compared with the charge made by most public battery charging stations. In addition, the convenience which the Rectigon offers the private owner is well worth considering.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Condensers (Fixed and Variable).

A.W.A. Logarithmic (Centraline) Condensers

For Use Singly, or in Gang Operation.



The increasing popularity of single-control receivers has created a demand for a variable condenser suitable for use either singly or in "gang" operation. For the latter it is essential, to obtain maximum efficiency, that the condenser has a logarithmic characteristic in addition to the various other improvements inseparable from the low loss principle.

The new A.W.A. Logarithmic Centraline Condensers meet this demand. The insulating material has been reduced to a minimum, and high-grade quality has been maintained throughout; true alignment with contact bearings, very low minimum capacity, and rigid construction ensure freedom

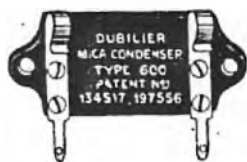
from faulty contacts. It has been designed especially for Australian conditions, and is manufactured in three capacities, viz.:—.00015, .00035, and .0005 microfarads.

DUBILIER MICA CONDENSER
(Type No. 600).

To keep the efficiency high the electrical losses in every part of a wireless set must be reduced to the absolute minimum. Losses in the condensers are extremely detrimental to the proper functioning of the apparatus.

The Type 600 Dubilier Condenser illustrated is constructed with Mica, and is enclosed in a moulded insulating case which carries the terminal connections, so that the highest insulation is secured.

This condenser will withstand the application of a testing voltage of 1,000 volts.

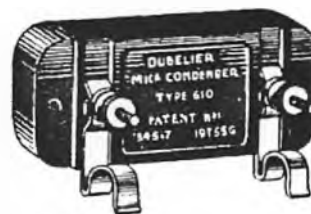


DUBILIER MANSBRIDGE
CONDENSERS.

A special Condenser of the Mansbridge Pattern, designed for "by-pass" work ranging up to 4MF. capacity and tested to 300 v. D.C. Attractively designed and very compact. Fitted with terminals and tinned lugs for making connections. The base has two projecting pierced lugs for affixing to sub-panel or base-board. Carries the usual Dubilier guarantee.

DUBILIER MICA CONDENSER
(Type 610).

This condenser is suitable for use everywhere in receiving circuits. The condenser unit is the same in essentials as that of the well-known Dubilier Type 600. As a whole, however, this new condenser represents a distinct improvement. The moulding is of a different design, and the terminals are of the screw type, though the connections can easily be soldered if required. The application of a soldering iron does not in any way affect the moulding or impair the efficiency of the condenser.



The Type 610 is supplied with or without Grid Leak Clips, as required. These are detachable—an added convenience when, during experimental work, it may be necessary to remove the clips.



A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Condensers.

Electrad Certified Mica Fixed Condensers

"The Six Point Pressure Condenser."

Type GS.

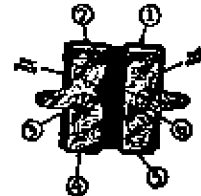


The six pressure points: Ingenious riveting and binding method fastens parts securely at six different points and exerts even pressure upon the largest possible surface. Cannot loosen and change value of condenser.

Materials: Thin sheet of copper is used in place of tin foil. A slip of the soldering iron cannot possibly melt or otherwise damage the copper and thereby ruin this condenser.

SCIENTIFIC DESIGN insures perfect electrical contact always. The soldering lug and the binding strap are in one piece. Neither can work loose from the other.

Type S.



Standard Type, with soldering lug and binding strap in one piece.

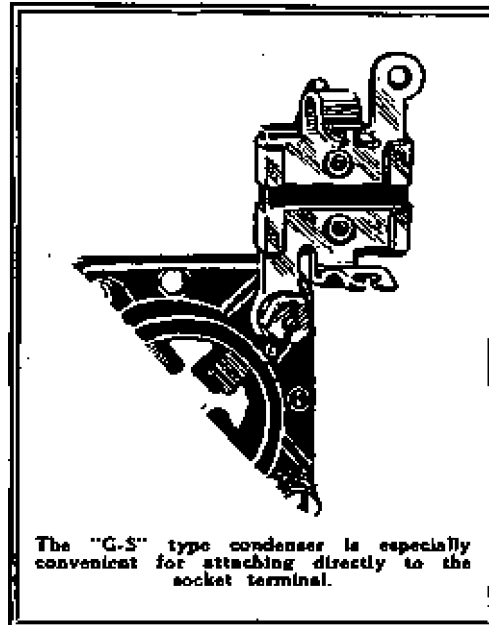
"ELECTRAD" CERTIFIED CONDENSER,

"GS" TYPE.

"Electrad" Condensers, G.S. type, are designed so that minimum wiring is needed. The clips may be fitted directly over the terminal of the valve socket, and the Gridleak mounted on the second set of clips, so that a complete unit is made.

Manufactured in following types:—

Type.	Capacity.				
GS. (Fixed)	.00025 mfd.	(with	Grid	Leak	Clips
Standard ..	.0005	"	(without	")
" "	.0003	"	"	"	"
" "	.0002	"	"	"	"
" "	.0001	"	"	"	"
" "	.006	"	"	"	"
" "	.005	"	"	"	"
" "	.004	"	"	"	"
" "	.003	"	"	"	"
" "	.002	"	"	"	"
" "	.001	"	"	"	"



The "G-S" type condenser is especially convenient for attaching directly to the socket terminal.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Crystals.

URALIUM CRYSTAL.

A super-sensitive crystal—the crystal that is one big point. There is no difficulty in finding a sensitive spot—it is all sensitive.

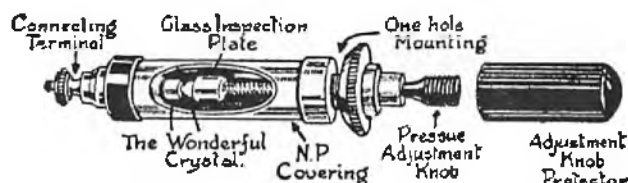
Neatly packed in an attractive tin, complete with catswhisker and tweezers. Each crystal is tested and guaranteed.



DIAL-VERNIER.

All radio apparatus requires a sensitive indicating device for the careful calibration of a particular setting of the instruments. Such an indicator must be carefully designed in order to include in its operation all the good points that are required.

Detectors



THE LIONTRON CRYSTAL DETECTOR.

The "Liontron" is one of the well-known Lion Detector family. This particular type is especially designed for use in crystal circuits and crystal-valve reflex receivers.

A one-hole mounting detector, it is easily fastened to the panel through a hole $\frac{1}{4}$ -inch in diameter by one lock-nut. The crystals are visible through a glass window, and are entirely free from dust.

The two crystals used are the well-known South American semi-transparent, rare, permanent crystal (Gillenham), and Tellurium.

The adjustment between these crystals is obtained by rotating a small knurled knob, and the crystals are held together by a tension spring. When once adjusted, a safety cap is provided to prevent the crystals being disturbed.

The detector is of British manufacture, and is of heavily nickel-plated brass, with high-grade Bakelite insulation.



THE MAXTONE.

The Maxtone Crystal Detector is another of the "Lion" Detector family, and is designed for base-mounting, being provided with two nickel-plated brackets.

The operation of the "Maxtone" is the same as the "Liontron."

The detector is constructed of highly-polished Bakelite, and has the usual adjusting screw, but is not provided with a safety cap.

A.W.A. RADIO GUIDE
RADIO ACCESSORIES—Continued.

Grid Leaks (Variable).

The Dubilier "Duvarileak" Variable Resistance.



The Dubilier "Duvarileak" Variable Grid Leak resistance has been developed as the result of research work extending over a period of three years.

The resistance material employed has an extremely hard surface so that the wear on it, due to the rolling contact, is negligible. Consequently the resistance has a permanence of adjustment which enables it to be set to a given resistance value on every occasion by means of the graduated scale provided.

This instrument is arranged for one hole fixing and is easily mounted to the panel.

BRADLEYLEAK.

The Perfect Grid Leak.

Grid leaks are among the most sensitive devices in a radio receiver. Each tube requires a slightly different grid leak resistance. An adjustable grid leak provides the only means of getting maximum efficiency from every valve.

The Bradleyleak has a range from $\frac{1}{4}$ megohm to 10 megohms. A small grid condenser (0.00025 Mfd.) is also offered for mounting across the Bradleyleak terminals. The size, finish and mounting is identical to that of the Bradleystat.

Provision is made for baseboard mounting. The turning of the knob provides a smooth, stepless and noiseless adjustment of grid leak resistance.



Shown with Bradley Micadon Condenser fitted.

Grid Leaks (Fixed).

GLASS GRID LEAKS.



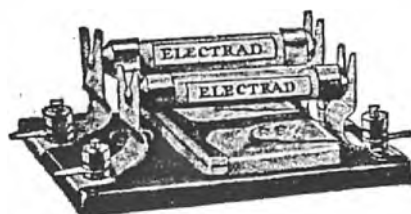
accurate and constant. Sizes: $\frac{1}{4}$ to 10 megohms.

Where a good low-priced Grid Leak is required, the "Electrad" Glass Grid Leak is unsurpassed. Each Grid Leak is individually tested. Resistance is

METALLIC GRID LEAKS.

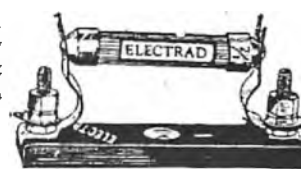
less. Non-inductive, accurate. Unaffected by weather, temperature or working conditions. Non-hydroscopic. Great current carrying capacity without overheating or change in resistance. No paper, carbon, varnish or fibre. Metallic resistance element fused to the inside of a glass tube. Paraffined under high vacuum. All sizes. 5,000 ohms—10 meg.

GRID LEAK MOUNTINGS.



Bases are genuine, moulded Bakelite. Spring clips are specially selected spring brass, and will not break or bend out of shape. A high quality mounting at a low price.

Double and Single Mountings.



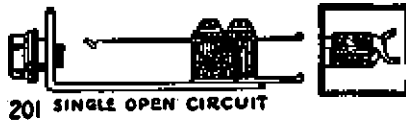
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RADIO ACCESSORIES—Continued.

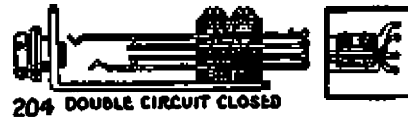
Jacks

B.M.S.

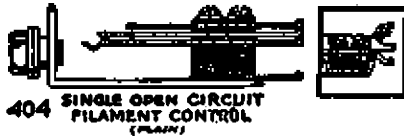
Constructed with the Fantail Cupped Lugs for easy soldering. Silver contacts, Bakelite Insulators, polished nickel plating, positive snap.



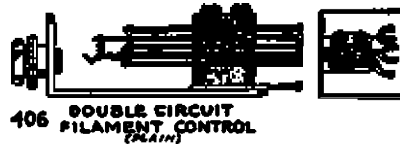
201 SINGLE OPEN CIRCUIT
Open Circuit Jack.—Generally used with a detector unit alone or in circuit of last stage of amplification.



204 DOUBLE CIRCUIT CLOSED
Double Circuit Jack.—Generally used between detector and first stage of amplification, or between successive stages before the last.

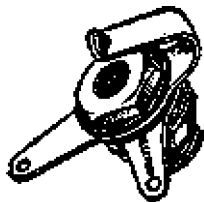


404 SINGLE OPEN CIRCUIT
FILAMENT CONTROL
(MAIN)
Single Fil. Control Jack is used in last stage of amplification. Automatically lights or extinguishes filaments of tubes as plug is inserted or withdrawn.



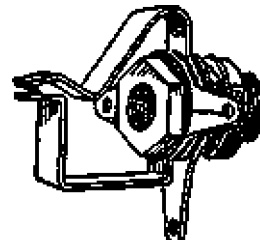
406 DOUBLE CIRCUIT
FILAMENT CONTROL
(MAIN)
Double Circuit Filament Control.—Same features as Single Fil. Control Jack, but is primarily used in intermediate stages.

Electrad



Open Type.

The new ELECTRAD Certified Single Circuit Jacks, open and closed, are of solid brass construction, with positive acting spring of phosphor bronze. Sterling silver contact points. Insulation of hard rubber. Tinned soldering lugs, so placed that good connections can easily be made. Requires less than 1 inch behind panel.



Closed Type.

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RADIO ACCESSORIES—Continued.

Amplion Loud Speakers.

There is no more truthful way of describing a radio set than to say it is no better than the loud speaker used.

No matter how expensive the instrument may be, your ultimate verdict will rest upon the quality of the music which the loud speaker dispenses.

The perfecting of a unit which is capable of faithfully reproducing the immediate phases of radio entertainment could not be accomplished in a day.

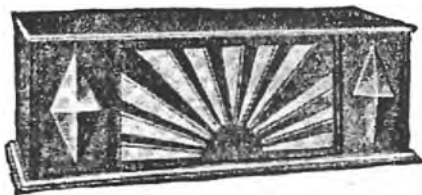
The House of Graham, pioneers in the manufacture of loud-speaking telephones, have fostered and perfected the art of making wireless loud speakers.

Their experience in this phase of manufacturing has extended over almost half a century and to-day their name is so universally accepted and approved that to ask for an "Amplion" is a sufficient guide to the trade.

All Amplion Loud Speakers are supplied in one Standard Resistance, viz., 2,000 ohms.

Amplions are adjustable—that is to say, the position of the diaphragm may be varied until it is suited to the volume passed by the set. Once having been adjusted, make future adjustments to the receiver only. If signals are not as loud as they were the night before, the set may not be tuned quite as well; look here for trouble and not to the speaker.

When connecting up a loud speaker to the receiver make quite sure that the terminal marked "+" goes to the positive H.T. battery, and the "—" terminal goes to the plate of the valve. If this is not done the magnets will become weakened, and a loss of efficiency will result.



Model AR100

In Jacobean Finish Oak.



Model AR100M

In Polished Dark Mahogany.

The Amplion Cabinette is a genuine British made Amplion Loud Speaker, with all the essential Amplion features—with the Amplion reputation and guarantee behind it. It forms an attractive alternative to the Radiolux type of speaker. It is attractive in appearance, and is capable of giving faithful reproduction with full volume and delightful tonal quality.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—LOUD SPEAKERS—Continued

DRAGON AMPLION

THE FAMOUS "DRAGON" RANGE.

The "DRAGON" Range of Amplion Loud Speakers has established an extraordinary popularity. Compact shape, consistent performance and superb tonal quality are the outstanding characteristics. The "DRAGON" Range has always met with world-wide praise, and remains supreme in the field of "horn" type Loud Speakers.



AR65.

Model AR65—
All metal chocolate crystalline finish. Height, 17in. Diam. of Trumpet, 12in.

AR65O— Same as AR65, but with Oak Flare.

The Amplion Junior Dragon Model, AR114. With Oak Flare. Height, 15in. Diam. of Trumpet, 10in.



AR111.

The Amplion Junior Dragon, Model AR111. All metal, black crystalline finish. Height, 15½in. Diam. of Trumpet, 10in.



AR102.

The Amplion Dragonfly, Model AR102. Height, 8in. Diam. of Trumpet, 5½in.



AR19.

The Amplion Standard Dragon, Model AR19 (Oak Flare). Height, 20½in. Diam. of Trumpet, 15in.



AR23.

The Amplion Concert Dragon, Model AR23 (Oak Flare). Height, 26in. Diam. of Trumpet, 21in.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Loud Speakers.



AR88.

Swan-neck "De Luxe," Type AR88. All metal, black crystalline finish, nickel-plated base. Height, 23½ in. Diam. of Trumpet, 14½ inches.

**SWAN-NECK
AMPLION**

The "Swan-neck" Models are acknowledged as essentially efficient types: they are provided with units of a size carefully balanced with the acoustic duct, and undoubtedly represent the greatest value in vertical "horn" Loud Speakers.



AR58.

Swan-neck "Senior," Type AR58. All metal, black crystalline finish. Height, 20½ in. Diam. of Trumpet, 12 inches.

AMPLION GRAMOPHONE ATTACHMENT.

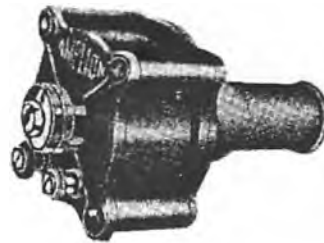
Fit this to any Gramophone and you have a Wireless Loud Speaker.

By means of a gramophone attachment, it is possible to convert any well-designed gramophone into an excellent loud speaker, merely by fixing an Amplion Attachment to the tone arm. For handling large volume the larger units should be used.



AR88O.

Type AR88O. With Trumpet of Dark Oak.

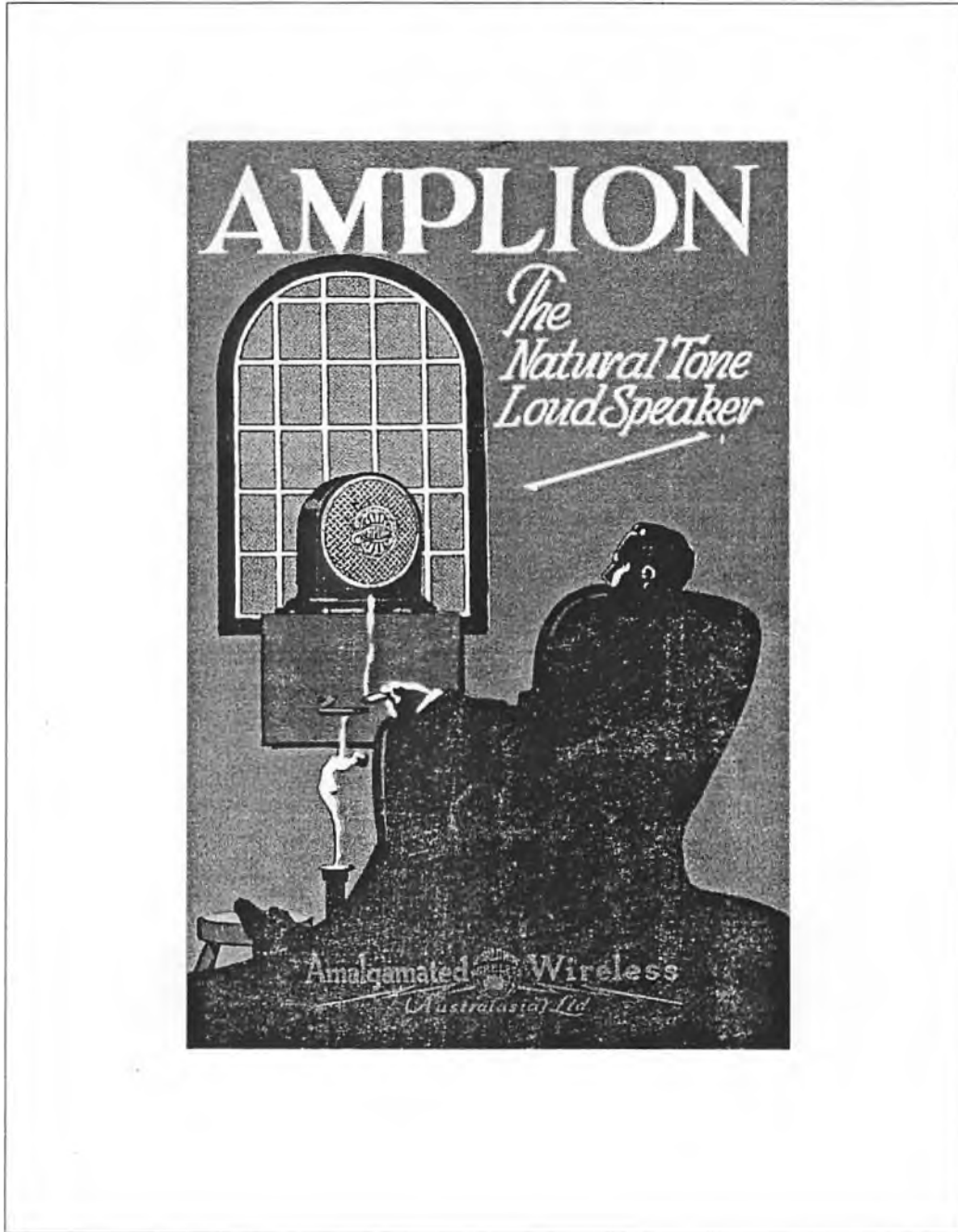


AU4—2000 ohms.
AU5—2000 ohms.
AU6—2000 ohms.

Swan-neck "Junior," Type AR38. All metal, chocolate crystalline finish. Height, 17½ in. Diam. of Trumpet, 10 in.



AR38.



A.W.A. RADIO GUIDE

RADIO ACCESSORIES—LOUD SPEAKERS—Continued



Model RS2.

Model RS2. — Black Crystalline Enamel, on Junior-size Metal Cabinet, with Copper-finished Grille. Height, 13½ in.

Model RS2, O.—Junior-size Cabinet, in Dark Oak, with Oxidised Copper Fittings. Height, 13½ in.

Radiolux Amplion.

"Every detail a feature" expresses in a few words the unique qualities of the Radiolux Amplion—the outstanding speaker of its type.



RS5.

Model RS5.—Senior-size Cabinet in Queensland Maple, with Rosewood Finish. Height, 15½ in.

Model RS3.—Junior-size Cabinet, in Queensland Maple, with Rosewood Finish. Height, 13½ in.

Amplion Cone Type Loud Speakers.

The New Amplion Cone Speakers possess the following special features: A cone diaphragm made, not of paper or similar substance, but of strong seamless fabric material, acoustically correct and impervious to changes in temperature and climate—a vital point; an adjustable electro-magnetic unit of improved type specially designed for heavy duty (Senior models) or medium and light duty (Junior models); a system of construction retaining all the better qualities of the cone type speaker without any of the common defects, thus affording extraordinary lifelike and natural results.



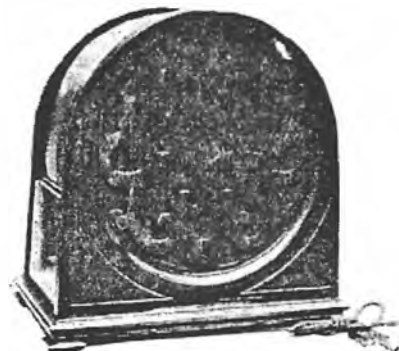
Chippendale Mahogany
No. AC9 Senior.

No. AC9.—"Chippendale Mahogany" Senior Model. A remarkably beautiful cabinet model worthy of a place in the most tastefully furnished room and affording the Amplion Cone standard of reproduction. It will appeal equally to the listener of taste and the advocate of Radio Realism.



"Jacobean" Oak, No. AC7
Senior Model.

No. AC7.—"Jacobean Oak" Senior Model. A cabinet in the popular Jacobean style. It will appeal to those requiring an oak model less severe in style than the AC9.



Type AC12.
In Mahogany Case.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Loud Speaker Accessories.

METHOD OF CONNECTING LOUD SPEAKER TO RECEIVER.

It is very important that due regard should be given to the polarity marked on the Loud Speaker when connecting it to the receiving set. As loud speakers contain a permanent magnet, if the current from the "B" battery does not flow through the speaker in the correct direction it will weaken the magnet and in time destroy it altogether. Fig. 1 shows the correct way to connect up the loud speaker.

Fig. 2 shows an alternative method. In this case the direct current from the "B" battery flows through the choke coil L and is isolated from the loud speaker by the condenser C. This method is preferable to the first when high "B" battery voltages are used, as in the case of power amplification. The polarity of the speaker is immaterial, as no current from the "B" battery flows through it. The condenser C should have a capacity of about 2 microfarads, and the choke coil L requires the same impedance as that of the secondary winding of the average audio-frequency transformer; in fact, a transformer secondary is frequently used for this purpose, the primary being left open.

The use of a "Siftron" is highly recommended. This prevents demagnetisation and improves results.

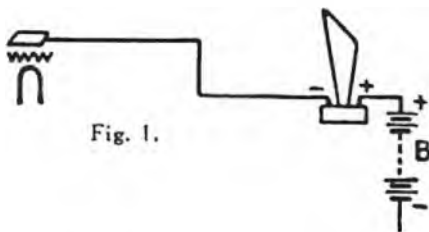


Fig. 1.

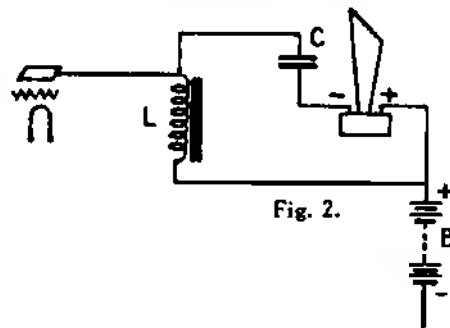


Fig. 2.



A SIFTRON CIRCUIT FOR LOUD SPEAKERS.

When a SIFTRON is connected in the output circuit of a Broadcast Receiver, only modulated current flows through the windings of the Loud-speaker, thus enabling closer adjustment, which, once made, remains undisturbed.

The magnet of the element cannot become demagnetised and the windings are safeguarded from breakdown.

Using a SIFTRON it is not necessary to connect the Amplion Loud-speaker "a special way round," and "over-loading" is out of the question.

If two or more Loud-speakers are used on the same Set the SIFTRON makes a decided improvement in clarity and quality of signals.

LOUD SPEAKER CORDS.

Flexible braided cords fitted with standard tips for connecting Amplion Speakers to Broadcast Receivers, etc., etc. They are also suitable for many other purposes. Supplied in three standard lengths, namely, 5ft., 10ft., and 20ft.

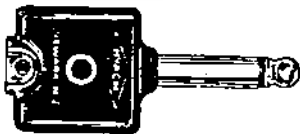


A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Loud Speaker Accessories

(CONTINUED)



BRACH TELEPHONE PLUG.

Of high-grade manufacture, with brown Bakelite moulding, red dot on side showing polarity marking. Has special slot on which to tie speaker or telephone cord, thus taking the strain off the tips.



To attach 'phone cords to plug, insert tips into opening and push in as far as they will go. They will be held automatically.

To release, pull cords to side of plug firmly and withdraw.

NOTE.—Red dot on plug indicates the sleeve side or plus (+). Manufacturers often arrange their circuits so that if the line marked cord is inserted in this side it will permit favourable current direction through 'phone or loud speakers.



BRACH EXTENSION CORD CONNECTOR.

The Brach Extension Cord Connector is made of genuine Bakelite, and provides the means for moving the Loud Speaker or Headset to another room without disturbing the set; no tools are required to release connections. It is shockproof, small and neat in appearance.

Lightning Arresters

Electrad Lightning Arresters.

A Constant Safeguard Against Loss.

If a fire should occur, it's best to have an approved lightning arrester. Improved construction assures unvarying air-gap spacing. Completely sealed and moisture proof. Indoor Arrester is of glazed porcelain. These arresters comply with Fire Underwriters' Regulations.



A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Meters.

Radio engineers all agree that it is absolutely impossible to get the best out of a radio set unless the filament voltages are correct and the "B" batteries at their proper operating point. The life of a valve burned 10 per cent. above its rated voltage will be cut in half. If burned below its rated voltage the reception will be under normal. A recent survey made by a large set manufacturer showed that 60 per cent. of all radio trouble is traceable to defective or run-down batteries.

These are established engineering facts which a radio set owner cannot afford to ignore. The control of filament voltages and checking of "B" batteries will eliminate most of your radio troubles. Nothing is more disappointing in radio than to have trouble or poor reception while listening to a Premier's broadcast message, a grand opera aria, the football returns, or while entertaining guests with a dance programme.

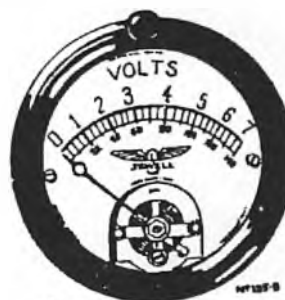
Hand in hand, and in step with the great strides of this industry, the Jewell Co. saw the need for precision instruments to control the plate, filament and antenna currents produced in the operation of continuous wave transmitters.

Always first in the field, JEWELL developed a complete line of instruments for direct, alternating and high frequency currents, uniform in design, accurate in operation—all one size—"THE JEWELL TRIO." High grade D'Arsonval direct current meters, rugged alternating current meters, and the superior thermo couple type of radio frequency ammeters make up the Jewell transmitting trio.



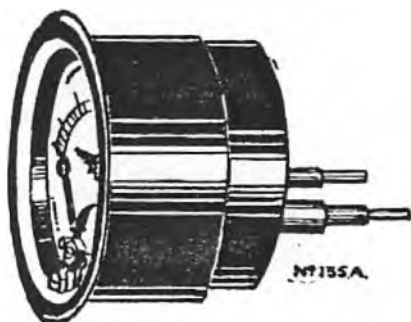
Pattern No. 135.

For panel mounting. Case diameter, 2 inches, with special cup for mounting. 0-15 milliamps, 0-25 milliamps, 0-50 milliamps.



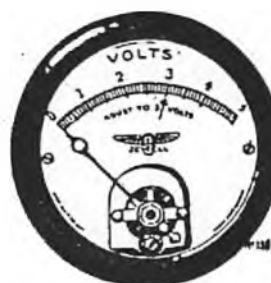
Pattern No. 135-B.

Double reading volt-meter, 2-inch case diameter, with narrow flange. Push button switch for high voltage reading. 0-7.5-150 volts.



Pattern No. 135-A (Side View).

Two-inch high resistance voltmeter with pin jacks for plugging into Radiola Receivers. Has zero adjuster. 0.5 volts.



(Front View).

Pattern No. 135-A.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

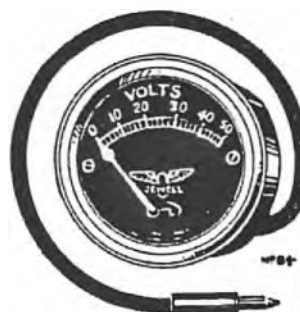
Meters.



Pattern No. 54.

For transmitting sets. Case 3 inches diameter.

- 0-150 m/amp.
- 0-250 ..
- 0-500 ..
- 0-1000 ..



Pattern No. 84.

The most substantial and accurate low-priced voltmeter made for checking "B" batteries, 0-50 volts. With cord and prod complete.

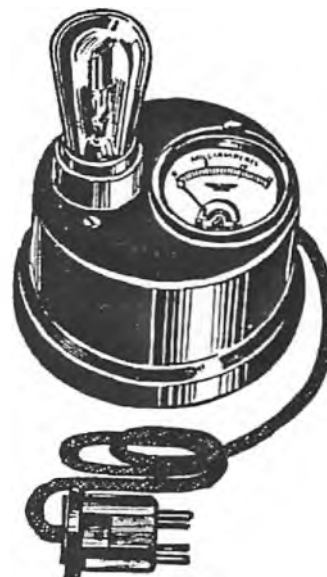


Pattern No. 64.

Antenna Ammeters.—This is one of the "Jewell Trio" for amateurs. 3-inch case. Thermo-couple type. .5, 1.5, 3, and 5 amps.

Pattern No. 107.

Jewell Junior Tube Checker. The checking of tubes in the home is made easy for set owners. The milliammeter indicates condition of tube. Complete with cord, plug, and adaptor. Tests all three and five-volt valves.



A.W.A. RADIO GUIDE

RADIO ACCESSORIES (METERS)—*Continued.*

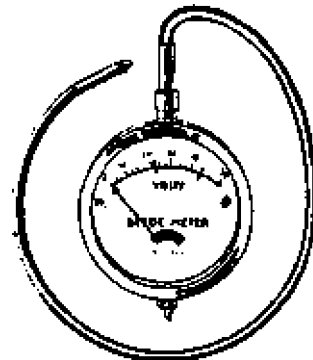
Beede Battery Meters.

TYPE 206.

Voltmeter—0.50 volts. Used for determining the voltage or pressure of 22½ or 45-volt "B" Batteries.

TYPE 211.

Storage Battery Tester—This meter is designed for testing all three cells or individual cells of a six-volt storage battery. Tells the condition of the battery, showing when to stop and when to charge.



The Beede Double Reading Meter.

The Beede type No. 105 double reading meter for measuring the voltage of either "A" or "B" batteries, is enclosed in a highly-polished nickel-plated watch case, fitted with a flexible connection and two point-terminals for "A" and "B" batteries. It incorporates the moving iron principle, and the scale shows readings from 0 to 10 for "A" batteries, and 0 to 100 for "B" batteries.

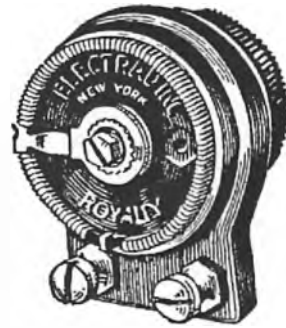
A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Resistances.

Electrad Royalty Variable Non-inductive High Resistances

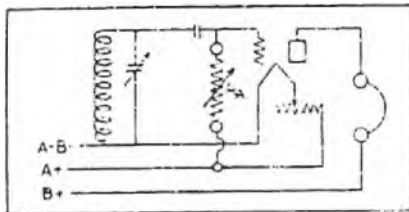
The Royalty is a decided step forward in Variable High Resistances. Its exclusive wire-wound principle is covered by patents and applications. Resistance remains constant at every point, making it possible to select immediately any resistance desired. Ideal for volume control. Recommended for resistance coupled, impedance coupled, and transformer coupled audio amplifiers. Admirably suited as a flexible control for detector plate current in "B" Battery eliminators. Permits full range in one turn. Non-inductive, non-hygroscopic. Practically indestructible. Unusually high current-carrying capacity. No parts to break or wear.



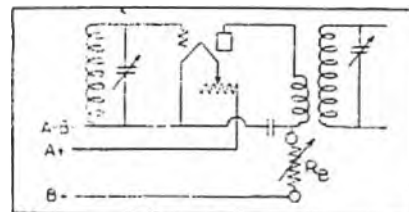
- TYPE A—1/10 to 7 megs. Variable Grid Leak.
- TYPE B—1,500 to 100,000 ohms, for Resistance Coupling.
- TYPE C—500 to 50,000 ohms, for Volume Control.
- TYPE D—10,000 to 700,000 ohms, Detector Control for "B" Eliminators.
- TYPE E—500,000 ohms Compensator Potentiometer.

- TYPE F—0 to 2,000 ohms Variable High Resistance.
- TYPE G—0 to 10,000 ohms Variable High Resistance.
- TYPE H—0 to 25,000 ohms Variable High Resistance.
- TYPE J—0 to 200,000 ohms Variable High Resistance.
- TYPE K—0 to 5,000 ohms Variable High Resistance.
- TYPE L—0 to 500,000 ohms Variable High Resistance.

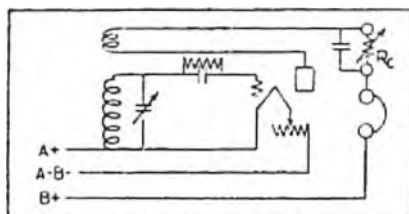
Some Applications to Radio Circuits.



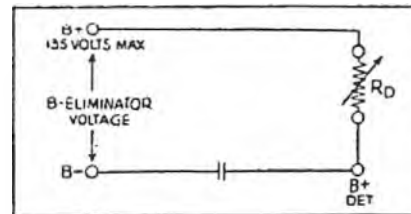
The ELECTRAD ROYALTY Variable Grid Leak (Type A) (RA) connected with shaft grounded so as to avoid capacity effects.



The ELECTRAD ROYALTY (Type B) (RB) as oscillation control in a tuned Radio Frequency amplifier.



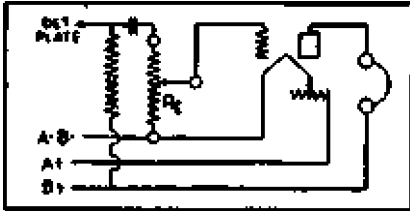
The ELECTRAD ROYALTY (Type C) (RC) as control of regeneration in detector.



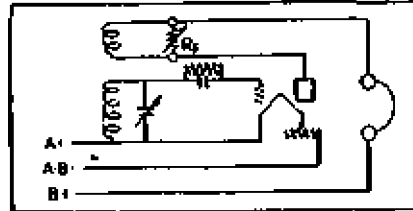
The ELECTRAD ROYALTY (Type D) (RD) used as control of detector plate voltage in B-Eliminator circuit.

A.W.A. RADIO GUIDE
RADIO ACCESSORIES—Continued.

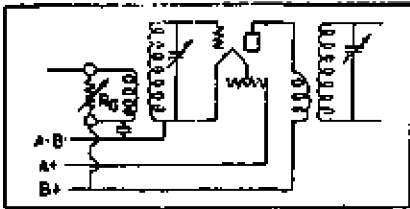
Resistances.
The Electrad Resistances.



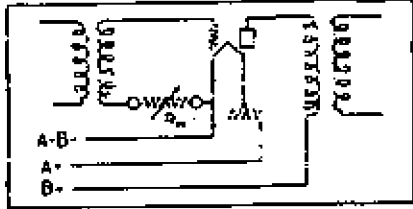
The ELECTRAD ROYALTY (Type E) (RE) used as volume control in the grid circuit of a resistance coupled or an impedance coupled audio amplifier.



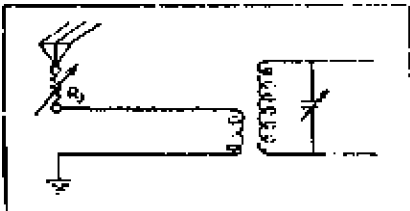
The ELECTRAD ROYALTY (Type F) (RF) used as control of regeneration in detector.



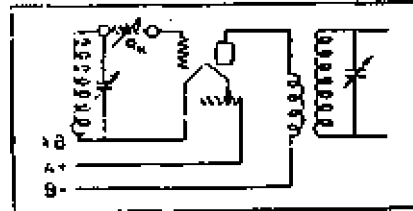
The ELECTRAD ROYALTY (Type G) (RG) used as volume control in a tuned Radio Frequency Amplifier.



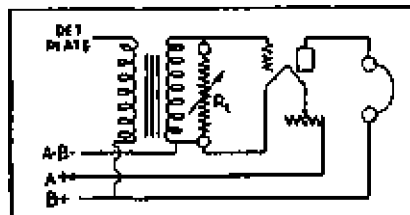
The ELECTRAD ROYALTY (Type H) (RH) used as oscillation control in an untuned Radio Frequency amplifier.



The ELECTRAD ROYALTY (Type J) (RJ) used in series circuit to increase selectivity and prevent overloading of tubes by powerful signals.



The ELECTRAD ROYALTY (Type K) (RK) used as oscillation control in grid circuit of a Tuned Radio Frequency Amplifier.



The ELECTRAD ROYALTY (Type L) (RL) used as volume control in a transformer coupled audio amplifier.

A.W.A. RADIO GUIDE

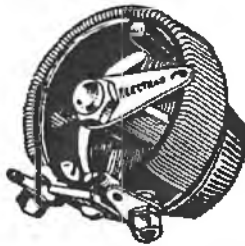
RADIO ACCESSORIES—Continued.

The Electrad Air-Cooled Rheostat.

Dependability is Built into These Better Rheostats.

Examine Electrad Certified Rheostats as carefully as you desire—subject them to every test—you will find them absolutely dependable in every respect.

Resistance element guaranteed to within 5 per cent. Milled shaft with squared hole in contact arm insures rigidity. No wobble of shaft. Extra long metallic bearings. Highest grade BAKELITE insulation, maximum radiation and mechanical strength. Single-hole or three-hole mountings. For three-hole mounting, base is tapped, eliminating use of nuts behind panel. Phosphor bronze spring contact arm insures perfect contact. In every respect a better rheostat—6, 10, 20, and 30 ohms.



BRADLEYSTAT.

Perfect Filament Control.

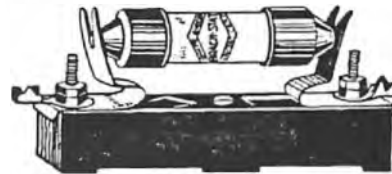
This remarkable graphite disc rheostat has an unbroken stepless range of control from approximately $\frac{1}{2}$ ohm to 100 ohms, thereby affording sufficient control for ALL valves without change of connections.

All metal parts are nickel-plated, and a one-hole mounting makes installation easy. The knob is of Bakelite, and is quickly detachable. The Bradleystat is one of the smallest rheostats on the market. An internal switch opens the battery circuit when desired.



THE BRACH-STAT AUTOMATIC FILAMENT CONTROL.

BRACH-STATS possess the unique property of automatically changing in resistance with varying A battery voltages, thereby making hand rheostats unnecessary, and simplifying the operation of radio sets. Brach-Stats are connected in series with the radio filaments. They protect valves and lengthen their life many times. One Brach-Stat (according to type) can be used to control any number of valves. Brach-Stats are furnished on standard mountings in types to suit every valve, and are as easy to interchange as a fuse. They can be used on any radio circuit.



Rheostat Values.

The value of Filament Rheostat depends on the type of valve used and the number of valves controlled by that particular Rheostat. When using one valve per control, A.W.A. 33, '99, or Radiotron UX199, and UX-201A require a 30-ohm Rheostat. The UV200 works off a 6-ohm Rheostat.

These same values can also be taken when using three valves per Rheostat in the case of A.W.A. 33, '99, and Radiotron UX-199. A 6-ohm Rheostat should be employed when working three UX-201A per control.

A.W.A. 33, '99, or Radiotron UX199 valves will work off 3-1 $\frac{1}{2}$ v. dry cells, but if a number of valves are used it is more economical to use a 4-volt 25 A.H. accumulator. Radiotron UX or UV-201A valves work off a 6-volt accumulator, the A.H. capacity depending on the number of valves employed.

The Marconi DEP 410 and DEL 410 work from a 3 to 4 ohms, and the DEP 610 and DEL 610 work off a 6-ohm Rheostat.

A.W.A. RADIO GUIDE

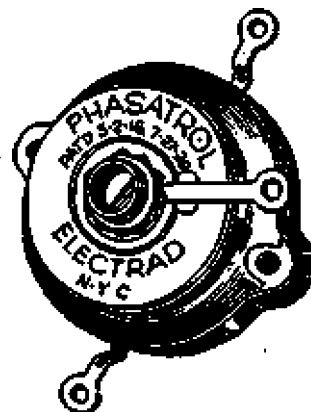
RADIO ACCESSORIES—Continued.

Stabiliser

The Electrad Phasatrol

PHASATROLS are particularly recommended to the man who builds his own receivers as a simple, yet effective means of balancing and controlling radio frequency amplification. They are equally suited to sets already operating, whether factory or home made, and can be installed by the inexperienced radio fan in a short time.

PHASATROLS are suited to any circuit having radio frequency amplification, whether tuned, untuned or reflexed. One PHASATROL must be used for each stage of radio frequency amplification, and when correctly installed and adjusted, PHASATROLS will absolutely eliminate any tendency to frequency oscillation or distortion.



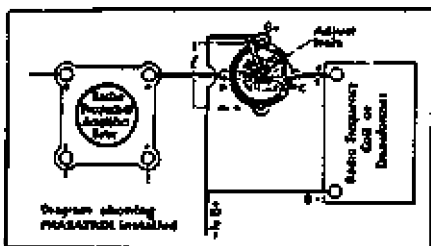
HOW TO INSTALL THE PHASATROL.

PHASATROLS are suitable for base or sub-panel mounting. For sub-panel mounting it is only necessary to bore a $\frac{3}{8}$ inch hole. The PHASATROL is then fastened to the panel (preferably on the underside) by means of the lock-nut in the centre. For base mounting the dimensions between holes is 1-13/16 inches.

The electrical connections are simple and readily understood by reference to the diagram shown. A diagram of the plate connections in the ordinary radio frequency amplifier is shown with the Phasatrol connected in the circuit. The PHASATROL has three lugs or terminals marked "B +", "P," and "PC," respectively. The "B +" terminal on the PHASATROL is to be connected to the "B +" terminal on the radio frequency coil or transformer. The lug on the PHASATROL marked "P" connects to the plate terminal on the socket; the other lug marked "PC" connects to the plate connection of the coil or transformer.

Adjustment is comparatively simple and quickly made. By referring to diagram it will be noted that there is an adjustment screw in the centre of the PHASATROL.

After the PHASATROLS have been properly installed, before attempting to tune in a signal, turn the adjusting screw of each PHASATROL gently in a clockwise direction as far as it will go, using a screw-driver. Do not force.



A station is now tuned in and adjustment is made by turning the set-screw of each PHASATROL back in a counter-clockwise direction a small amount at a time until maximum signal strength without oscillation is obtained. The set should now be returned to the incoming signal and the PHASATROLS carefully readjusted to a point just below oscillation. In this way maximum efficiency and selectivity will be secured over the entire wave length band.

A.W.A. RADIO GU

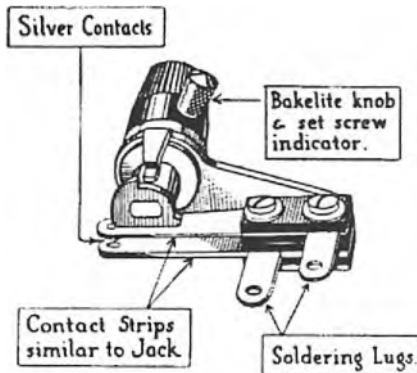
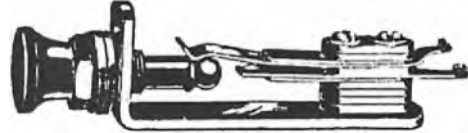
RADIO ACCESSORIES—

Switches

B.M.A.

(FILAMENT SWITCH)

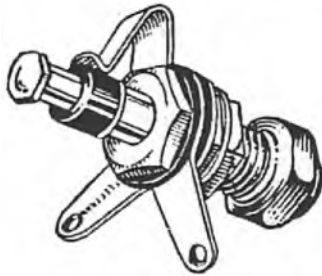
The improved Push-Pull Jack Switch for switching on and off the filament battery current.



THE NEW SATURN FILAMENT SWITCH.

They are particularly neat and very compact, requiring approximately 1/2 in. behind the panel. It is simple to mount, requiring only one hole in the panel; is positive acting and fitted with a genuine polished Bakelite knob. Metal parts are heavily nickled brass and is simple to connect by means of tinned soldering lugs incorporated in the contact arms. These switches, apart from presenting a neat and efficient appearance on the front of the panel, should prove most popular on account of their compactness and accessibility for connecting purposes, combining with the extraordinarily small amount of room required for their assembly, which in no way detracts from their efficiency as a switch. The set screw on the Bakelite knob sets as an indicator and a stop is incorporated in the switch so that it cannot be turned beyond either the "On" or "Off" position.

It operates on the same principle as the plug and jack, that is to say that by turning the knob two contact strips are brought together, the actual points of contact being made of sterling silver and insulation of hard rubber and oversize.



ELECTRAD CERTIFIED SWITCH

The Electrad Switch is of solid brass construction, with tinned soldering lugs placed to make easy connections. Neatly designed, genuine Bakelite knob. Requires less than 1 inch behind panel. Adds to the appearance of your set. An ideal filament switch.

Telephones

Ericsson A.W.A. Telephones.

Of the highest-grade workmanship, the British-made Headphone consists of two Aluminium Double Pole Watch Pattern Receivers attached to a double "Duralumin" Headband with 6-foot two-way flexible cord. The receivers are connected in series. Very light in weight, the earpieces being composed of Aluminium. A special feature about this telephone is that by unscrewing the earcap the whole of the magnet section can be detached without releasing any screws. Ideal for broadcast reception.

These 'phones were adopted as standard by the British Admiralty as far back as 1909, and by the Air Board for Wireless Telephony in Aeroplanes in 1917. Many improvements have since been made.

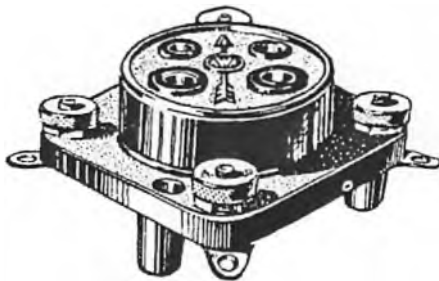


A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

Valve Sockets.

The A.W.A. Non-Microphonic Valve Socket.



This cushion type socket is manufactured in Australia in the A.W.A. Radio-Electric Works, Sydney, from genuine high-grade British bakelite. Incorporating the improved spring suspension principle, it offers full protection to the valves in addition to effectively eliminating microphonic noises. The cushioning of the floating element is fully balanced, while the contacts are positive. Each terminal is clearly marked and fitted with soldering lugs, and the socket itself is available in two types, viz.—mounted and unmounted.

Supplied also in unassembled types.

Benjamin Five-Hole Socket.

The five-hole Socket for use in conjunction with the new UY type valves.

The general appearance of the UY Socket is identical with the Benjamin UX Socket, incorporating spring suspension principle. The five terminals are clearly lettered, and the appearance of the Socket as a whole has been improved by using green insulating material on the upper portion. From this peculiarity is derived the name "Green Top" Socket, which has now become a general designation in trade circles. At present the Green Top Benjamin Socket is only obtainable complete with mounting base, the type being No. 9036, and is for use in connection with AC radio tubes generally, and in particular with the Radiotron UY-227, the new Radiotron A.C. operate detector amplifier valve.



No. 9036.



Polished Ebonite "R" Type Valve Sockets.

Suitable for panel mounting, complete with nuts and washers. The material and finish are of the highest grade and workmanship, and for any English 4-pin valve this socket is ideal.

A.W.A. RADIO GUIDE
RADIO ACCESSORIES—Continued.

SOLDERING LUGS.

This lug is of the popular "pear" shape, and is manufactured from best quality tinned copper, and of suitable dimensions as to be indispensable to the set-builder.

The use of this lug simplifies wiring, ensures positive contact, and enables a very neat connection to be made when soldering.

The other four types illustrated are constructed of a similar material and designed for battery connections, etc.



"SPAGHETTI."

Insulated Sleeving for the purpose of covering and insulating busbar wire and commonly known as "Spaghetti." It has a high resistance value, and is easily threaded on to the busbar wire for wiring the set. Supplied in four different colours for identification purposes.

Where the use of "Spaghetti" is not required, a make of insulated wire known as "HIVOLT-SIT" can be used. The insulation of this wire has a high resistance value, and in addition is water and acid proof.



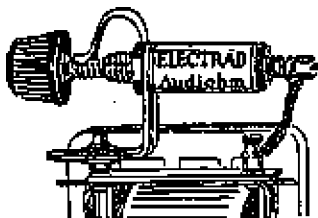
TERMINAL STRIP.

A small strip of Bakelite with the necessary markings engraved thereon, and containing seven metal terminals with non-removable tops. The bottom portion of the terminal is fitted with copper lugs for the necessary wiring to the instrument. Two of the terminals are used for aerial and earth connections, the remainder having the usual 5-cord battery cable connected to them. The markings, reading from right to left, are as follows:—

Antennae, Ground, A —, A +, B —, B Det., B Amp. +

Tone Purifier

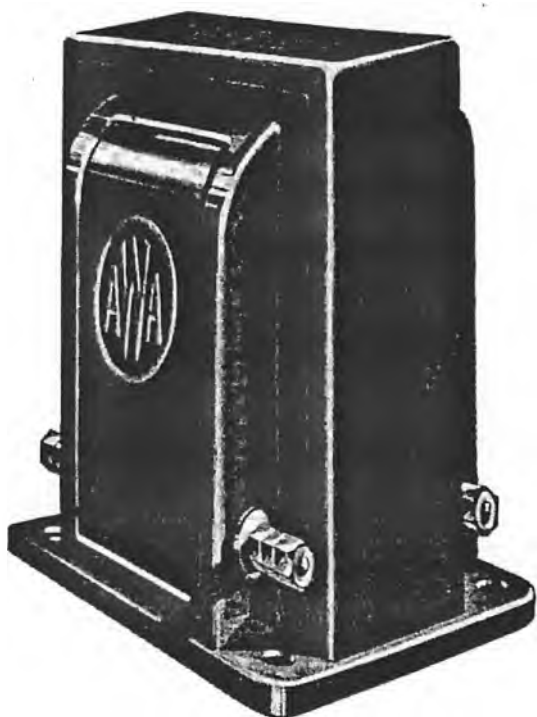
The Audiohm.



Every set with one or more audio transformers needs one of these tone and quality controlling devices. Placed across secondary of first audio transformer, it eliminates distortion and transformer noises. Once adjusted remains permanent. Requires no drilling or soldering. No tools needed to attach. Fits any transformer.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.



The A.W.A. Ideal Distortionless Transformer

This new transformer undoubtedly sets a new standard. All the features of modern transformer design have been incorporated, including high inductance primary, low distributed capacity, and absolutely minimum air gap.

A very high ratio of turns to cross section of iron has been chosen, so that the transformer will handle relatively high steady plate currents without distorting. Ample cross section of wire is also provided, ensuring mechanical strength and freedom from breakdown due to expansion or contraction, of the whole coil due to changes in temperature. A special process is incorporated to eliminate the very common primary "open circuit" fault. It is housed in a metal case with black lacquer finish, small base area, and with terminals low down for convenient wiring. The name plate on the top of the transformer clearly indicates the terminal markings.

These A.W.A. Ideal Transformers are made in four ratios, 2-1, 3½-1, 5-1, and 9-1, while in addition to the above a special 1-1 output transformer is made for coupling loud speakers in the last stage of an amplifier where a super-power valve is being used.

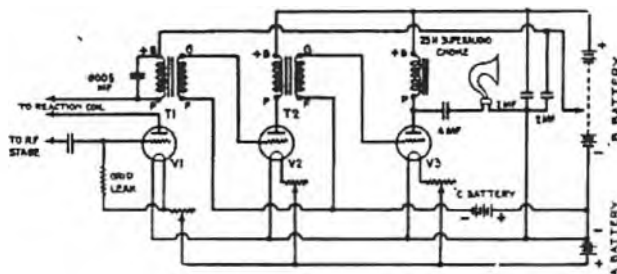


Diagram showing how to connect up the A.W.A. Ideal Transformer. The lettering corresponds to that on the name-plates of the Transformers themselves.

A.W.A. IDEAL AUDIO FREQUENCY CHOKE COILS.

The A.W.A. Ideal Audio Frequency Choke Coils are identical in size and appearance with the A.W.A. Ideal Transformer, except that there are only two terminals mounted on the cases. They have been specially designed for use in impedance-coupled Amplifiers, utilising A.W.A., Radiotron or Marconi Valves. They are made in four sizes, namely, 100 henries, 75 henries, 50 henries, 25 henries. Their specific uses briefly being as follows:—

- 100 henries—With general purpose valves having plate currents of not more than 4 milliamps.
- 75 henries—With detector and amplifier valves having plate currents of not more than 6 milliamps.
- 50 henries—With amplifier valves having plate currents of not more than 10 milliamps.
- 25 henries—For use with loud speakers, using up to 25 milliamps.

The 25 henry choke can also be used as a smoothing choke in small "B" battery eliminators where the total output does not exceed 25 to 30 milliamps.

A.W.A. RADIO FREQUENCY CHOKE COIL.

A.W.A. Radio Frequency Choke Coil is designed for use in circuit where some method for neutralising Radio Frequency Oscillations is necessary. Very compact in size, measuring approximately 1 inch high by ½ inch in diameter, it is enclosed in an insulated Cylinder, and can be mounted either above or below the panel by means of a small set-screw.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—Continued.

VALVES.

Valves are primarily instruments of precision—the most sensitive ever manufactured and sold on a large scale. They are a kind of artificial eye, for they “see” waves to which our living retinas are unresponsive—the waves which carry broadcast music and speech.

The amount of energy received by a radio set may be only a few millionths of a millionth of that transmitted, but good valves respond to it and amplify it millions, even billions, of times. Despite its sensitivity this extraordinary artificial sense organ is so sturdy that it withstands ordinary usage and it is made in large quantities, so that its price is low. One of the functions of a good valve is to control the flight of billions of electrons—invisible particles of electricity, so small that they bear the same size-relation to atoms that footballs bear to a large dirigible balloon. A stream of electrons speeding from filament to plate is instantly and automatically influenced by the waves from the broadcasting station which affect the grid. What we hear is a duplicate of what is broadcast.

These electrons are shot forth by the heated filament. A few years ago only expensive storage batteries could be used to heat the filament. Now many of these valves are operated by inexpensive dry-cells; their filaments glowing only a dull red.

This improvement is the result of ceaseless research. More electrons are now emitted with less heat—therefore less current. Lower filament temperature also enhances the quality of reception.

An air or gas molecule is immense compared with an electron; it would stop an electron in its flight to the plate. Research showed how obstructing air molecules could be swept out of the bulb.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—VALVES—Continued

Marconi Economy Valves.

Seven reasons why Receivers should be fitted with Marconi Economy Valves:—

1. They have behind them the greatest name in the history of wireless—"Marconi"—and all that name implies.
2. They meet every requirement—"A Valve for every purpose."
3. Each valve is subjected to no fewer than eight tests before leaving the factory.
4. Freak design plays no part in the arrangement of the electrode system, which has proved itself the best in practice.
5. The characteristics of each type are chosen by scientists, who are not only valve experts, but also experts in the design of wireless sets.
6. They are sold in sealed containers, a guarantee that the valve you buy is new.
7. They are manufactured from raw material to finished product by the same British organisation.

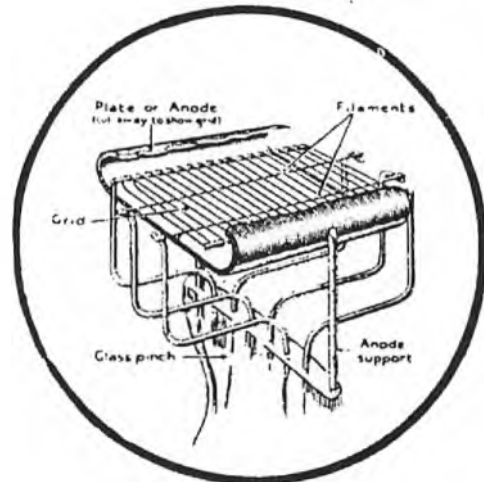


Diagram showing Construction.

FOUR-VOLT TYPE.

Running costs become much less when you use Marconi Economy Valves, but volume and sensitivity become much greater, and, at the same time, you obtain a quality of reproduction which is infinitely more life-like. Particular attention is drawn to the new designations allotted to these latest Marconi Valves.

Each valve is allotted three letters and three figures, representing the characteristics of the valve.

Below are listed the two four-volt Marconi Economy Valves—DEL 410 and DEP 410.

The letters DEL mean "Dull Emitter Low Frequency," and DEP mean "Dull Emitter Power" Valves, while the first figure 4 refers to the filament volts, and the remaining two figures to the filament consumption in decimals.



DEL 410.

A general purpose valve for radio frequency circuits, for grid rectification; or in the first audio frequency stage with choke or transformer coupling.

Filament Volts . . . 4.0 max.
 Filament Current01 amps.
 Anode Volts . . . 120. max.
 Amplification factor 13.
 Impedance . . . 14,000 ohms
 Socket Standard UX or "R,"

DEP 410.

A power valve for last stages of receivers operating loud-speakers. Will handle enough power to fill a large room.

Filament Volts . . . 4.0 max.
 Filament Current01 amps.
 Anode Volts . . . 120. max.
 Amplification factor 6.25
 Impedance . . . 6250. ohms
 Socket Standard UX or "R,"



A.W.A. RADIO GUIDE

RADIO ACCESSORIES—VALVES—Continued

Marconi Valves--Six Volt Type.

Having created exceptional standards of sensitivity and volume in the four-volt class, Marconi now provides six-volt valve enthusiasts with the same extraordinary degree of perfection, and again these wonderful Marconi Economy Valves operate on a filament consumption of .1 ampere only. The principle of initial and numerical designation is employed similar to those allotted to the types in the four-volt class.

CHARACTERISTICS.



DEL 610.

Fil. Volts .. 6.0 max.
 Fil. Current 0.1 amp.
 Anode Volts 120 max.
 Amplification
 Factor .. 15
 Impedance .. 13,000 ohms
 Socket Stan-
 dard UX or "R"

DEP 610.

Fil. Volts .. 6.0 max.
 Fil. Current 0.1 amp.
 Anode Volts 100 max.
 Amplification
 Factor .. 7
 Impedance .. 4,500 ohms
 Socket Stan-
 dard UX or "R"



DULL EMITTER. GENERAL PURPOSE RECEIVING VALVE

TYPE D.E.3,

Approximate dimensions:—Overall length, including pins, 115 mm.; Maximum diameter of bulb, 25 mm.

General purpose dull emitter valve. Current consumption is so low—0.06 amps—that dry cells (three in series) can be used satisfactorily.

When running off a 4-volt supply, the variable resistance should have a value of 30 ohms, or with 6 volts, 60 ohms—30 fixed and 30 variable. The filament must never be run bright, and, in any case, the voltage must not exceed 3. Used on the low frequency amplification side, 60 volts may be used on the plate, with approximately 5-6 volts negative grid bias. Use a maximum of 40 volts on plate if employed as detector or high frequency valve.



Characteristics:

Filament Volts 2.8
 Filament Current 0.06 amps.
 Anode Volts 20-80
 Impedance 18,500 ohms
 Amplification Factor 6
 Socket Standard UX or "R"

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—VALVES—Continued

A.W.A. VALVE CHARACTERISTICS

Model	Use	Socket	Grid Condenser Mf	Grid Leak Megohms	Detector Grid Return Lead	A Battery Volts (Supply)	Filament Terminal Volts	A Battery Current Amperes	B Battery Volts Detector	B Battery Volts Amplifier	Negative C Battery Volts	Plate Current Milliamperes Normal operating See Notes 1 & 2	Output Resistance Ohms See Note 1	Mutual Conductance Micro-Mhos See Note 1	Voltage Amplification Factor See Note 1
AWA 33	Detector Amplifier	English Base	.00025	2-9	+ F	4.5	3.0	.06	45	90	4.5	2.5	15000	400	6
AWA 99X	Detector Amplifier	English Base	.00025	2-9	+ F	4.5	3.0	.06	20 40	40 80	4.5	2.5	15000	400	6
AWA 55	Detector Amplifier	English Base	.00025	2-9	+ F	6	5	.25	20 40	90 135	4.5 9.0	3.0	10000	800	8
AWA 101 X	Detector Amplifier	English Base	.00025	2-9	+ F	6	5	.25	20 60	90 135	4.5 9.0	3.0	10000	800	8

MARCONI VALVE CHARACTERISTICS

DE 3	Detector Amplifier	English or Amer UX	.00025	2-9	+ F	4.5	2.8	.06	40	80	4.5	1.0	21000	320	7
DE 5 B	L F Amplifier	English base	.00025	2-9	+ F	6	5	.25	—	60 120	1.5 3	5	30000	665	20
DEV	H F Amplifier	English base	.00025	2-9	+ F	4	3.0	.2	20 60	60	1.5	1.5	24000	250	6
DEQ	Detector	English base	.00025	2-9	+ F	4	3.0	.2	20 60	—	—	—	100000	200	20
DEP 410	Power Amplifier	English or Amer UX	—	—	—	4	4	.1	—	120	9	6	6250	1000	6-25
DEP 610	Power Amplifier	English or Amer UX	—	—	—	6	6	.1	—	100	7.5	5	4500	1500	7
DEL 410	L F Amplifier	English or Amer UX	.00025	2-9	+ F	4	4	.1	45	120	4.5	1.5	14000	920	13
DEL 610	L F Amplifier	English or Amer UX	.00025	2-9	+ F	6	6	.1	45	120	4.5	1.0	13000	1150	15
V 24	H F Amplifier	English base	.00025	2-9	+ F	6	5.0	.75	20 60	60	3.0	1.0	20000	300	6
LS 5	Power Amplifier	English base	—	—	—	—	4.5	.8	—	150 400	9 20	12 40	6000 4500	835 1110	5
LS 5 A	Power Amplifier	English base	—	—	—	6	4.5	.8	—	60 400	45	95	2750	910	2.5
LS 5 B	L F Amplifier	English base	—	—	—	6	4.5	.8	—	—	—	—	25000	800	20.0
T 15	Transmitting Valve	English base	—	—	—	—	5.5 6.0	1.0	—	600	—	20	50000	500	25
T 30	Transmitting Valve	English base	—	—	—	—	6.5 7.0	1.8	—	1000 1500	—	10 20	70000	645	45

Note 1. At normal operating grid voltage (not at zero grid)

Note 2. The plate current values given are less than those obtained with zero grid, but are the currents actually obtained when the tube is operated at indicated values of plate voltage and grid bias voltage

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—VALVES—Continued

A.W.A. Valves.

A.W.A. 33 AND 99X.



These are general purpose valves suitable for dry battery and storage battery operation. Equally serviceable as detectors, or as radio-frequency or audio-frequency amplifiers. They are identically the same, differing only in the bases.

Their very low filament consumption—most .18 watts—and small plate current, causes a very light drain on the A and B battery. These characteristics make its use most economical, especially where dry batteries of low capacity only are available.

The construction has been so arranged to give low internal capacity, making the ideal for neutrodynes and other receivers employing several stages of radio-frequency amplification.



Characteristics.

Fil. volts	..	..	..	3
Fil. amps.	..	..	..	.06
Anode volt	..	..	..	20-80

Base A.W.A. 33 Standard English "R" type.

Base A.W.A. 99X Standard American UX (Small).

A.W.A. 101X.



A good all-round "storage battery operated" valve, equally good as detector or amplifier.

The thoriated filament gives an extraordinary high electronic emission, coupled with long life. Although only taking .25 amps., it is robust, and will withstand a surprisingly great amount of rough usage. It has an undistorted output, reaching 55 milliwatts, making its use ideal for last stage audio amplification, capable of giving distortionless loud-speaker reproduction of sufficient volume for ordinary large rooms.

Characteristics.

Fil. volts	..	..	..	5
Fil. Amps.	..	..	..	.25
Anode volts	..	..	..	40-120

Base A.W.A. 101X Standard American UX (Large).

A.W.A. RADIO GUIDE

RADIO ACCESSORIES.—VALVES—Continued

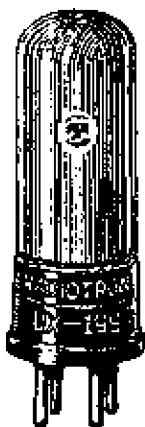
Radiotron Valves.

Four years ago, when broadcasting was young, there were just three members of the Radiotron family. The name Radiotron itself had but just emerged from the laboratories. It meant little or nothing to the radio public of those days.

To-day, however, the Receiving Radiotron family has grown in number to 19 in all, comprising 15 Radiotrons and four Rectifying Valves. Each of these valves has its own particular and important place in acoustic synchronization—bringing into the home a true reproduction of the original sound values picked up by the distant microphone—as well as economical operation.

The growth of the Radiotron family has set the pace of development of the radio art. Current consumption has been reduced to a minimum, making for economical and more convenient operation. Special filaments have made possible the convenient and simple dry-battery receiver. Stable and reliable operation has come to take the place of the critical and uncertain operation of early valves.

The Genuine Radiotron Seal on every Genuine Radiotron sold is your assurance of the quality valve, fully representative of the best that radio technique has to offer.



Radiotron Valves.

RADIOTRON UX199—DETECTOR AMPLIFIER.

Radiotron UX-199 is adaptable to either portable or home dry battery operated sets. It is equally serviceable as a detector or as a high efficiency radio or audio frequency amplifier. Economy of operation is particularly pronounced when it is used in circuits having more than three valves.

RADIOTRON UV-199—DETECTOR AMPLIFIER.

UV-199 and UX-199 are electrically identical, differing only in their bases. UV-199 will fit only a UV socket and UX-199 will fit the only standard Push Type Socket. Both Radiotrons have the "XL" filaments which require such low current; the dry cells of the "A" battery are subjected to very slight drain.

A.W.A. RADIO GUIDE

RADIO ACCESSORIES—VALVES—Continued



RADIOTRON UX-201A—DETECTOR AMPLIFIER.

Radiotron UX-201A is the equivalent of the well-known UV-201A equipped with the new standard UX base. UX-201A will fit both the old Navy socket and the new Push Type socket. This sturdy Radiotron has long been the accepted standard of every radio engineer, amateur and broadcast listener. It is the standard, all-round storage-battery valve of radio, good in detector or amplifier circuits, and sure to give the best results at the lowest operating cost.

All the results of modern electron-valve research are embodied in UX-201A. Thus its "XL" filament has an electron emission which is not simply high, but extraordinarily high; and this at low current consumption and with long life.

RADIOTRON UX-200A—DETECTOR.

Radiotron UX-200A is the most sensitive and efficient detector ever placed on the market. It is a very stable valve and is not at all critical to the adjustment of the plate voltage. The use of this Radiotron in the detector socket of a radio set employing Radiotrons UX-201A will produce additional sensitivity and volume approximately equal to that which would be obtained by the addition of one stage of radio frequency amplification. The advantage becomes readily apparent on receiving signals from distant stations. The characteristics of this Radiotron, as will be seen from the characteristic chart, are such that no change in the set itself is required, when it is used to replace Radiotron UX-201A. The filament consumption and the plate voltage are identical to those of Radiotron UX-201A.

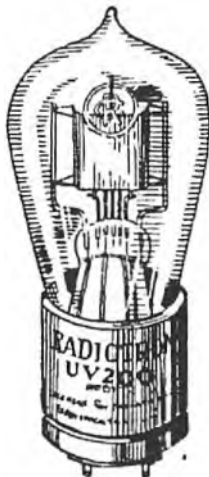


RADIOTRON UV-200.

The valve is "soft"—that is, special gases are introduced during the manufacturing process giving that characteristic which provides "detection" with great sensitivity.

UV-200 operates from a 6-volt storage battery, and may be used in any circuit.

The socket is the well-known UV.



RADIOTRON UX-240.

Radiotron UX-240, a high Mu-detector and voltage amplifier, is designed for use in resistance or impedance-coupled amplifier circuits.

Having a Voltage Amplification Factor (Mu) of 30, Radiotron UX-240 will be welcomed particularly by amateur builders who prefer resistance-coupled amplification. Where valves of the general purpose type have heretofore been used in resistance coupled circuits, improved amplification may now be obtained by the use of one or two Radiotrons UX-240.

The UX-240 may be used in the popular types of resistance coupled amplifier circuits without change in plate coupling resistances with superior results. Best performance is obtained, however, when the values recommended in the instruction sheet are employed.



A.W.A. RADIO GUIDE

RADIO ACCESSORIES—VALVES—Continued



RADIOTRON UX-120—POWER AMPLIFIER.

This new dry-cell power Radiotron is to be used in the last stage of audio-frequency amplification.

It is manufactured with the small standard UX base. Adapters are available which permit its use in practically any valve socket and which provide connections in many cases for the additional plate and grid voltages which are necessary.

All dry battery operated set owners should avail themselves of the advantage of improved quality at high volume which is provided by this efficient but low-priced amplifier. The high emission "XL" filament is one of the features of this Radiotron.

RADIOTRON UX-171—POWER AMPLIFIER

Radiotron UX-171 is a power amplifier valve of extremely low output impedance for use in the last audio stage only. Its filament characteristics are the same as those of Radiotron UX-112, except that Radiotron UX-171 employs an "XL" filament instead of an oxide-coated one.

Since the plate current of Radiotron UX-171 is exceptionally high at maximum voltage, some form of loud-speaker coupling such as an output transformer or a choke coil and by-pass condenser should be used to prevent DC from passing through the loud-speaker.

The output of the UX-171 at 90 volts is exceptionally high, but at this voltage the usual direct connection to the loudspeaker may be used, omitting the loudspeaker coupling mentioned above.

UX-171 was designed to handle great volume without distortion. This is accomplished very economically since the filament consumption is only .25 amperes.

RADIOTRON UX-112A.

Radiotron UX-112A is a Storage Battery Valve especially adapted as a Power Amplifier for use in the last stage of Audio Frequency Amplification.

Because of its relatively high Amplification Factor this Radiotron may also be used as a General Purpose Valve in Detector, Radio, or Audio stages.

FILAMENT

This Radiotron embodies an improved type of filament which gives high emission at the reduced filament current of .25 Amperes. Other characteristics of the UX-112A remain the same as those of the UX112.

The conventional 6 volt storage battery is generally used as an "A" Battery to heat the filament of this valve.

RATING

Filament	5.0 Volts, .25 Amperes
Plate	157½ Volts Maximum
Grid Leak	2-9 Megohms
Grid Condenser	.00025 Mfd.
Detector "B" Voltage	45 Volts

"C" Battery

For best quality of reproduction, however, a detector "C" Connection is recommended

Detector "C" Voltage	4½ Volts
Detector "B" Voltage	45 Volts
Grid Leak and Condenser omitted.	

AMPLIFICATION

Plate (B) Voltage	90	135	157½ Volts
Grid Bias (C) Voltage	4½	9	10½ Volts

When the UX-112A is used as a Power Amplifier, a "B" Voltage of 135 or 157½ volts should be applied with the corresponding "C" Voltage as shown above. As a General Purpose Valve a "B" Voltage of 90 with a "C" Voltage of 4½ to 6 Volts is recommended. Operation as amplifier without a "C" Battery is always to be avoided. Where the "C" Battery must be omitted the plate ("B") Voltage should be reduced to 67½ Volts. In Radio Frequency stages designed for the UX-201A it may be necessary to readjust neutralising condensers.

RADIOTRON UX-210—POWER AMPLIFIER.

Radiotron UX-210 is a super-power amplifying valve whose filament is designed primarily for operation at 7.5 volts directly from a transformer. It may, however, be operated from an 8-volt storage battery. Its plate voltage may be supplied from "B" batteries, which are capable of furnishing sufficient current, although it is primarily for use with rectified alternating current. This Radiotron is capable of handling far greater volume without distortion than any receiving valve now in use, and its output is ample to supply any Amplion Loud Speaker to its limit of volume.

Where extra volume and quality of reproduction are demanded, UX-210 is the power amplifier par excellence.



A.W.A. RADIO GUIDE

RADIO ACCESSORIES—VALVES—Continued

"AC" Radiotrons—UX-226 and UY-227.

The two new "AC" Radiotrons UX-226 and UY-227 require no "A" Battery, but can be operated from the alternating current lighting socket through a small step-down transformer. Radiotron UX-226 is recommended for use in the radio and first audio frequency stages of receivers employing the new UY-227 as a detector, with a power amplifier Radiotron in the last audio stage. "A" Batteries are completely eliminated by using a transformer having separate windings to supply each type of filament and heater voltage required by the different Radiotrons.

RADIOTRON UX-226.



Radiotron UX-226 is an amplifier tube, the AC filament of which is operated from alternating current. Its characteristics are otherwise somewhat similar to those of the popular UX-201A as it can be used for radio or transformer coupled audio frequency amplification. It is not, however, ordinarily suited for detection, nor is it equal to a power tube in the last audio stage.

Radiotron UX-226 contains a plate, a grid, and a heavy filament of the oxide-coated type designed to operate at a relatively low voltage. Attention is called to the relatively low filament current which is one of the outstanding features of this valve. The chief objection to high filament current of some types of valves is the introduction of AC hum due to the electromagnetic effect on the electron stream. In Radiotron UX-226 the lowest practical values of filament voltage and current have been chosen for minimum hum reproduction.

The large RCA Standard UX base with which this Radiotron is equipped fits both the new Push Type and Old Navy Type sockets.

RADIOTRON UY-227.

Radiotron UY-227 is a detector tube containing a heater element which permits operation from alternating current. It is especially recommended for detection in sets using Radiotron UX-226 in the radio and first audio stages of amplification.

The UY-227 contains four elements: a plate, a grid, a heater, and an oxide-coated cathode electrically insulated from but heated by the heater element. Connections are made to these elements through a special five-prong base. Using the face of a watch as a guide the socket connections for this Radiotron are as follows:—Grid, 12 o'clock; Plate, 3 o'clock; AC heater, 5 and 7 o'clock; Cathode, 9 o'clock. The centres of all prongs are on a circle $\frac{1}{2}$ of an inch in diameter.



Grid Leak Detection is recommended for the average receiver. A plate voltage of 45, with a 5.9 megohm grid leak usually gives greatest sensitivity. More stable operation is insured, however, with a 2.5 megohm grid leak. With a plate voltage of 90, a $\frac{1}{2}$ to 1 megohm grid leak is recommended for quality at high volume, where the input to the detector is great.

Grid Bias Detection, though not quite as sensitive as Grid Leak Detection, gives extremely fine quality of reproduction if high-grade transformers of high input impedance are used.

RADIOTRON UV-876.

USE.

Any receiver operating from electric light power supply is subject to all the voltage variations of the line. The resulting variation in power supplied to the receiver damages the tubes to the extent of materially decreasing their useful life.

Radiotron UV-876 is a "Ballast Tube" (current regulator) designed to maintain constant power input to A.C. receivers by absorbing voltage variations normal to supply lines.

MOUNTING.

Radiotrons UV-876 and UV-886 are equipped with the Mogul Base, which fits the Mogul screw socket. These Radiotrons operate at a high temperature, and must be surrounded by a metal ventilating stack.

RATING.

Operating Current	1.7
Mean Voltage Drop	50
Permissible Line Voltage Variation	+10



RADIOTRON CHARACTERISTICS

Model	Use	Socket	Grid Condenser Mf	Grid Leak Megohms	Detector Grid Return Lead	A Battery Volts (Supply)	Filament Terminal Volts	A Battery Current Amperes	B Battery Volts Detector	B Battery Volts Amplifier	Negative C Battery Volts	Plate Current Milliamperes Normal operating See Notes 1 & 2	Output Resistance Ohms See Note 1	Mutual Conductance Micro-Mhos See Note 1	Voltage Amplification Factor See Note 1		
Radiotron UV 199	Detector Amplifier	UV 199	.00025	2-9	+ F	4.5	3.0	.06	45	90	4.5	2.5	15000	415	6.25		
Radiotron UX 199	Detector Amplifier	UX	.00025	2-9	+ F	4.5	3.0	.06	45	90	4.5	2.5	15000	415	6.25		
Radiotron UV 200	Detector only	UV	.00025	2-2	+ F	6	5	1.0	15-25	—	—	—	—	—	—		
Radiotron UX 201 A	Detector Amplifier	UX	.00025	2-9	+ F	6	5	.25	45	90 135	4.5 9.0	3 4	12000 11000	675 725	8 8		
Radiotron UX 112 A	Detector Amplifier	UX	.00025	3-5	+ F	6	5	.25	45	90 135	4.5 9.0	5.5 7.0	5300 5000	1500 1600	8 8		
Radiotron UX 120	Audio Amp Last stage only	UX	—	—	—	4.5	3.0	.125	—	135	22.5	6.5	6600	500	3.3		
Radiotron UX 200 A	Detector only	UX	.00025	2-3	+ F	6	5	.25	45	—	—	—	—	—	—		
Radiotron UX 210	Amplifier Oscillator	UX	—	—	—	6 6	7.5 6	1.25 1.1	—	125 135	35 9	22 4.5	5000 8000	1550 940	7.75 7.5		
Radiotron UX 171	Amplifier	UX	—	—	—	6	5	.5	—	180	40.5	20	2000	1500	3		
Radiotron UX 222	H. F. Amplifier	UX	—	—	—	4.5	3.3	.132	—	180	11-22½	—	150000	400	60		
Radiotron UY 227	Detector A.C. Heater Type	UY	.00025	2-9 ¼-1	C	Transformer 2.5	2.5	1.75	49 90	—	—	2 7	10000 8000	800 1000	8 8		
Radiotron UX 240	Detector Amplifier	UX	.00025	2	+ F	6	5	.25	135 180	135 180	1.5 4.5	2	150000	450	30		
Radiotron UX 226	Amplifier	UX	—	—	—	2	1.5	1.05	—	90 180	6 15.5	3.5 7.5	9400 7000	875 1170	8.2 8.2		
Radiotron UX 213	Full wave Rectifier	UX	Overall Dia. 2 3/16"	Overall height 5 7/8"	Purpose for use in rectifying systems, particularly designed for these rectifiers	Filament Voltage.....	7.5 Volts	Max. A.C. Voltage per plate.....	270 Volts (R.M.S.)	Filament Current.....	2.0 Amps	Max. D.C. Current both plates.....	65 Milliamperes				
Radiotron UX 216 B	Half wave Rectifier	UX	2 3/16"	5 5/8"		Filament Voltage.....	7.5 Volts	Max. A.C. Voltage.....	550 Volts (R.M.S.)	Filament Current.....	1.25 Amps	Max. D.C. Current.....	65 Milliamperes				
Radiotron UX 280	Full wave Rectifier	UX	2 3/16"	5 5/8"		Filament Voltage.....	5.0 Volts	Max. A.C. Voltage per plate.....	300 Volts (R.M.S.)	Filament Current.....	2.0 Amps	Max. D.C. Current output.....	125 Milliamperes				
Radiotron UX 281	Half wave Rectifier	UX	2 3/16"	5 5/8"		Filament Voltage.....	7.5 Volts	Max. A.C. Voltage per plate.....	750 Volts (R.M.S.)	Filament Current.....	1.25 Amps	Max. D.C. Current output.....	110 Milliamperes				
Radiotron UV 876	Current Regulator	Moqui Screw base	2 1/16"	8"		A constant current device designed to insure constant input to power operated radio receivers despite fluctuations in line voltage.							Operating current.....	1.7 Amps	Max. Voltage drop.....	50 Volts	Permissible variation.....	± 10 volts

Note 1:- At normal operating grid voltage (not at zero grid)

Note 2. The plate current values given are less than those obtained with zero grid, but are the currents actually obtained when the tube is operated at indicated values of plate voltage and grid bias voltage.

Radiotron Valves.

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Illustrations of Radio History '35 & '36

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RADIO ACCESSORIES—Continued.

Radiotron Rectifiers.

Radiotron UX-280 and UX-281.



Radiotrons UX-280 (full wave) and UX-281 (half wave) are improved rectifying valves that contain a new type of oxide-coated ribbon filament which is extremely sturdy both electrically and mechanically, and which gives high emission with low power input. The plates of these Radiotrons have a specially treated surface (to be noted by their dark appearance) which causes rapid dissipation of heat.

The advantages of Radiotrons UX-280 and UX-281 over gas type rectifiers are numerous. In the first place, fewer condensers are required in rectifying and filtering circuits. Then again, lower capacity and lower voltage condensers may be used, thus effecting further manufacturing economy. A high initial surge voltage from the transformer is not required as Radiotrons UX-280 and UX-281 start well below normal operating voltage. Thus design is simplified, condensers are not subjected to the danger of failure by erratic surge peaks, and the possibility of failure to operate due to insufficient breakdown voltage is eliminated. Uncertain and noisy operation, often characteristic of some rectifiers, is not experienced with the highly evacuated Radiotrons UX-280 and UX-281.

While the maximum ratings of Radiotrons UX-280 and UX-281 are higher respectively than those of the UX-213 and UX-216B, their outputs at the normal operating voltages of the latter valves are approximately the same. Thus the UX-280 can be used in devices designed for the UX-213, and the UX-281 can be used in devices designed for the UX-216B.



RADIOTRON UX-216B—HALF-WAVE RECTIFIER.

Radiotron UX-216B is a half-wave rectifying valve, which is used to supply unidirectional current from an alternating current source.

Its rated output is 65 milliamperes at a maximum impressed voltage of 550 A.C.

UX-216B delivers this output and at the same time is capable of long life, an important feature which has heretofore been lacking in valves of this type.

Two UX-216B may be connected to give full-wave rectification with an output of 130 milliamperes.

RADIOTRON UX-213—FULL-WAVE RECTIFIER.

Radiotron UX-213 is a full-wave rectifier—the first of its type ever introduced for "B" battery elimination.

Prior to its introduction two valves were required to give full-wave rectification, because each valve usually rectified only half of the wave.

Since one valve takes the place of two in the case of UX-213, space and money are saved, with the added virtue that a very even current is delivered to the Radiotrons of the set.

Radiotron UX-213 has an output of 65 milliamperes and may be operated at a maximum impressed voltage of 220 volts A.C.



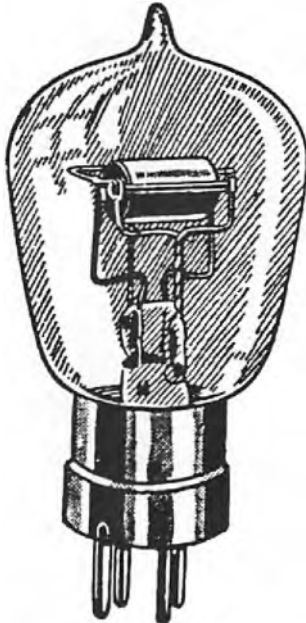
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RADIO ACCESSORIES—Continued.

Transmitting Valves.

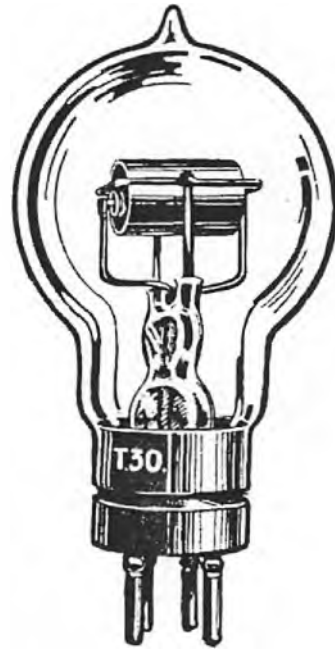
MARCONI. 15 Watts. T15.

A small power Transmitting Valve, tested dissipating 15 watts at the anode, suitable for voltages up to 600.

	Approximate Data:	
Filament Volts	5.5/6.0	Impedance (ohms) .. 50,000
Filament Amps.	1.0	Voltage Magnification .. 25
Anode Volts	600	



Type T15.



Type T30.

MARCONI. 30 Watts. Type T30.

(Approximate overall dimensions: 135 x 60 mm.)

A small power Transmitting Valve, tested dissipating 30 watts at the anode, suitable for voltages up to 1,000.

Approximate Data:

Filament Volts	6.5/7.0	Impedance (ohms) .. 70,000
Filament Amps.	1.8	Voltage Magnification .. 45
Anode Volts	1,000	

MARCONI. 50 Watts. Type T50.

(Approx. overall dimensions: 145 x 76 mm.)

A small power, double-ended Transmitting Valve, tested dissipating 50 watts at the anode, suitable for voltages up to 1,500.

Approximate Data:

Filament Volts	7.0	Impedance (ohms) .. 35,000
Filament Amps.	2.5	Voltage Magnification .. 30
Anode Volts	1,500	



Type T50.

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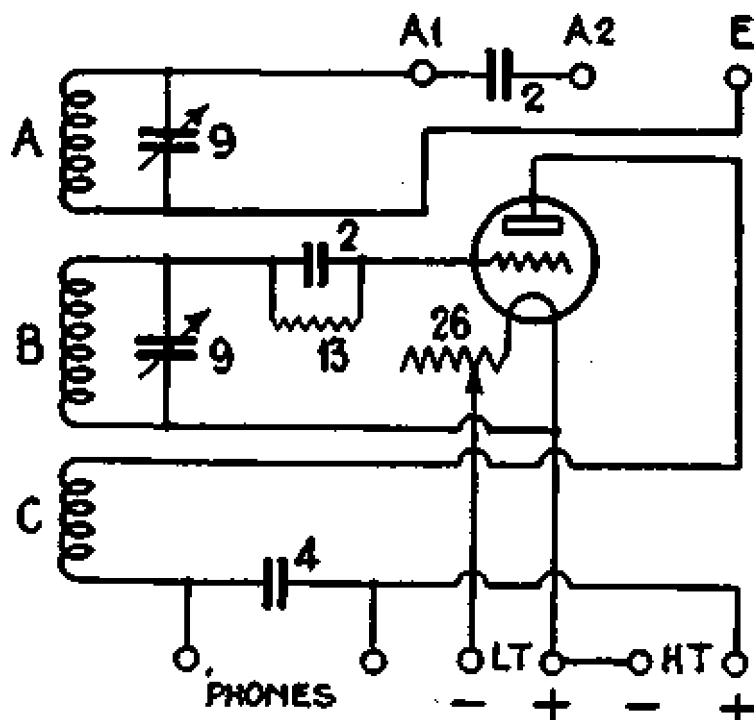
Home Construction Diagrams.

The following diagrams will help the reader to build a receiver to his own design incorporating ideas from the circuits.

KEY TO PARTS SET OUT IN FOLLOWING CIRCUITS.

1. .0001 MF Fixed Condenser Electrad or Dubilier.
2. .00025 " " " " "
3. .001 " " " " "
4. .002 " " " " "
5. .01 " " " " "
6. 1 " " " Mansbridge.
7. 2 " " " "
8. .00025 Variable " AWA.
9. .0005 " " " "
10. Midget " " " "
11. Neutralising Variable " "
12. Grid Leak 1 meg. Electrad.
13. " " 2 " "
14. Potentiometer Volume Control $\frac{1}{2}$ meg.
15. Audio Transformer $3\frac{1}{2} : 1$. AWA.
16. " Choke, 25 henries.
17. " " 50 " "
- 17A. " " 75 " "
18. " " 100 " "
19. 100,000 ohms Fixed Resistance Dubilier.
20. 50,000 Variable Resistance. Electrad type C.
21. Single Circuit Filament Jack. " "
22. Double " " " " "
23. Single " Jack. " " "
24. R.F. Choke Coil, A.W.A.
25. R.F. " " A.W.A.
26. Filament Rheostat of suitable Resistance for Valve employed.

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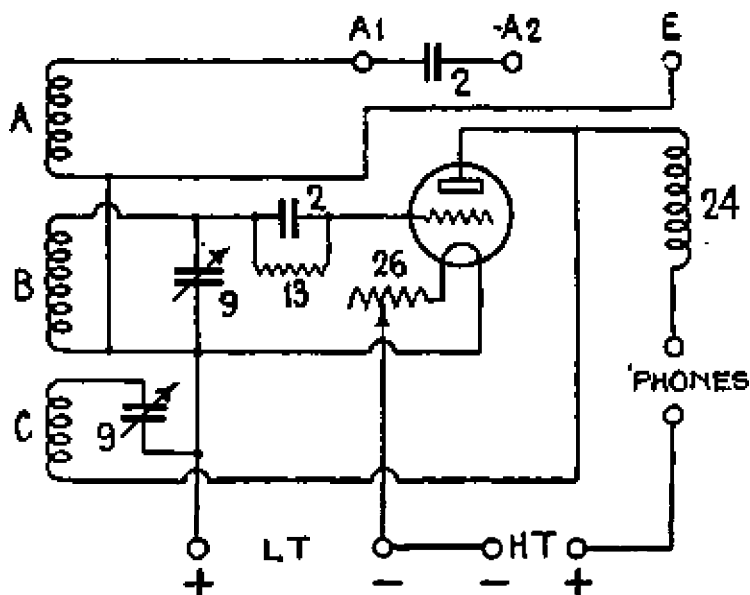
SINGLE VALVE CIRCUIT.

(1) Coils A, B and C are wound on a former 3in. x 5in. A = 16 turns No. 22 D.C.C. B = 50 turns No. 22 D.C.C. C = 20 turns No. 22 D.C.C. Distance between A and B = $\frac{1}{2}$ inch, and between B and C $\frac{1}{4}$ inch. Reaction is controlled by means of the Filament Rheostat. A Radiotron UX-201A or Marconi DE3 valve is recommended. If desired, the aerial tuning and aerial coupling condensers may be omitted, but this will broaden the tuning. The distance between coils A and B may be increased to 1 inch in cases where the receiver is located close to a broadcast station.

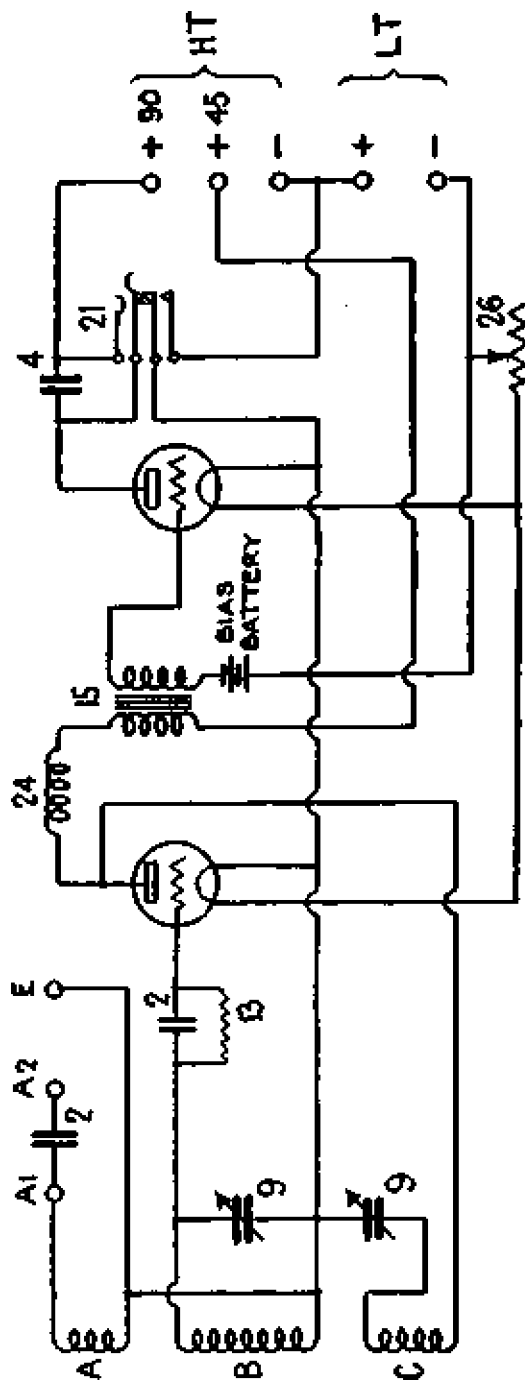
SINGLE VALVE CIRCUIT

CAPACITIVE REACTION.

(2) Coils A, B and C are wound on a former 3in. x 5in. A = 15 turns of No. 22 D.C.C. B = 50 turns No. 22 D.C.C., and C = 22 turns No. 22 D.C.C. Allow $\frac{1}{2}$ inch between A and B and $\frac{1}{4}$ inch between B and C. A telephone condenser must not be added in this type of circuit. A Radiotron UX-201A or Marconi DE3 valve is recommended. Item 24, the radio-frequency choke, may consist of a 250-turn A.W.A. H.C. coil if desired.



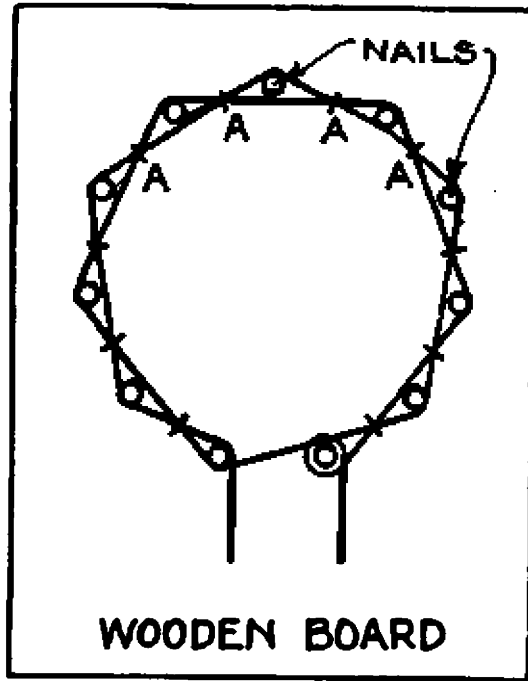
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TWO-VALVE REINARTZ CIRCUIT.

(3) Coils A, B and C are wound similar to data supplied in Figure 2. Radiotron UX-201A valves may be used with a 6 ohm rheostat and 6-volt accumulator. If, however, dull emitter valves are required, a Marconi DE3 as detector and a Marconi DEP410 valve as amplifier are recommended, with a 10 ohm or 30 ohm rheostat and 4-volt accumulator or three Columbia dry cells. Item 24 may be replaced by a 250-turn A.W.A. H.C. coil if desired, and item 15 an A.W.A. super-audio transformer.

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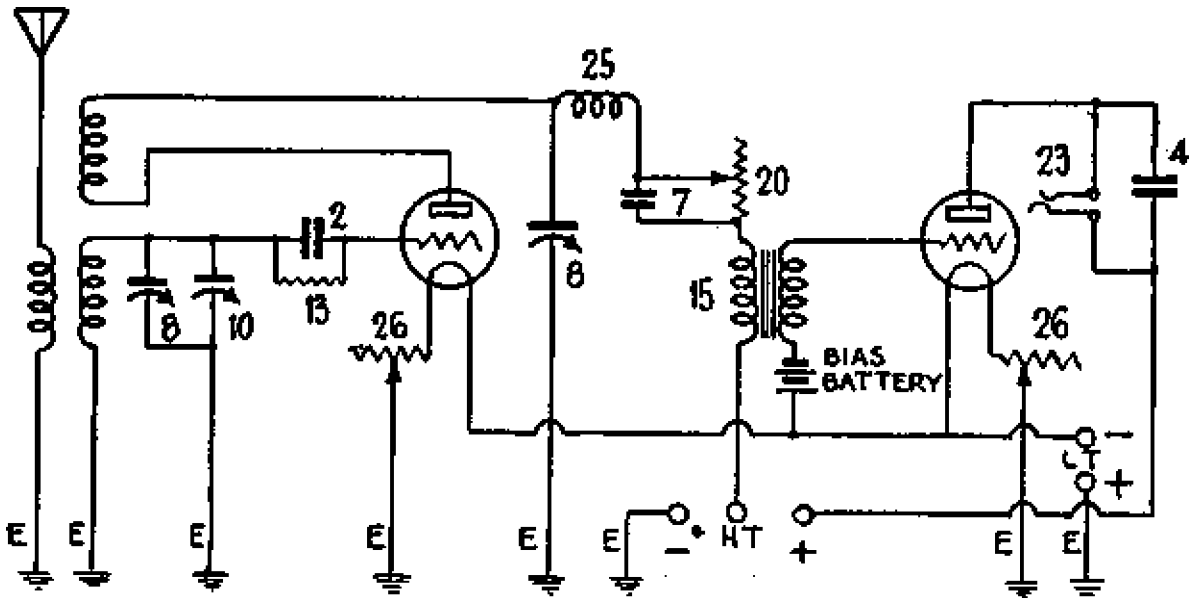


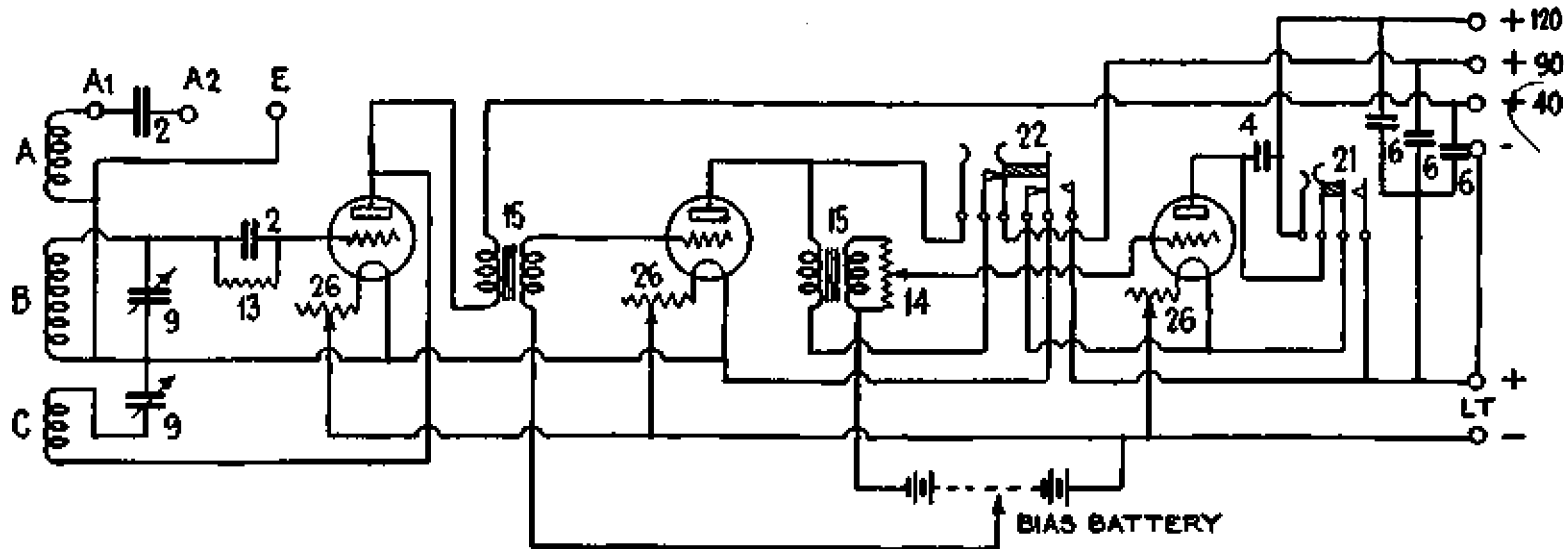
SHORT WAVE RECEIVER.

(4) The front of this receiver is screened with 24-gauge brass sheet carefully earthed. All connections marked "E" in the diagram should be carefully soldered to this screen. Special short-wave coils may be purchased, or the builder may make his own. These may be wound Lorenz fashion with No. 16 D.C.C. wire, as shown in the accompanying sketch. The actual number of turns will, of course, vary with the wave-length. After having wound the coils as illustrated, they should be tied at points A with twine in order to keep the wire secure. This receiver is quite suitable for the broadcast band if proper coils are used.

Marconi DE3, Radiotron UX-199 or UX-201A valves may be employed as a detector valve, while Marconi DEP410, Radiotron UX-120 or UX-201A valves may be used as amplifiers. Note: The AF choke "A" consists of 250 turns of fine gauge wire wound on a 1-inch diameter former.

METHOD OF WINDING COILS

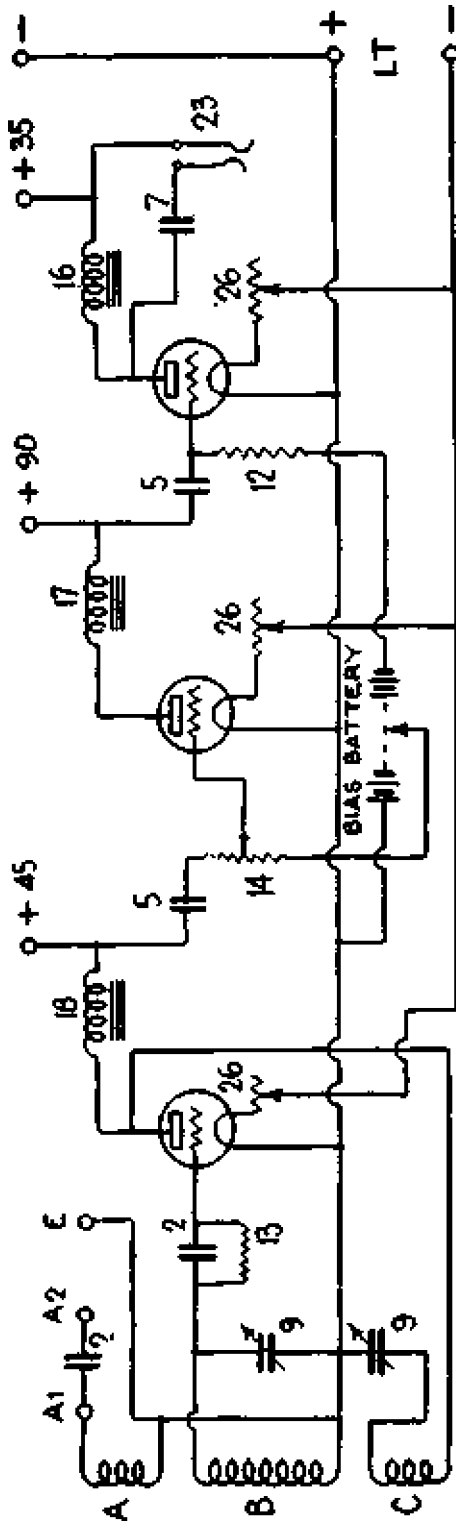




THREE-VALVE REINARTZ RECEIVER.

(5) Coils A, B and C are wound in a similar manner to those described in Fig. 2. The following valves are recommended:—
 Six-volt valves, UX-201A (first and second stages) and UX-171 for the last stage.
 Four-volt valves, UX-199 (first and second stages) and UX-120 for the last stage; or Marconi DE3 valve (first stage) and Marconi DEP410 valves in second and third stages.
 A.W.A. audio transformers are also recommended.

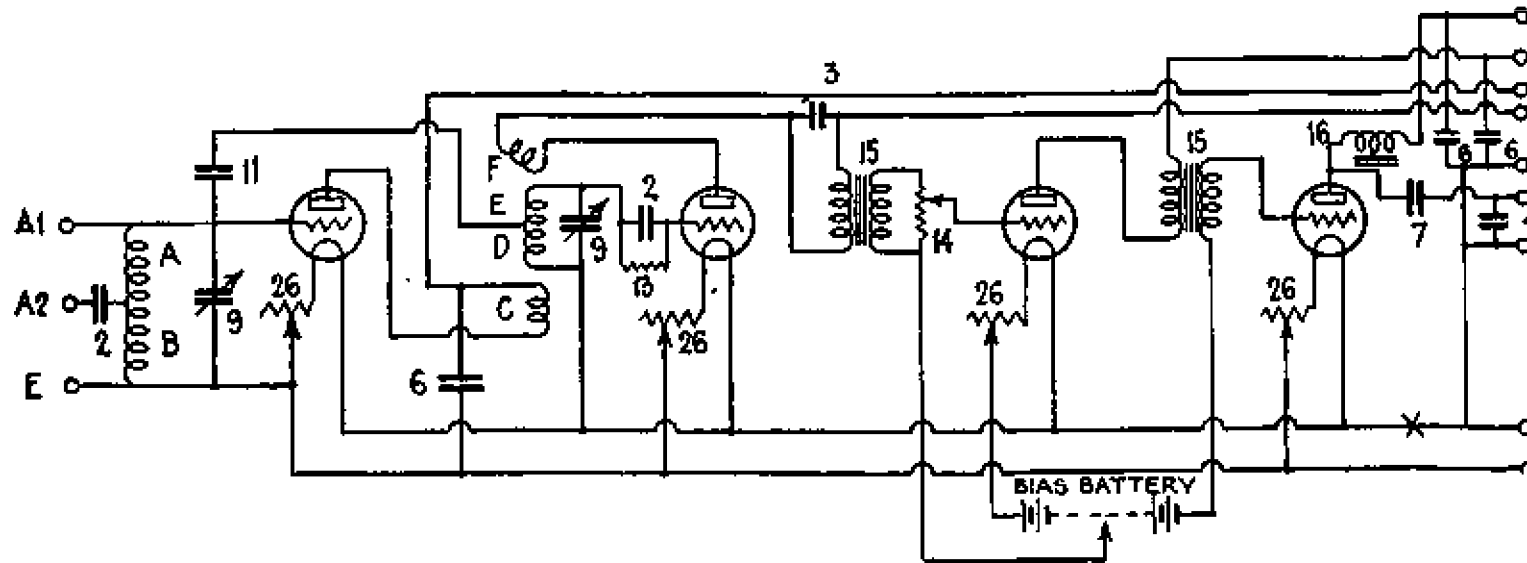
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THREE-VALVE CHOKE COUPLED RECEIVER.

(6) Coils A, B and C are wound in a similar manner to those described in Fig. 2. The same valves as recommended for Fig. 5 may be used. It will be an advantage to employ a 25 henry choke for coupling the speaker to the last valve, as shown in the above sketch. The three filament rheostats may be replaced by a similar number of ballasts if it is desired to reduce the number of controls on the set.

won't work '5' doesn't connect 138
to preceding valve plate (both stages)



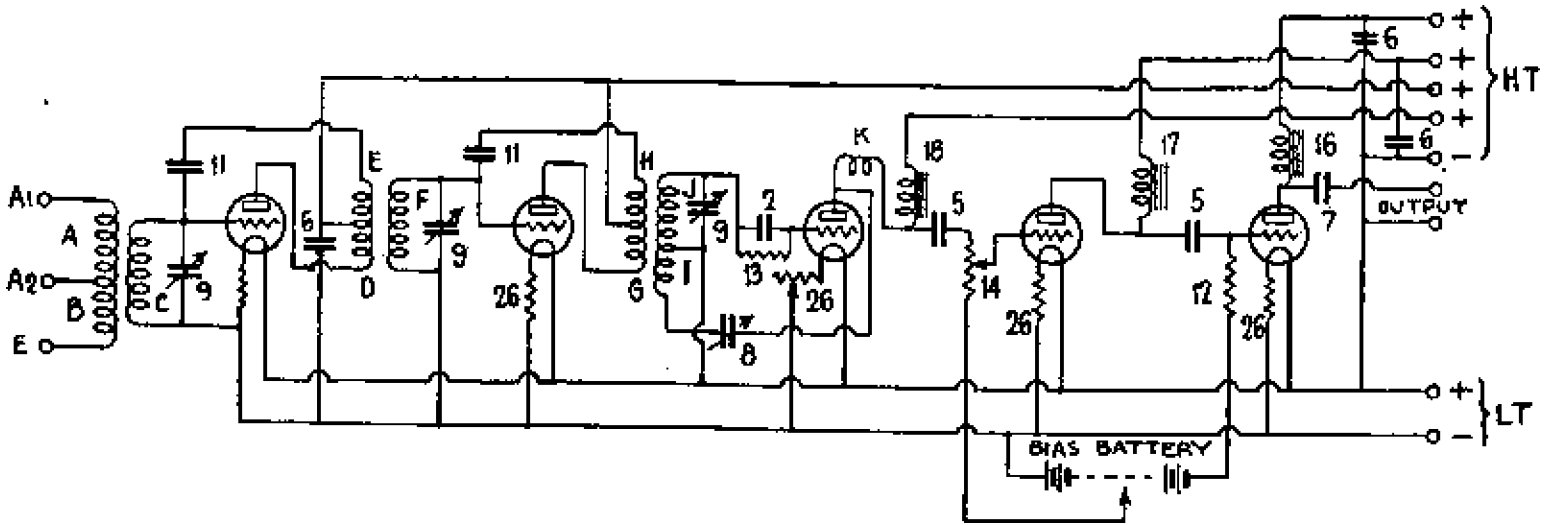
THE BROWNING DRAKE CIRCUIT.

(7) Suitable kits, consisting of the aerial unit A B and the coupling unit C D E F, may be purchased, but if the reader prefers to build his own coils, the following instructions are supplied:—

Coil A B consists of 50 turns of No. 20 D.S.C. wound on a 3-inch diameter former with centre tap. Coil C consists of 24 turns of No. 30 D.S.C. wound on a 3-inch diameter former at low potential end. Coil D E consists of 77 turns of No. 20 D.S.C. wound on a 3-inch diameter former with tapping at the 17th turn from low potential end. Coil F consists of 20 turns of No. 28 D.S.C. wound on a rotor located at the grid end of coil D E. A slot should be made in the base of the former underneath the low potential end of coil D $\frac{1}{8}$ inch wide and $\frac{1}{16}$ inch deep, into which is wound jumble fashion the plate winding C. Winding D may be placed over this.

Winding F: The two coils aerial and coupling should be kept 8 inches apart and at right angles to one another. UX-199 valves are recommended for the first three stages, followed by a UX-120 for the final stage, or, as an alternative, one Marconi DEL410 followed by one DE3 valve and two DEP410 valves as last stage amplifiers. Another combination that could be used is three UX-201A followed by a UX-171 valve.

The first and second combinations are suitable for a four-volt battery, and the third for a six-volt battery.



FIVE-VALVE NEUTRODYNE CIRCUIT.

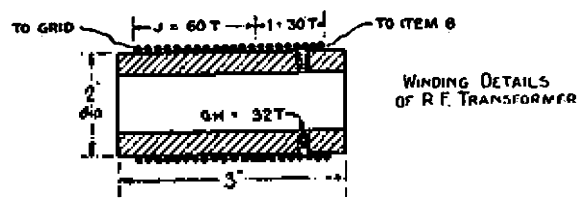
(8) Winding AB consists of 26 turns of No. 28 D.S.C. slot wound on the low potential end of a 2-inch diameter former. A tapping is taken out at the 16th turn from the bottom.

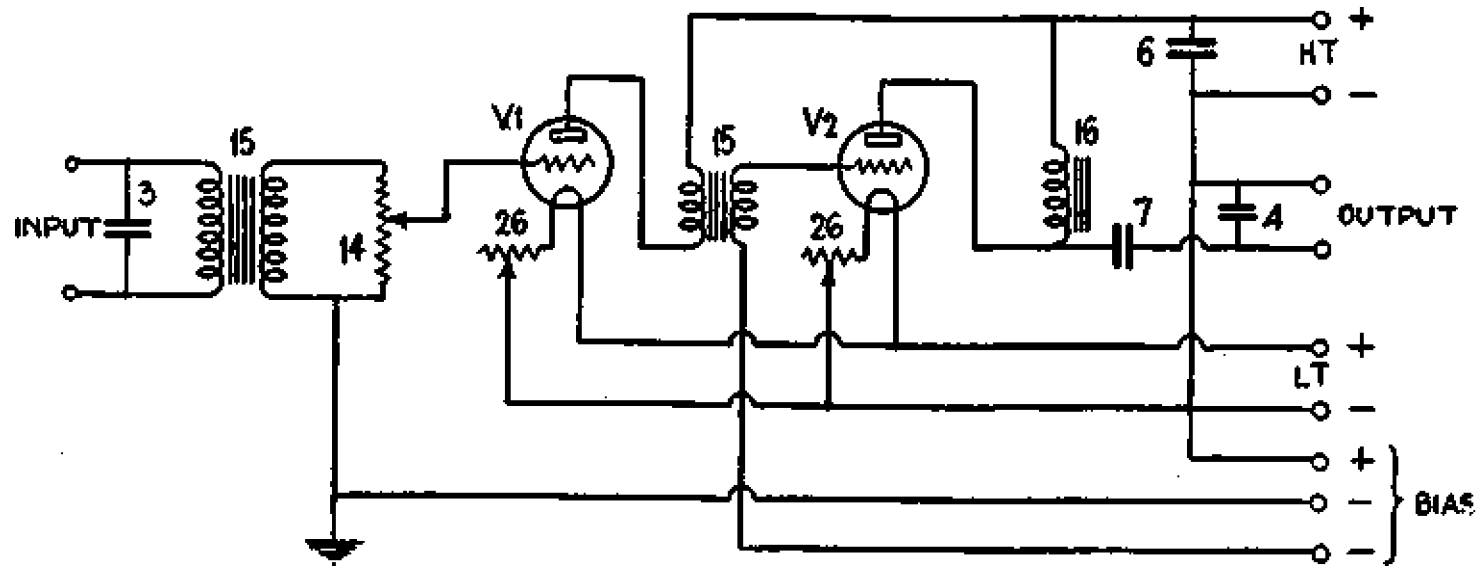
Windings C and F consist of 60 turns of same gauge wire wound on the same former. Windings DE and HG consist of 32 turns of No. 28 D.S.C. centre tapped and slot wound on the low potential end of a 2-inch diameter former.

Winding J consists of 60 turns of No. 28 D.S.C.

Winding I consists of 30 turns of No. 28 D.S.C.

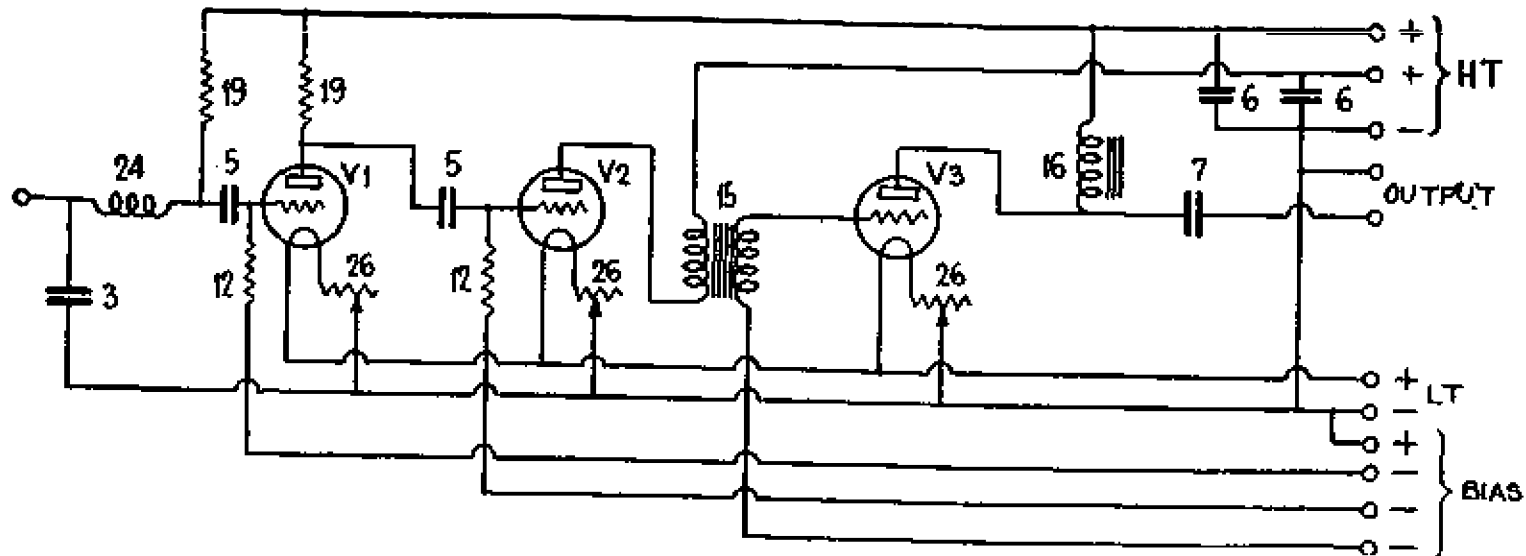
Winding K consists of 500 turns No. 28 D.S.C. bank wound on a 1-inch diameter former 1 inch long.





TRANSFORMER COUPLED AMPLIFIER.

- (9) Six-volt valves—V1: UX-201A or DE5, DEP610.
 V2: UX-171, a DEP610, a UX-201A.
 Four-volt valves—V1: Marconi DEP410.
 V2: UX-120 or DEP410.

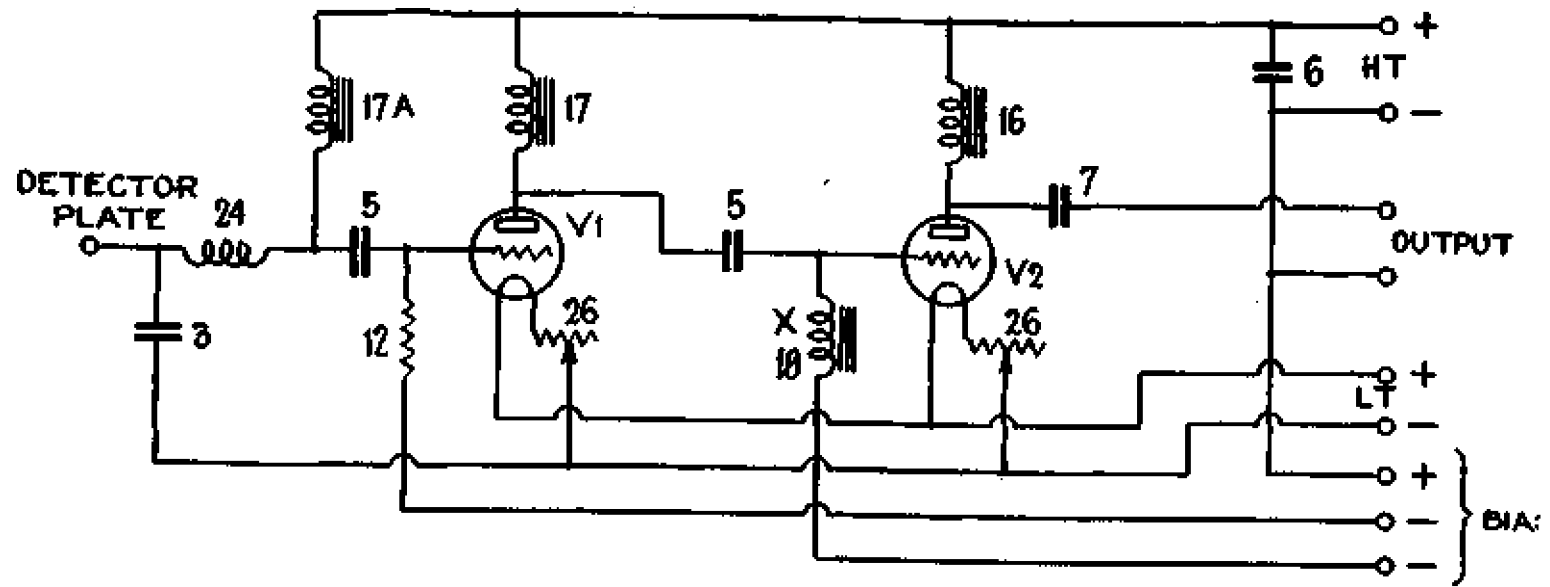


RESISTANCE CAPACITY AND TRANSFORMER COUPLED AMPLIFIER.

(10) Six-volt valves—V1: UX-240 or DE5B.
 V2: UX-201A.
 V3: UX-171.

Four-volt valves—V1: Marconi DEL410.
 V2: Marconi DEP410.
 V3: UX-120.

NOTE.—The detector valve employed in conjunction with this amplifier must be either a UX-240 or a Marconi DEL410 for six-volt and four-volt accumulators respectively.



CHOKE COUPLED AMPLIFIER.

(11) Same valves as recommended in Fig. 9 to be used. The choke X may be replaced by a 1 megohm grid leak

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Technical Terms Used in Radio.

- Aerial.**—One or more wires insulated from, and suspended at a certain height above the ground, and used to radiate or receive that energy in the form of ether waves produced by a transmitter.
- Alternating Current (Abbreviated A.C.).**—An electrical current flowing through a wire which has the direction of its flow periodically changed. Thus when we speak of a 60-cycle alternating current, we mean one that completely reverses its direction of flow sixty times per second. Alternating current plays a prominent part in practically every part of the radio circuit.
- Ammeter.**—An instrument used for measuring the flow of current in amperes through a given circuit. An ammeter is invariably connected in series.
- Ampere.**—The standard electrical unit of current flow.
- Amplifier.**—This term is used in referring to either an amplifying valve or an amplifier receiving unit.
- Amplitude.**—In radio work, this refers to the highest point reached by a wave or oscillation, i.e., the crest of each wave. A wave may, therefore, have a high or low amplitude according to the initial energy which created it.
- Antenna.**—See aerial.
- Atmospherics.**—Also known as static, strays, X's. "The noises of space." Natural electrical discharges occurring in the ether, and in reality miniature lightning storms. Since these discharges travel through the same medium as radio waves, they are readily picked up by receivers and prove very troublesome at times. It is difficult to tune out these disturbances, for they have no definite wave length.
- Audio Frequencies.**—Frequencies corresponding to vibrations which are normally audible to the human ear. All frequencies below 10,000 cycles per second are termed audio frequencies. See radio frequencies.
- Broadcasting.**—As applied to radio work, the transmitting, either by radio telegraphy or telephony from a given central point for the benefit of a great number of receiving stations located within the broadcasting station's range.
- Capacity (Abbreviated C).**—Capacity is the property of a device to store energy in electro-static form. Capacity, as well as inductance, governs the frequency and wave length of a circuit. The unit is the farad, but on account of its size, the micro-farad (Mfd.) is used. A micro-farad is one-millionth part of a farad.
- Cascade Amplification.**—This refers to high amplification of received radio signals, where several valves are employed in cascade fashion. Thus, we may speak of a three-stage (cascade) amplifier.
- Choke Coil.**—A coil wound so as to have great self-induction. This choking action introduced in a radio circuit is called impedance.
- Circuit.**—In radio and electrical work the path in which an electric current flows from the source and returns to it, is called a circuit. A circuit may be either open or closed.
- Close Coupling.**—A tuning coil or coils, or transformer, are said to be close coupled when the primary and the secondary are very close together, thereby causing large values of mutual inductance.
- Condenser.**—Two or more sheets of metal separated by an insulator called the dielectric. A condenser is used in radio work for storing electrical energy and for bringing circuits into resonance or tuning them.
- Counterpoise.**—One or more wires stretched immediately above the earth, but insulated from it, usually directly beneath the regular aerial and employed in transmission and reception instead of, or in connection with, an "earth."
- Continuous Wave (Abbreviated C.W.).**—A form of electro magnetic wave used extensively in radio work, having a constant amplitude and no damping, as distinguished from the older form of discontinuous, highly damped wave. C.W. makes possible long-distance radio telegraphy and telephony.
- Crystal Detector.**—Certain metallic crystals when introduced in a radio receiver circuit have the property of rectifying the incoming signal oscillations so that the resultant intermittent direct current will operate a sensitive telephone receiver.
- Detector.**—Any apparatus which transforms the oscillations received by the aerial into a form of current which will operate a telephone or other recording device.
- Direct Current (Abbreviated D.C.).**—An electric current flowing continuously in one direction. In a circuit direct current always flows from the positive source to the negative return. Therefore, direct current always has a readily determinable polarity, while alternating current (A.C.), which is periodically reversing its polarity while flowing through a circuit, has no apparent polarity.
- Electron.**—Negative electricity. An atom combined with an electron is a negative ion; an atom minus an electron is a positive ion.
- E.M.F.**—Electromotive force, the unit of which is the volt.
- Ether.**—A medium of great elasticity, supposed to pervade all space as well as the interior of solid bodies. It is the medium through which light, heat and radio waves are transmitted.
- Frequency.**—In alternating currents, the number of complete cycles or reversals of current through a circuit per second. Thus, we speak of a 60-cycle current as one which has sixty complete reversals per second. See Alternating Current and Audio and Radio Frequencies.
- Grid Leak.**—A very high, non-inductive, resistance connected across the grid condenser or between the grid and the filament of a valve to permit excessive electrical charges to leak off to an external source, thus furnishing stable control under all operating conditions, and governing the action of the grid.
- Ground, or Earth.**—In radio work the ground is the low potential end of the circuit, and functions in connection with the aerial of most sending and receiving systems. See Counterpoise.
- Harmonics.**—In radio, harmonics refer to the incidental waves mostly noticeable in undamped wave operation. These harmonics differ in length and frequency from the true and original operative wave of such transmitters. At times, listeners will hear the harmonics of high power long-wave stations while their tuners are set for much shorter waves.
- Henry.**—The unit of inductance.
- Hertzian Waves.**—Electro-magnetic waves, named after their discoverer, Professor Heinrich Hertz.
- Hot Wire Ammeter.**—An instrument used in radio transmission work which measures current in amperes by means of a wire expanding in proportion to the heat generated by the passing current.
- Impedance.**—The combination of resistance and retarding action offered by a coil of wire to a varying current on account of the back e.m.f. produced by the varying lines of force. (See also Reactance.)
- Inductance (Abbreviated L).**—Inductance, like capacity, plays a very prominent part in radio circuits. It is the property of a coil of wire which tends to prevent any change in the value of current flowing through it. It governs the frequency and therefore the wave length of a circuit. The unit of inductance is the henry. In radio work the millihenry and the microhenry are the more practical terms used.
- Induction.**—The transference of energy from one circuit to another by means of electro-magnetic phenomena.
- Insulator.**—A non-conductive material, and one through which an electric current will not pass.
- Ion.**—A gaseous atom having a surplus or deficiency of electrons.
- Kilowatt (Abbreviated K.W.).**—One thousand watts. A unit of power.

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Technical Terms Used in Radio—(continued).

- Loop Aerial.**—A small frame aerial used for indoor reception, thus eliminating both outdoor aeriels and earth connections. It gives very marked directional effects.
- Loud-speaker.**—Any receiving device designed to reproduce signals or speech loud enough to be heard without individual use of the conventional telephone receivers.
- Megohm.**—One million ohms.
- Microfarad (Abbreviated Mfd.).**—One-millionth part of a farad, and the practical unit of capacity.
- Microphone.**—A sound magnifier, or an instrument used in both wire and radio telephony to vary the current in circuit by means of speech.
- Milliampere (Abbreviated M.A.).**—The thousandth part of one ampere.
- Neutralising Condenser.**—A condenser of small capacity used in radio frequency circuits to neutralise the internal capacity existing between the plate and grid elements of the valve.
- Neutral-formers.**—Specially wound radio frequency transformers with a tapped secondary for external connection to the neutralising condenser.
- Ohm.**—The unit of electrical resistance.
- Ohm's Law.**—The fundamental law of electricity. It is that the current in amperes flowing through a circuit is equal to the pressure in volts divided by the resistance in ohms.
- Oscillations.**—Alternating currents of very high frequencies are called electrical oscillations. If the amplitude of a series of oscillations is constant, they are called continuous or undamped waves, but if the amplitude is not constant, as in the spark method, they are called damped waves.
- Potential.**—Referring to electrical pressure. See E.M.F. and Volt.
- Radiation.**—The transmission of energy through space in the form of electro-magnetic waves.
- Radio Frequencies.**—Frequencies corresponding to vibrations not normally audible to the human ear. All frequencies above 10,000 cycles per second are termed radio frequencies. See Audio Frequencies.
- Reactance.**—Opposition offered to the flow of a varying current by a condenser (capacity reactance), or an inductance (inductive reactance).
- Rectifier.**—An apparatus which converts alternating current (A.C.) into pulses of direct current (D.C.). Tungar, and Kenotron apparatus are employed for rectifying purposes. Certain metallic crystals also have rectifying action when used as detectors in radio reception.
- Regenerative Circuit.**—A radio circuit comprising a valve so connected that after detection, the signal introduced in the plate circuit is led back to or caused to react upon the grid circuit, thereby increasing the original energy of the signal received by the grid and greatly amplifying the response to weak signals. In reception, the leading back of plate energy to the grid for further strengthening is usually accomplished by means of a coil placed close to the secondary of the receiving tuner. This small coil is called the reaction coil.
- Resistance.**—Opposition to the flow of an electric current through a conducting medium. All metals have more or less electrical resistance. Copper is used universally for both electrical and radio work on account of minimum resistance, comparative low cost and ready availability. The unit of resistance is the ohm.
- Resonance.**—A very important function of radio circuits. The theory of electrical resonance is similar to that of acoustics, readily demonstrated by the tuning forks, when one tuning fork will not respond to another unless it is of the same key or pitch.
- Rheostat.**—A variable resistance employed to control or regulate current flow.
- Selectivity.**—In radio work, the power of being able to select any particular wave length to the exclusion of others.
- Sharp Tuning.**—Where a very slight change of a tuner or tuning system will produce a marked effect in the strength of signals.
- Static.**—See atmospheric.
- Transformer.**—A device used in electrical and radio work for the transference of energy. Thus we have Power Transformers, Amplifying Transformers, Telephone Transformers, Oscillation Transformers.
- Tuning.**—The act of altering capacity or inductive values in a radio circuit so as to bring the circuit into resonance. In radio receiving, the greatest signal strength is obtained when the product of the inductance and capacity value of the receiver matches that of the transmitter.
- Undamped.**—A train of high frequency oscillations of constant amplitude as continuous waves or C.W.
- Valve.**—In radio work, applies to a glass tube exhausted of air and containing essentially a filament, a plate positively charged, to which electrons are attracted, and a grid, inserted between the filament and the plate, for controlling the amount of electronic flow. This action of the valve plays three leading functions in radio work, i.e., detection, amplification and generation of high frequency electro-magnetic waves.
- Velocity of Waves.**—Wireless waves travel through space at the speed of 186,000 miles per second, or 300,000 kilometres per second.
- Volt (Abbreviated V).**—The unit of electric pressure.
- Voltmeter.**—An instrument for measuring the voltage across an electric current.
- Wave-meter.**—An instrument for measuring the wave length of a transmitting station.
- Watt (Abbreviated W).**—The unit of electric power. To find power in watts multiply voltage by amperage. 746 watts equal one horsepower. 1000 watts equal one kilowatt (K.W.).
- Wave Length.**—Radio waves in their passage through the ether, travel in undulating wave form, similar to water waves. When the wind is blowing hard and steady the distance between each wave crest is comparatively long, while if the wind is blowing more mildly and in short spurts, the distance between wave crests is shorter and we have short waves. In radio substitute the wind for the transmitter and you have a similar action.

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SOME USEFUL FORMULÆ.

Capacity.

CONVERSION TABLES.

- The Farad = 1,000,000 Mfds.
 9×10^{11} Cms.
- The Microfarad = 0.000001 Farad.
 = 900,000 Cms.
 = 900 Jars.
- The Jar = 1,000 Cms.

Formula for finding the capacity of a Condenser:—

$$C = \frac{AKN}{4\pi \times d \times 9 \times 10^9} \text{ (Mfds.)}, C = \frac{AKN}{4\pi \times d} \text{ (Cms.)}$$

- where A = Area of one plate in square Cms.
- K = Dielectric constant
- N = Number of dielectrics
- D = Distance between plates in Cms.

If inches are used instead of Cms., these formulæ will become:—

$$C = \frac{AKN}{d \times 45 \times 10^9} \text{ (Mfds.) and}$$

$$C = \frac{AKN}{5d} \text{ (Cms.)}$$

- where A = Area of one plate in sq. ins.
- K = Dielectric constant
- N = Number of dielectrics
- D = Distance between plates in ins.

Dielectric Constants .. (K)	
Air	1
Ebonite	2.1 — 2.76
Glass	5 — 10
Shellac	2.75 — 3.73
Mica	4 — 8
India Rubber	2 — 3
Porcelain	4.4 — 6.8
Paraffin	1.7 — 2.3
Bakelite	5 — 7
Paraffined Paper	3.65

Capacities in Series and Parallel.

Capacity in Parallel—

$$C = C_1 + C_2 + C_3 \dots + C_x$$

Capacity in Series—

$$C = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \frac{1}{C_x}}$$

- Where C = Total capacity of bank
- $C_1, C_2, C_3 \dots C_x$ = Individual capacity of each condenser.

Wavelength and Frequency.

Relationship existing between the wavelength and frequency—

$$\lambda = \frac{V}{F} \text{ or } \frac{3 \times 10^8}{F}$$

- where V = Velocity of light
- F = Frequency
- λ = Wavelength in metres

Calculation of wavelength from the inductance and capacity—

$$\lambda = 1885 \sqrt{LC}$$

- where λ = Wavelength in metres
- L = Inductance in MHS.
- C = Capacity in Mfds.
- $\lambda = 59.6 \sqrt{LC}$
- where L = Inductance in Cms.
- C = Capacity in Mfds.

Radiation Resistance.

$$R = 1590 \times \frac{h^2}{\lambda^2}$$

- where R = Radiation resistance in ohms.
- N = Effective height in metres
- λ = Wavelength in metres

Note.—For a fair length of horizontal span the height of an aerial may be considered as the distance from the horizontal span to the earth. For a vertical aerial the effective height is 0.63 of the actual height.

Reaction in Ohms. of a Condenser.

$$R = \frac{1}{2\pi NC}$$

- where R = Reaction in ohms.
- N = Frequency of charging source
- C = Capacity of condenser in farads

Reaction in Ohms. of an Inductance.

$$R = 2\pi NL$$






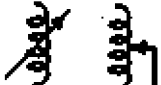







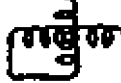














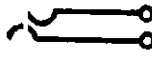



- where R = Reaction in ohms.
- N = Frequency
- L = Inductance in henries

Formula for finding the Correct Value of a Filament Rheostat.

$$R = \frac{E - e}{iN}$$

- where R = The resistance in ohms.
- E = Accumulator voltage
- e = Operating voltage of the valve
- i = Operating current of the valve
- N = Number of valves operated from the rheostat

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WIRELESS SYMBOLS

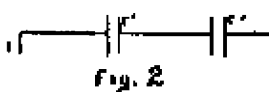
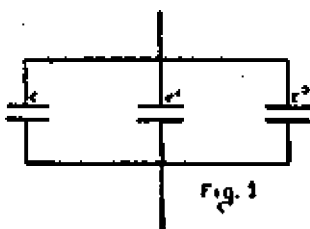
	Aerial		Crystal Detector
	Earth		Fixed Inductance or R.F. Choke
	Frame or Loop Aerial		Variable Inductance
	Fixed Condenser		Coupled Inductances
	Variable Condenser		Speech or Filter Choke
	Grid Condenser & Leak.		Audio Frequency Transformer
	Tapping (Inductance) Switch		Variometer
	D.P., D.T. Switch		Fixed Resistance
	D.P., S.T. Switch		Variable Resistances or Filament Rheostats
	Two-way Switch		Voltmeter
	Positive } Negative } Signs		Ammeter
	Batteries or Accumulators		Two-electrode Valve
	Crossed Wires		Three-electrode Valves
	Joined Wires		Telephones
	Single Circuit Jack		Loud Speaker
	Double Circuit Jack		Microphone

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THE CONDENSER.

Series and Parallel Connections.

There are two methods of connecting up condensers in an oscillatory circuit. They may be joined up in parallel, as shown in fig. 1, or in series, as in fig. 2.



When two or more condensers are connected up as in fig. 1, they are said to be in parallel, and the total capacity of the bank is equal to the sum of the individual capacities.

$$\text{Thus } C = C_1 + C_2 + C_3$$

When C_T is the total capacity and C_1 , C_2 and C_3 are the capacities of the three condensers.

If $C_1 = .001$ mfd., $C_2 = .00035$ mfd., and $C_3 = .0005$ mfd., we have $C = .001 + .00035 + .0005 = .00185$ mfd. total.

Series Connections (fig. 2).

When two or more condensers are connected up as shown in fig. 2, they are said to be in series, and the total capacity is always smaller than the capacity of the smallest condenser.

$$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} \text{ or } C_T = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}}$$

In the case of our first example we have:—

Parallel Connections (fig. 1).

$$C = \frac{1}{\frac{1}{.001} + \frac{1}{.00035} + \frac{1}{.0005}} = .00017 \text{ mfd.}$$

If two condensers are joined in series, their total capacity will be:—

$$C_T = \frac{C_1 \times C_2}{C_1 + C_2}$$

Let us suppose that $C_1 = .001$ mfd., and $C_2 = .0005$ mfd.,

$$\text{Then } C_T = \frac{.001 \times .0005}{.001 + .0005} = \frac{.0000005}{.0015} = .000333.$$

Two condensers are often placed in series when they have to withstand a higher voltage than the safe voltage stipulated by the makers. As an example, supposing we require a condenser of .0005 mfd. capacity which will withstand a pressure of 2,500 volts, and we already possess two condensers of .001 mfd. capacity, each capable of withstanding 1,500 volts in safety. As these two condensers are of equal capacity, they will, if placed in series, withstand $1,500 \times 2 = 3,000$ volts, and their joint capacity will be equal to $\frac{.001}{2} = .0005$ mfd.

Thus, two .001 condensers capable of withstanding 1,500 volts each, when placed in series, will have a joint capacity of .0005 mfd., and will be able to withstand a pressure of 3,000 volts in safety.

INDUCTANCE CALCULATION OF SINGLE-LAYER COILS.

These tables and formulæ are of great interest to those amateurs who wind their own coils in receivers such as the neutrodyne, or Browning-Drake, or any other circuit employing single-layer inductance coils in the Radio-frequency circuit. The inductance in cms. of a single-layer coil "L" may be calculated from the following formula:—

$$L = \frac{(2\pi \times R \times N)^2}{B} \times K$$

Where L = Inductance in cms.

$$2\pi = 6.28$$

R = Radius of coils in cms., as measured from the centre of the former to the centre of the wire (see fig. 1)

N = Number of turns on the former

B = Length of the winding in cms., and

K = a factor depending on the ratio of $\frac{2R}{B}$.

The values for this factor are given in the accompanying table.

Let us take the following example:—

We have a coil having a mean radius R of 5 cms., wound with 50 turns of wire, the length of the winding being 7 cms. (There are 2.54 cms. to an inch.)

The inductance will be equal to

$$L = \frac{(6.28 \times 5 \times 50)^2}{7} \times K.$$

Now, in order to find the value of K we must divide $2R$ by B or $\frac{10}{7} = 1.4$.

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Referring to our table, we find that the value of K corresponding to 1.4 = 0.6115, so the formula becomes

$$\frac{(6.28 \times 5 \times 50)^2}{7} \times .6115 = 215,326 \text{ cms.}$$

In order to convert cms. to mhs., it is necessary to divide by a thousand or

$$\frac{215,326}{1,000} = 215.3 \text{ mhs.}$$

The reader will probably want to know whether this value (215.3 mhs.), if used with, say, a .001 mfd. variable condenser, will reach up to 550 metres, the upper limit of the broadcast wave-band.

By applying the formula—

$$\lambda = 1885 \sqrt{LC}$$

Where λ = wavelength in metres,

L = inductance in microhenries,

C = capacity in microfarads.

We have

$$\lambda = 1885 \sqrt{215.3 \times .001} \text{ or } 1885 \sqrt{.2153} = \text{approximately } 870 \text{ metres.}$$

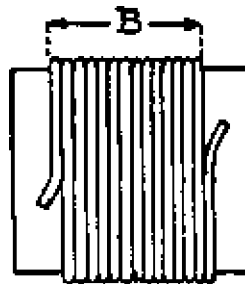
If, however, the value of the condenser is reduced to .0005 mfd., this value is reduced to

$$\lambda = 1885 \sqrt{215.3 \times .0005} \text{ or } 1885 \sqrt{.1076}, \text{ approximately } 610 \text{ metres.}$$

In the event of the answer being below 550 m., it will be necessary to either increase the capacity of the variable condenser or the number of turns of the coil.

VALUES OF "K" FOR THE RADIO 2R

2R	K	2R	K
0.00	1.0000	1.80	0.5511
0.05	0.9791	1.90	0.5379
0.10	0.9588	2.00	0.5255
0.15	0.9391	2.20	0.5025
0.20	0.9201	2.40	0.4816
0.25	0.9016	2.60	0.4626
0.30	0.8838	2.80	0.4452
0.35	0.8665	3.00	0.4292
0.40	0.8499	3.20	0.4145
0.45	0.8337	3.40	0.4008
0.50	0.8181	3.60	0.3882
0.55	0.8031	3.80	0.3764
0.60	0.7885	4.00	0.3654
0.65	0.7745	4.20	0.3551
0.70	0.7609	4.40	0.3455
0.75	0.7478	4.60	0.3364
0.80	0.7351	4.80	0.3279
0.85	0.7228	5.00	0.3198
0.90	0.7110	5.50	0.3015
0.95	0.6995	6.00	0.2854
1.00	0.6884	6.50	0.2711
1.10	0.6673	7.00	0.2584
1.20	0.6475	7.50	0.2469
1.30	0.6290	8.00	0.2366
1.40	0.6115	8.50	0.2272
1.50	0.5950	9.00	0.2185
1.60	0.5795	9.50	0.2106
1.70	0.5649	10.00	0.2033



Inductance Calculation from the Formula

$$L = \frac{(2\pi \times R \times N)^2}{B} \times K$$

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WIRE TABLES.

This table shows the approximate lengths of bare copper wire contained in 8oz. reels of the respective gauges of the wire.

S.W.G.	Diameter in Inches.	Yards per 8 ozs.	S.W.G.	Diameter in Inches.	Yards per 8 ozs.
10	.13	3.3	24	.023	113.5
12	.1	5	26	.019	170
14	.08	8.5	28	.015	250
16	.065	13.2	30	.0125	358
18	.05	23.4	32	.0105	475
20	.037	42.5	36	.0075	950
22	.028	70	40	.0046	2390

COIL WINDING TABLE.

This table will be of special interest to home constructors.

S.W.G.	Enamelled	S.S.C.	D.S.C.	S.C.C.	D.C.C.	S.W.G.
10	—	7.64	7.55	7.35	7.04	10
11	—	8.41	8.30	8.06	7.69	11
12	—	9.35	9.22	8.93	8.48	12
13	—	10.5	10.4	10.0	9.43	13
14	—	12.1	11.8	11.4	10.6	14
15	—	13.3	13.1	12.5	11.6	15
16	15	14.9	14.6	14.1	13.2	16
17	17.1	16.9	16.5	15.9	14.7	17
18	19.8	20.0	19.4	18.5	17.2	18
19	23.7	23.8	23.0	21.7	20.0	19
20	26.1	26.3	26.0	25.3	21.7	20
21	29.4	29.4	28.2	26.3	23.8	21
22	33.3	33.3	31.8	29.4	26.3	22
23	38.8	38.5	36.4	33.3	29.4	23
24	42.1	42.1	40.0	35.7	31.3	24
25	46.0	46.0	43.5	38.5	33.3	25
26	50.6	50.6	47.6	41.7	36.7	26
27	55.9	55.1	51.6	44.6	37.9	27
28	61.4	60.4	56.2	48.1	40.2	28
29	66.2	65.2	60.2	51.0	42.4	29
30	73.3	72.0	67.1	54.4	44.7	30
31	77.8	76.3	70.9	56.8	46.3	31
32	83.0	81.3	75.2	63.3	50.5	32
33	88.9	87.0	80.0	66.7	52.6	33
34	98.0	93.4	85.5	70.4	54.9	34
35	106.0	101.0	91.8	80.6	61.0	35
36	116	110	102	86.2	64.1	36
37	128	120	110	92.6	67.6	37
38	143	133	121	100.0	71.4	38
39	168	149	134	109	75.8	39
40	180	159	142	114	78.1	40

This table indicates the number of turns to the inch for all gauges of S.W.G. wire between No. 10 and No. 40, together with any of the standard forms of insulation.

TABLE OF SPARKING DISTANCES.

In Air for Various Voltages Between Needle Points.

Volts.	Distance.		Volts.	Distance.	
	Inches.	Centimetres.		Inches.	Centimetres.
5,000	.225	.57	60,000	4.65	11.8
10,000	.470	1.19	70,000	5.85	14.9
15,000	.725	1.84	80,000	7.10	18.0
20,000	1.000	2.54	90,000	8.35	21.2
25,000	1.300	3.30	100,000	9.60	24.4
30,000	1.625	4.10	110,000	10.75	27.3
35,000	2.000	5.10	120,000	11.85	30.1
40,000	2.450	6.20	130,000	12.95	32.9
45,000	2.95	7.50	140,000	13.95	35.4
50,000	3.55	9.00	150,000	15.00	38.1

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AUSTRALIAN BROADCASTING STATIONS.

Call Sign.	Name and Address.	Class.	Normal Wavelength in Metres.	Normal Power in Watts.
NEW SOUTH WALES.				
2BE	Burgin Electric Co., Ltd., 340 Kent Street, Sydney	B	316	100
2BL	Broadcasters (Sydney) Ltd., Sydney	A	353	5,000
2FC	2FC Ltd., Sydney	A	442	5,000
2GB	Theosophical Broadcasting Station Ltd., 29 Bligh Street, Sydney	B	316	3,000
2HD	Douglas, H. A., cnr. Darby and King Streets, Newcastle	B	288	100
2KY	Trades and Labour Council, Sydney	B	280	1,500
2MK	Mockler Bros., Howick Street, Bathurst	B	275	250
2UE	Electrical Utilities Supply Co., 619 George Street, Sydney	B	293	250
2UW	Sandel Radio Ltd., 213-217 Elizabeth Street, Sydney	B	267	500

VICTORIA.

3AR	Associated Radio Co. of Aust. Ltd., 44 Elizabeth Street, Melbourne	A	484	5,000
3DB	3DB Broadcasting Pty. Ltd., Capitol House, Melbourne . .	B	255	500
3LO	Broadcasting Co. of Australia Pty. Ltd., Melbourne	A	371	5,000
3UZ	Oliver J. Nilsen & Co., 45 Bourke Street, Melbourne	B	319	100

QUEENSLAND.

4GR	Gold Radio Service, Margaret Street, Toowoomba	B	294	100
4QG	Queensland Radio Service, Brisbane	A	385	5,000

SOUTH AUSTRALIA.

5CL	Central Broadcasters Ltd., Adelaide	A	395	5,000
5DN	5DN Proprietary Ltd., 2-4 Montpelier Street, Parkside . .	B	313	500
5KA	Sport Radio Broadcasting Station, c/o Charles Moore & Co., Victoria Square, Adelaide	B	250	1,000

WESTERN AUSTRALIA.

6WF	Westralian Farmers Ltd., Perth	A	1,250	5,000
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TASMANIA.

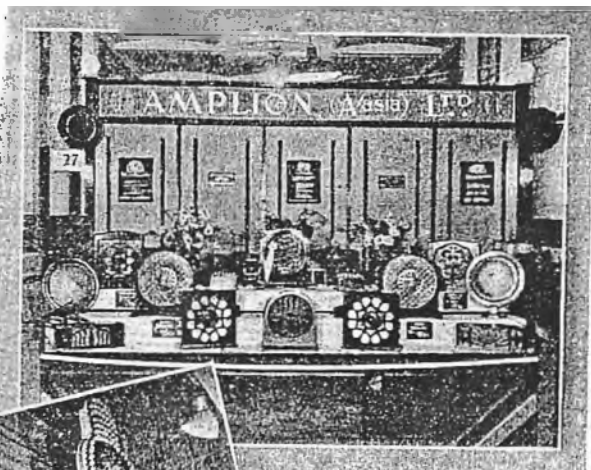
7ZL	Tasmanian Broadcasters Pty. Ltd., Hobart	A	516	3,000
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NEW ZEALAND BROADCASTING STATIONS

Call Sign.	Name and Address.	Class.	Normal Wavelength in Metres.	Normal Power in Watts.
1YA	Radio Broadcasting Co. of N.Z., 419 Queen Street, Auckland (Silent Night, Monday)	A	333	500
1ZB	La Gloria Gramophone Co., Auckland	B	275	50
1ZQ	L. R. Leith, Auckland	B	330	50
1ZY	N. C. Shepherd, Whangarei	B	250	15
2YA	Radio Broadcasting Co., Wellington	A	420	5,000
2YK	2YK Limited, Wellington	B	292	120
2YF	Radio Club, Palmerston North	B	200	5
3YA	Radio Broadcasting Co. of N.Z., Christchurch	A	306	500
4YA	Radio Broadcasting Co. of N.Z., Dunedin (Silent Night, Thursday)	A	463	750
4ZB	Otago Radio Association, Dunedin	B	300	50
4ZP	Southland Amateur Club, Invercargill	B	275	—
2ZM	The Gisborne Radio Co., 7 Wainui Road, Gisborne	—	—	—
2ZF	The Palmerston North Radio Club, The Square, Palmerston North	—	—	—

1928 RADIO EXHIBITION

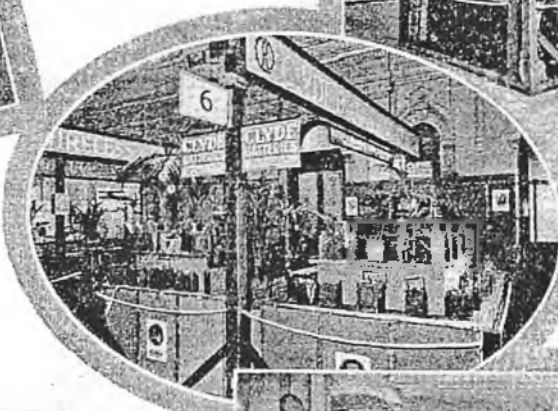
The **Amplion Exhibit** (right) was the outstanding loud-speaker stand. There was a varied showing of new cone models, and fine elaborate cabinet work.



Radiokes (right) appealed to the amateur experimenter. High-class R.F. components and kits for the latest sets were on view.



Philips (above) was the surprise stand at the Show. Among the new apparatus were the A635 and A435 Valves.



Clyde (immediate left) had a working exhibit—a unit of their battery assembling plant.

The **New Systems Receivers** were prominently displayed at Stand 13 (below). Acme eliminators, Fuller accumulators, Philco and the famous Burgess batteries.



Mullard (above) linked up with Ferranti in a display of their special low consumption valves and the well-known transformer—British throughout.

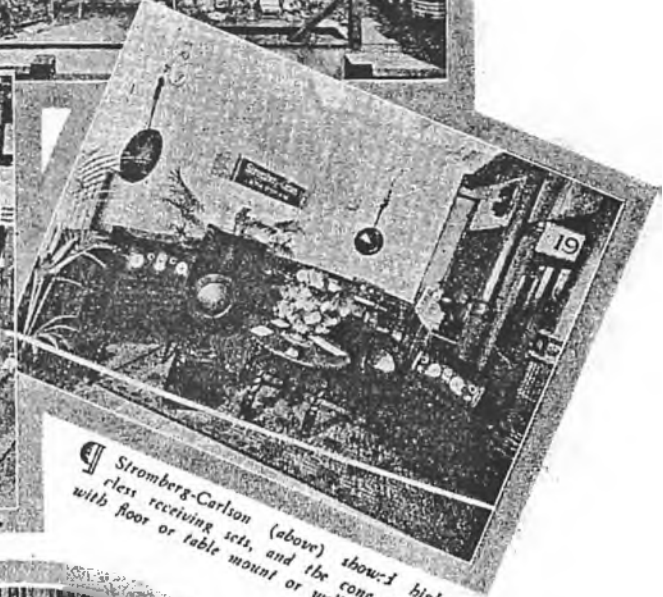
1928 RADIO EXHIBITION



W. G. Watson (left) exhibited electrical domestic apparatus, and a range of radio accessories and components. Of particular note was the Sonobrade Cone Speaker and the new Majestic "B" supply unit.

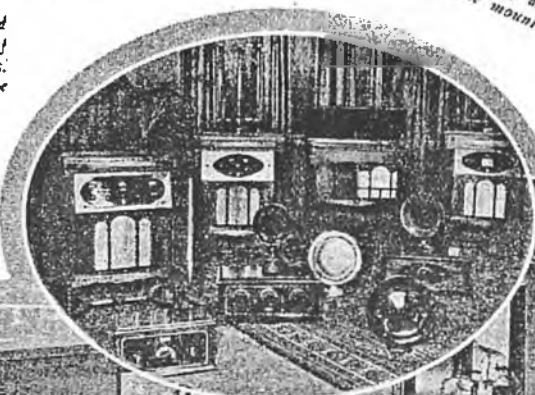


Amalgamated Wireless (above) attracted hundreds of visitors. A wide range of Radiolas, including all styles, sizes and prices. Of particular interest, however, was the powerful short-wave transmitter which was used for Empire programmes.



Stromberg-Carlson (above) showed high-class receiving sets, and the cone speaker with floor or table mount or wall bracket.

Colville Moore (right) with a wide range of receivers and loud-speakers.



Mick Simmonds (left) were prominent with their special dynamic speaker and the elaborate and beautifully designed Magnavox sets.



A. G. Healing (above) opened with a display of the famous Atwater-Kent receivers and loud-speakers.

1929

INDISPENSABLE

**FOR VASTLY
IMPROVED RESULTS**



Wireless Telegraphy, whether for experimental, commercial or purely business reasons, is largely dependent on the valve. See to it that you select Mullard every time, for in the long run unapproachable value combined with unfailing reliability prove the soundest value.

Mullard

THE · MASTER · VALVE

Adv. The Mullard Wireless Service Co., Ltd., Mullard House,
Charing Cross Road, London, W.C. 2

1929

Completely equipped
at the amazing
price of

£31/-/-



The
AIRZONE
AC FOUR

Screen - Grid, Loop
Receiver with built-in
Magnavox Dynamic
Speaker

The simplest and most compact receiver on the market to-day. No aerial . . . no earth is required. Simply plug into your electric light socket, and everything on the air is yours. Entirely self-contained, it can be moved from room to room . . . to the verandah . . . wherever there is current laid on. Fitted with the matchless Magnavox Dynamic Speaker, it has unsurpassable tonal beauty, and will give all that could be desired in volume without the slightest distortion. A quality receiver, indeed . . . and unquestionably representing the finest radio value offering to-day.

Home Demonstration and Terms,
if required, can be arranged by
Mick Simmons through the nearest
Radio Dealer.

MICK SIMMONS LTD.

HEADQUARTERS: HAYMARKET, SYDNEY

"Wholesale and Retail Dealers in Radio."

1930

DISTRIBUTORS FOR A.W.A. RADIOLAS!

**Supreme in
Performance**

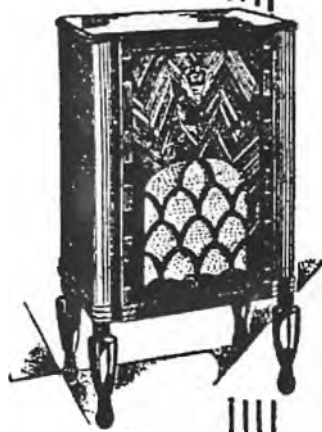
**Supreme in
Value.**

The New

RADIOLA

MODEL 45 E

With the New Tone Control



Completely equipped at the
amazing price of

£39/10/-

This Radiola Model is nothing short of a sensation. Mick Simmons' first extensive deliveries were sold almost immediately. To ensure prompt installation, early placement of order is advised.

The nearest SUBURBAN RADIO DEALER can arrange a home demonstration, and terms if required, through Mick Simmons Ltd.

If not in touch with a Radio Dealer, ring Mick Simmons' Radio Manager, M 6311.

NOTE:
A MAGNAVOX
Dynamic Speaker
can be supplied
with any Radiola
Model.

MICK SIMMONS LTD.

HEADQUARTERS: HAYMARKET, SYDNEY

"Wholesale and Retail Dealers in Radio"

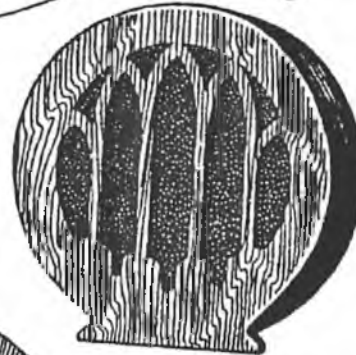
1930

BLUE SPOT SPEAKERS

The Tone's-the Thing



Speech
and
Music
Faithfully
Reproduced

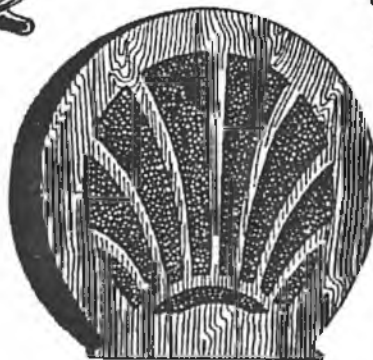


"CHANCERY COURT"

Blue Spot Speaker,
incorporating the
Famous "Blue
Spot" 66 K unit.

In metal, 12½ in.
diameter.

Price £3/7/6



"CHANCER GOTHIC"

Blue Spot Speaker,
Highly finished
mahogany, 12 ins.
diameter.

Incorporating the famous
66 K Blue Spot Speaker.

Price £3/7/6

"CHANCERY R."

Blue Spot Speaker. Highly finished
mahogany. Incorporating 66R Blue
Spot unit, capable of carrying 50
M/A.

Price £4/2/6

Distributors
BLOCH & GERBER, LTD.
48 YORK ST., SYDNEY

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Factory Representative
HECHT & CO.

Broughton House, 161 Clarence Street
SYDNEY

Chancery House, 459 Collins Street
MELBOURNE

VIII.

1930



Splendid Valves these COSSORS

"By Jove . . . what a valve . . . just look at it . . . you can see at once it's better . . . big, strong electrodes . . . all electrically welded into position, too . . . not a hope of them being jolted out of place . . . and here's the new box type of screening grid I've heard so much about . . . I believe it reduces inter-electrode capacity to a negligible amount . . . and that's why effective amplification is so great. . . . No wonder they surprise everyone with the results they give. . . . Splendid valves these Cossors."

Wholesale Distributors
W. G. WATSON & CO., LIMITED
Branches in All States.

Obtainable from all wholesale and retail dealers.



100 PER CENT BRITISH
COSSOR
New Process **VALVES**

A Valve for
every purpose

C. D. MACLURCAN,
Australian Representative,
28 Jamison Street, Sydney

Wireless Progress in Australia 1930



Wireless Progress in Australia 1930



Amalgamated Wireless (Australasia) Limited.

CAPITAL: £1,000,000.

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Sir WILLIAM VICARS, K.B., C.B.E.
Rt. Hon. W. M. HUGHES, P.C., K.C.
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L. A. HOOKE, Deputy General Manager.
J. F. WILSON, A.C.I.S., Secretary and Assistant Manager.
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S. M. GRIME, A.M.I.E. (Aust.), Assistant Manager.
R. V. DEARMAN, A.I.I.A., Accountant.

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NEW ZEALAND:

G. ROBERTSON, Branch Manager.

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G. APPERLEY, Traffic Manager.

COASTAL RADIO SERVICE:

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MARINE SERVICE:

W. H. C. PHILLIPS, Marine Superintendent.
S. TOOMBS, Staff Welfare Superintendent.

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PATENT DEPARTMENT:

C. E. TAPP.

MARCONI SCHOOL OF WIRELESS:

H. BUIK, Chief Instructor.



COMMERCIAL wireless in Australia dates back to 1910, when the first ships equipped with wireless arrived in Australasian waters.

Little was known of the then comparatively new science of wireless communication, and any wireless work that had been carried out during the preceding years had been spasmodic, and of an experimental nature only. So little progress had been made that there were no Coastal Radio Stations in Australia for wireless-equipped ships to communicate with.

Between the wireless situation in Australia in 1910, or, one may truthfully remark, the non-wireless situation, and the thriving and ever expanding wireless industry of 1930, employing thousands of Australians, wonders have been worked. In the space of two decades a new science has been developed in Australia and a key industry of vast importance to every Australian has been established. That it has attained such importance and has placed Australia in the forefront of wireless progress is due to the foresight, ability, and conscientious research and development work of Mr. E. T. Fisk, Managing Director of Amalgamated Wireless.

To-day, practically every ship in the Australasian Mercantile Marine is wireless-equipped; a chain of eighteen modernly equipped Coastal Radio Stations encircles the Australian coastline, while nine Island Radio Stations are operating in New Guinea and Papua, and four stations in the Fiji Islands. In the Northern Territory, Wireless Stations serve as feeders to the landline telegraph system. Broadcasting stations in each of the capital cities transmit programmes throughout Australia, while in Sydney and Melbourne the most modernly-designed short-wave transmitters are capable of transmitting any local broadcasting programmes to England and America. The largest and most scientific wireless equipment of every type is now manufactured for use at sea, on land, and in the air.

The A.W.A. Radiophone Service between Australia and Great Britain and the Continent of Europe, inaugurated on April 30th last, is now in successful operation, and dozens of people daily carry on private and business conversations from their homes in Australia with residents in Great Britain and Europe.

The Beam Wireless Service to Great Britain, the Continent of Europe, and North and South America now handles the greater part of Australia's overseas telegraphic communications.

This far reaching progress in the application and development of wireless was entirely due to the pioneering work carried out by Amalgamated Wireless (A/sia) Ltd., which was incorporated in 1913, and at once set about the task of providing Australia with modern wireless communication facilities.

A.W.A. Radiophone Service To Great Britain and the Continent.

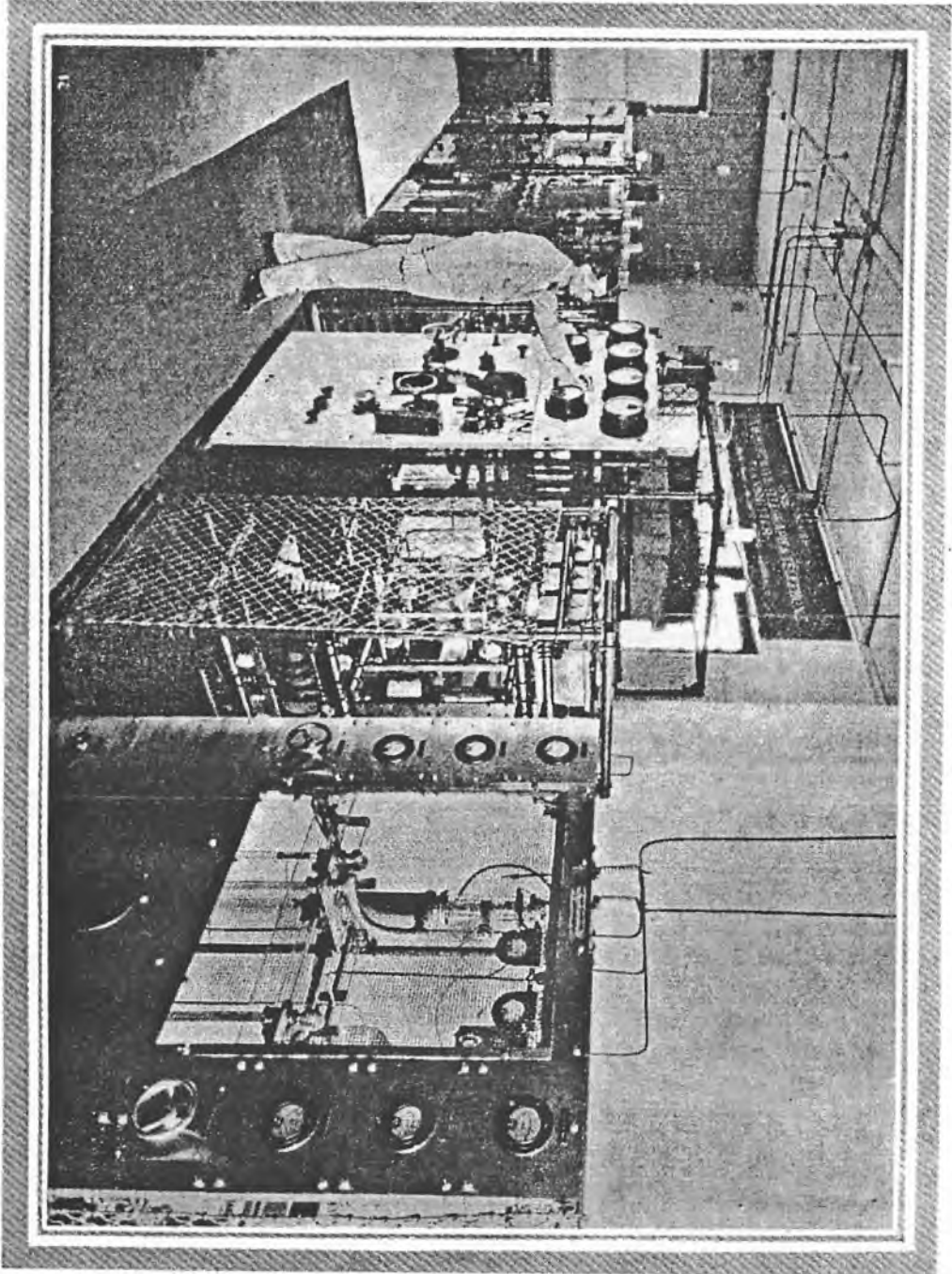
The longest telephone service in the world was opened on 30th April last, when Mr. Scullin, Prime Minister of Australia, spoke with Mr. Ramsay MacDonald, the English Prime Minister, and the Rt. Hon. W. M. Hughes, P.C., K.C., spoke with the Rt. Hon. David Lloyd George, by wireless telephone between Sydney and London.

Established and operated by Amalgamated Wireless, the A.W.A. Radiophone represents the first wireless telephone service to be inaugurated between Great Britain and a Dominion.

The necessity and practicability of wireless communication between Australia and England was early recognised by Mr. Fisk, who commenced experimenting in 1914, and was successful in receiving the first direct wireless telegraph messages from England to Australia in 1918. This was followed by his effecting the first wireless telephone reception from England in 1924. His strenuous advocacy and practical experiments in trans-ocean telegraphy resulted in the establishment of the Beam Wireless Service between Australia and Great Britain and the Continent of Europe in 1927, and due to his untiring efforts wireless telephony between Australia and the Homeland is now an accomplished fact. The whole of the transmitting and receiving gear installed by Amalgamated Wireless for the Imperial and International Wireless Telephone Service was designed, manufactured, and installed in Australia by Australians in the A.W.A. organisation.

The wireless telephone rates between Australia and Great Britain show a more than favourable comparison when compared with the rates ruling between New York and London; the rate for the Australian service being £2 per minute, with a minimum of £6 per call to Great Britain, as against £3 per minute or £9 per call minimum between New York and London, which is about a quarter of the distance between Australia and Great Britain.

Telephone subscribers in Australia may speak from their own homes or business places by simply ringing up trunk lines, B071, and asking for "London Service." The telephone number of the person wanted is not essential—the name and address are sufficient.



20 K.W. Short Wave Transmitter at Radio Centre, Pennant Hills, for use in Overseas Broadcasting and the Wireless Telephone Service to Great Britain and Continent of Europe. Designed and manufactured in Australia by A.W.A.

Beam Wireless Service.

The science of wireless has advanced by leaps and bounds during the last few years. Its commercial application has been a veritable triumph, annihilating distance and bringing the most distant parts of the world into wireless contact with the centres of civilisation. In that triumph Australia has not only played a very great part, but in the development of many phases of wireless, has led the world.

Less than two years ago, the only Australian wireless communication services available to the public were the Marine services to and from ships, and the Island services between Australia and Papua, and Australia and New Guinea. To-day, step into the Beam Offices at Sydney and Melbourne, or enter any Post Office in the Commonwealth, and you may send a message, via Beam, to some of the remote places of the world—to Esthonia or Greenland in Europe; Yukon or Alaska in North America; to Porto Rico or San Domingo; in the West Indies; Guatemala or Costa Rica, in Central America; to name but a few of the traffic destinations in these particular countries.

By day and night, messages are being despatched to Great Britain, Europe, Canada, the United States of America, and South America, via Beam.

The Beam wireless service between Australia and Great Britain and the Continent of Europe, owned and operated by Amalgamated Wireless (A/asia.), Ltd., was opened for commercial traffic on April 8th, 1927, and almost immediately leapt into public favour.

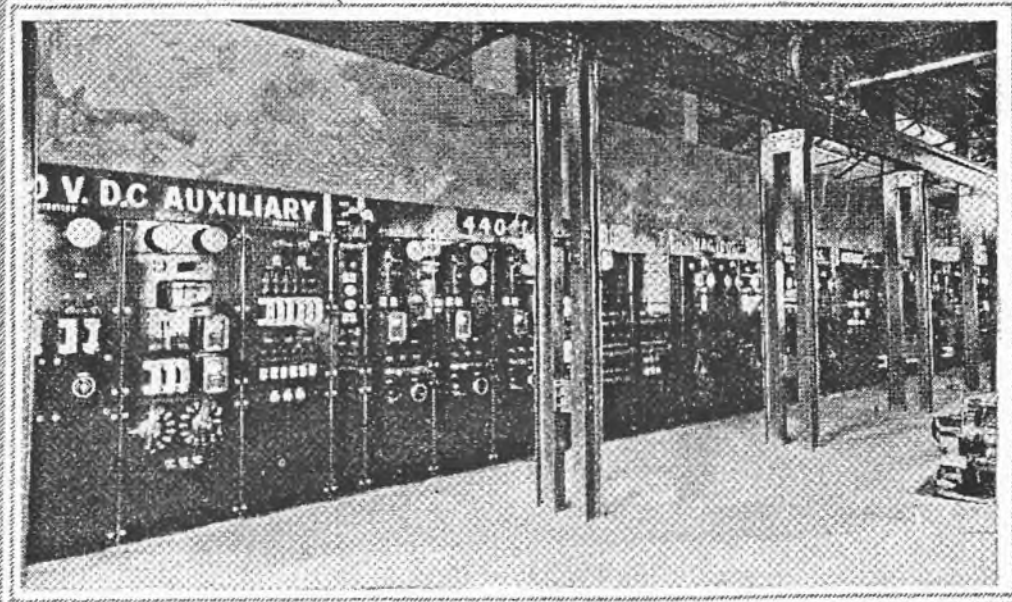
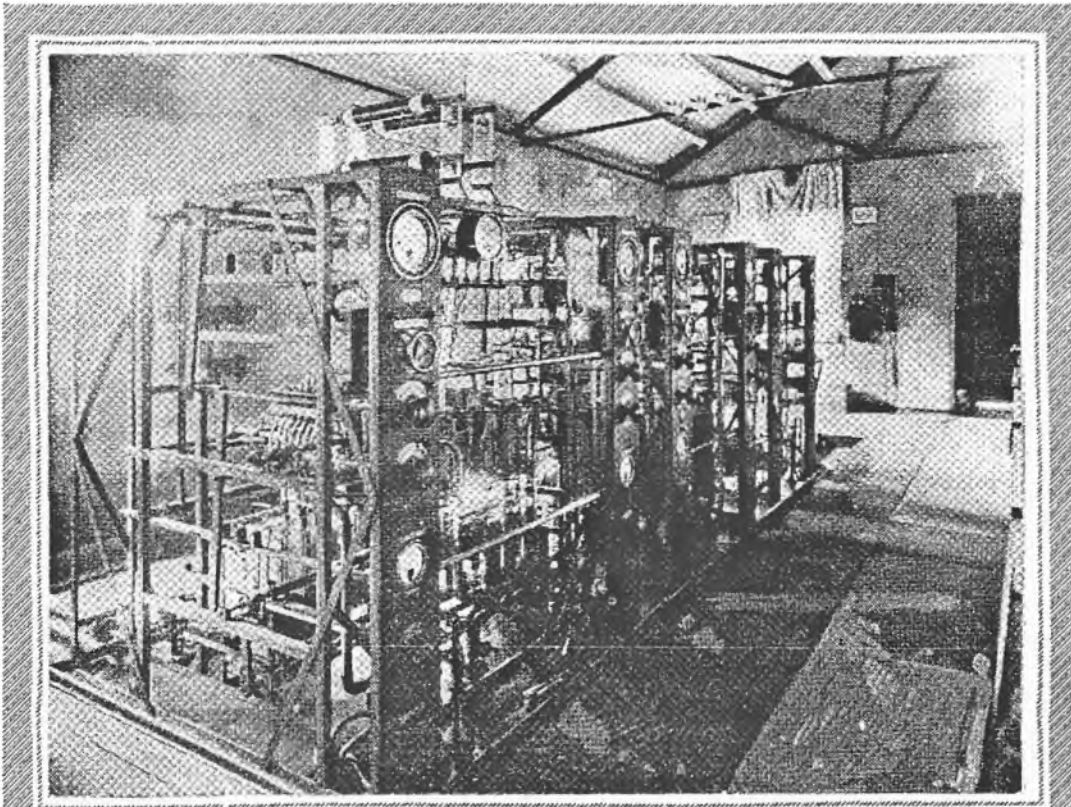
Additional Beam facilities were made available on June 16th, 1928, by the opening of the service between Australia and North and South America, thus providing not only direct communication with the New World, but also a second link with the Old World, via the Montreal-London Beam circuit.

Considering the excellent service rendered to clients—a service unknown to international telegraph users prior to the advent of the Beam—and the lower rates quoted to the public, together with the speed and accuracy of the Beam System, it is not surprising that to-day the majority of the messages between Australia and Great Britain, the Irish Free State, Europe, Canada, United States of America, and South America are transmitted "VIA BEAM." The service has been the means of effecting a saving to the Australian business community of many thousands of pounds per annum.

The greatest long-distance direct telegraph service in the world, the Beam service, is operated entirely without re-transmission or relays. It is by far the most speedy method of communication yet devised, the speed of working being limited only by the mechanical limitations of the manipulating and recording instruments at each terminal.

Beam wireless signals travel at the rate of 186,000 miles per second, and the sending apparatus handles the messages at the rate of 1,250 letters per minute.

Wireless Progress in Australia 1930



Top—Valve Transmitters at Beam Wireless Station, Ballan, Victoria.

Bottom—Control Switchboard at Beam Wireless Station, Ballan, Victoria.

Beam Wireless Service—Continued

It will be seen that a message of 125 code words could be in London one minute after transmission commenced in Australia.

The Beam Offices of Sydney and Melbourne are open for traffic day and night. The doors are but ornamental—they have never been closed since the inauguration of the service. Messages may be lodged at any time, or on receipt of a telephone call—in the case of Sydney BW 2211 and in Melbourne F 4161—a Beam messenger will gladly be sent to collect messages within the city area. Messages are accepted at the A.W.A. Offices in Sydney and Melbourne, and at all Postal Telegraph Offices in the Commonwealth, but be sure to mark your message "VIA BEAM."

Beam Stations.

The Beam wireless transmitting centre in Australia is located near Ballan—about 50 miles to the N.W. of Melbourne, and the receiving centre is at Rockbank—18 miles from Melbourne in the same direction. Both stations are connected by special telegraph lines with the Beam Wireless Office, 167 Queen Street, Melbourne, and with the Beam Wireless Office, 47 York Street, Sydney. At Ballan there are two transmitters—one of which is used for sending messages to London, whence they are distributed through the United Kingdom to Europe, and the other transmits to Montreal all messages for the North and South American Continents.

The transmission of messages originates at the Beam Offices in the heart of Melbourne or Sydney, and the telegraph operators there, by means of the special telegraph lines to the Beam stations, automatically cause the great transmitters at Ballan to radiate the messages, and likewise messages from London or Montreal are received at Rockbank and automatically passed on to the telegraph centres in Sydney or Melbourne, where they are recorded on tape. The whole of this work was carried out under the direct supervision of Mr. E. T. Fisk, Managing Director of A.W.A. Ltd., who, for the last decade had not only visualised a direct trans-ocean wireless communication between Australia and Great Britain and Australia and the other Dominions, but had consistently advocated and educated the powers that be to a realisation of the needs for such services, and had demonstrated to them the technical means and methods by which it could be carried out.

To-day Mr. Fisk has the satisfaction of seeing his cherished idea of a direct wireless service successfully in operation.

Page Ten

Coastal Radio Services.

The Coastal Radio Services play a very effective part in the inter-communication of the people of Australia and the adjacent Islands, also with ships at sea. The Service comprises 29 stations, all of which are owned and controlled by A.W.A. Ltd. They are so organised and situated that at any time of the day or night a message from or to any vessel within 500 miles of the coast can be despatched or received. The night range of these stations is anything up to 3,000 miles, and with a special short-wave apparatus communication with ships in European and Eastern Pacific waters is maintained.

The Coastal Wireless Stations form the only telegraphic route to many important points in the Pacific, including Papua and the Mandated Territory of New Guinea. The stations also send out to ships at sea a press news service, navigation warnings and reports, and weather forecasts.

Messages for ships at sea can be lodged at any Postal Telegraph Office, and also at the A.W.A. offices in Sydney and Melbourne, or at any radio-telegraph station, where rates and particulars regarding routes, etc., will also be supplied. A list of the Coastal Radio Stations now being operated by A.W.A. is as follows:—

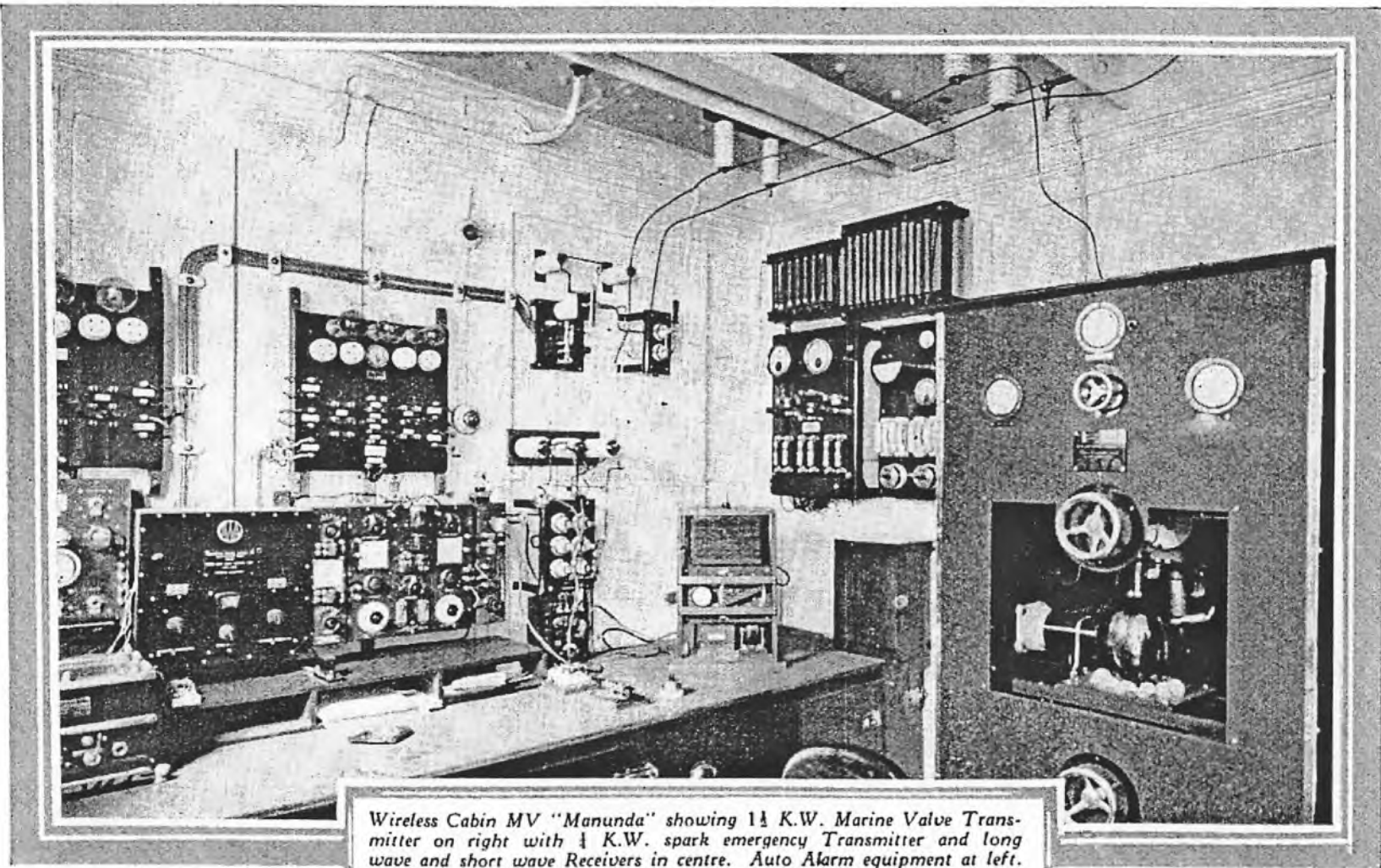
Brisbane	Geraldton	Rockhampton
Broome	Hobart	Sydney
Cooktown	King Island	Thursday Island
Darwin	Melbourne	Townsville
Esperance	Perth	Willis Island
Flinders Island		Wyndham

All passenger ships and most of the cargo ships trading in Australian waters carry wireless installations, and can be communicated with through some one of the stations listed above.

Marine Wireless Services.

Probably the greatest benefit which wireless has conferred on mankind is its application to shipping and navigation generally, particularly as a means of ensuring the safety of life and property at sea. Ever since the Company's inception, it has devoted a large proportion of its resources to the development of apparatus for the various purposes of marine communication and navigation.

We all know that to-day every passenger ship crossing the oceans is equipped with efficient wireless apparatus, but probably everyone does not realise the



Wireless Cabin MV "Manunda" showing 1 1/2 K.W. Marine Valve Transmitter on right with 1 K.W. spark emergency Transmitter and long wave and short wave Receivers in centre. Auto Alarm equipment at left.

Marine Wireless Services—Continued

important fact that a wireless station on board a ship, even on the remotest part of the sea, is a definite unit of the world's telegraphic system. Through carefully planned international arrangements, it is possible to hand in a telegram at any town or village which has a telegraph office, in any part of the world, and to have such telegram despatched through the various landlines, cables and wireless stations, to a person on board a ship in any part of the world. In the same way, if you are, for instance, at sea on board a ship off the coast of South America, you can give the wireless operator a telegram addressed to a person in Alice Springs or Bourke, in an Italian village, in Alaska or elsewhere, and know that in a few hours that telegram will be delivered to your friend at his home.

You will not have to concern yourself about the various routes your message will follow or the charges of the various authorities who operate those routes. You will pay so many pence or shillings per word, calculated by the operator in the ship, and the rest will be taken care of for you by means of the world's international telegraphic network.

Wireless is also extensively used in nearly every part of the world for the broadcasting of official time signals, meteorological bulletins, weather reports, storm warnings and warnings of any wreckage or other navigation dangers.

The Marine wireless service conducted by A.W.A. comprises the equipment of modern wireless apparatus, manufactured in its own works, on vessels of the Mercantile Marine; the services of operators; the benefits of its modern research organisation; the employment of inspectors to supervise the efficiency of the installations on the ships and the work of the operators; and reciprocal services in other parts of the world.

Network of Australian Controlled Stations in the Pacific Islands.

Amalgamated Wireless (A/asia.) Ltd. have established three large centres in the south-western Pacific—at Fiji, New Guinea and Papua.

The installation of modern wireless equipment at Suva Radio, designed by A.W.A. engineers and manufactured at the Company's Radio-Electric Works at Sydney, has established Fiji as an important link in the world's wireless system, and a part of the Empire wireless chain.

The A.W.A. radio station at Suva, Fiji, handles overseas traffic to Great Britain and the Continent via the Australian Beam Service, and is also in communication with important Island centres such as Samoa, Friendly Islands, Gilbert

Australian Controlled Stations—Continued

and Ellice Islands, New Caledonia, New Hebrides and Honolulu. Suva Radio also maintains communication with the three other A.W.A. controlled stations in Fiji—Labasa, Savu Savu and Taviuni.

The daily broadcasting of weather reports from Suva has proved of great value to shipping and to the Islands in range of Suva Station, especially during the hurricane season.

The second centre is in the Mandated Territory of New Guinea, where the Company's chief station is located at Bita Paka, near Rabaul, on the island of New Britain. This modernly-equipped station not only maintains direct radio communication with A.W.A. Radio Centre, Sydney, but also is in constant communication with the following A.W.A. owned stations: Aitape and Madang, New Guinea; Manus, Admiralty Islands; Kavieng, New Ireland; Kieta, Bougainville Island; Marienberg Radio on the New Guinea Oilfields, and Bulolo and Salamoia on the New Guinea Goldfields. The Rabaul Station also communicates with the Gilbert and Ellice Islands, the Solomon Islands, and the Santa Cruz Islands.

The third important centre is at Port Moresby, in Papua. This Station is in communication with Samarai, in Papua, and also with Thursday Island, and the Australian Stations at Cooktown and Townsville. In addition, there is a private station at Popo, on the Anglo-Persian Oilfields.

The development of these Australian-owned stations in the Pacific, is largely due to Mr. E. T. Fisk, Managing Director of A.W.A., who, in 1922, interviewed the Rt. Hon. L. S. Amery, then First Lord of the Admiralty, and suggested that A.W.A. should take over from the Imperial Government all the British wireless stations in the Pacific, with the object of modernising them and connecting them direct with the Australian wireless network.

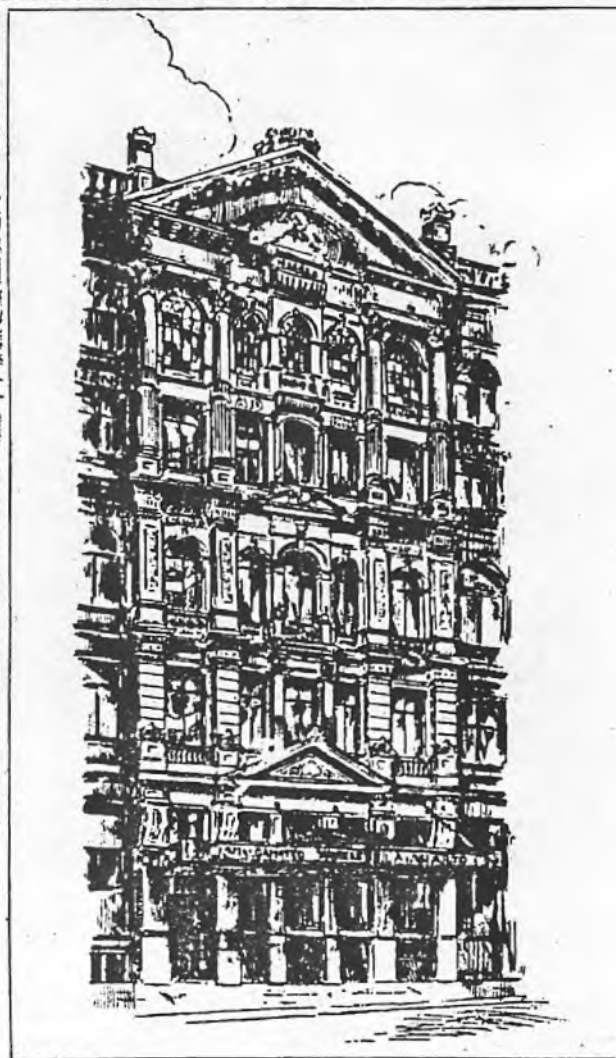
As a result of negotiations an Agreement was completed between the Imperial Government and A.W.A., and on January 1st, 1928, the Company took over the wireless stations in the Fijian group.

The development of this network of commercial wireless stations in time of peace gives assurance that they will be up to date and available for defence purposes in time of war; and that a trained personnel and equipment will be available on short notice for the extension of the services, or for the replacement of existing equipment that might be damaged or destroyed.

Wireless Progress in Australia 1930



"WIRELESS HOUSE"
47 YORK STREET
SYDNEY.



"WIRELESS HOUSE"
167-169 QUEEN ST
MELBOURNE





*Section of Sydney
Sales Department*



*Staff Quarters
Beam Station*

A Few of the Activities of A.W.



*A.W.A.
Transmitting Centre
Suva Fiji*



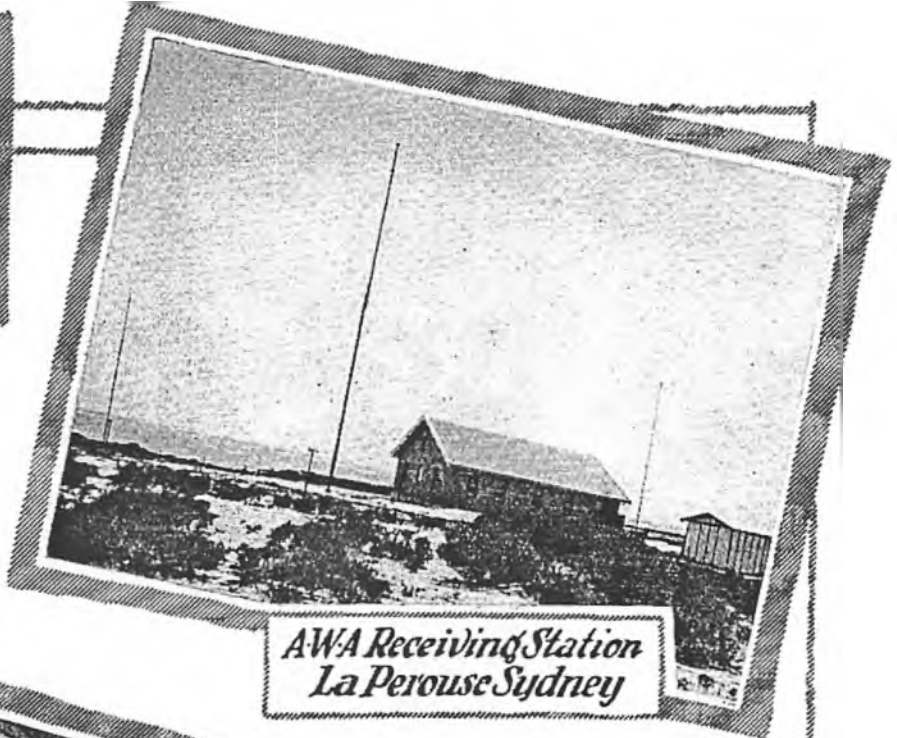
A.W.A. Radio Centre Pen.

Wireless Progress in Australia 1930



*Offices
in Rockbank*

*with
Many
ties &
V.A*



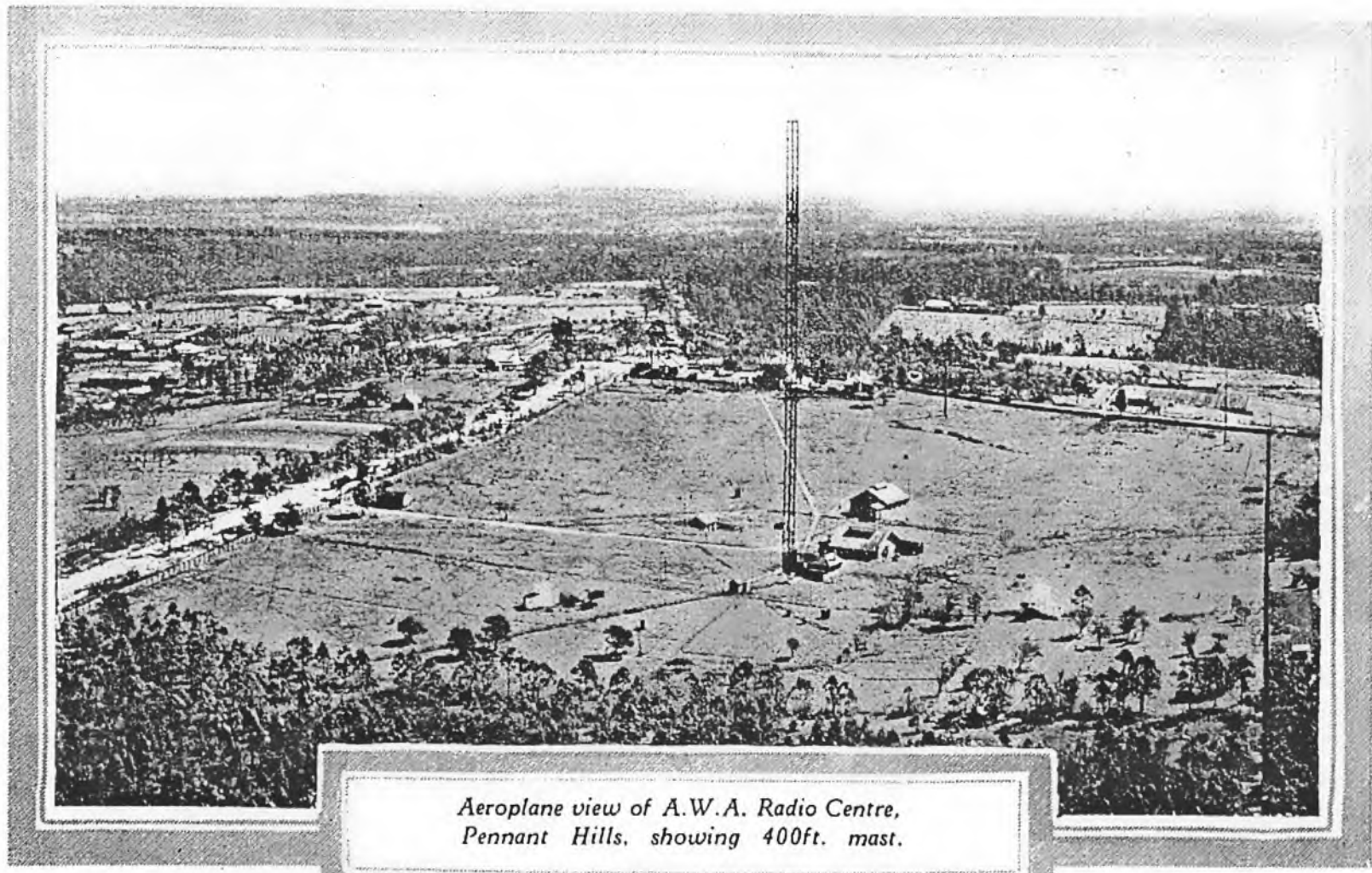
*AWA Receiving Station
La Perouse Sydney*



*AWA Overseas
Broadcasting Station
Braybrook Vic.*



Mount Pleasant Hills, Sydney.



*Aeroplane view of A.W.A. Radio Centre,
Pennant Hills, showing 400ft. mast.*

A.W.A. Radio Centre, Sydney.

One of the earliest commercial wireless stations in Australia, A.W.A. Radio Centre, Pennant Hills, near Sydney, is to-day the largest and most modern of its kind in the Southern Hemisphere.

The chief functions of the Centre comprise the Beam Feeder Transmitters, operating with Melbourne; the Coastal Radio Transmitters, communicating with Rabaul, Fiji and Noumea, and also with Adelaide, Perth, Townsville and Brisbane; Sydney Radio short-wave long-distance transmitters communicating with ships at sea; the ordinary 600 and 800 metre marine transmitters; the N.S.W. Police Transmitter, keeping police headquarters in touch with the Police Patrol Cars; the 5 k.w. Broadcast Transmitters of Broadcasting Station 2FC; the Trawler Transmitter for communication with trawlers operating on the N.S.W. coast. In addition, A.W.A. Radio Centre, Pennant Hills, houses the short-wave broadcasting transmitters for overseas broadcasting to England, Canada and the United States, for relaying in those countries.

While the whole of the above transmitting functions are carried out by A.W.A. Radio Centre, Pennant Hills, the actual operating of the various units is actuated by "remote control" from various parts of Sydney, and also from La Perouse.

The A.W.A. designed and manufactured 20 k.w. oil-cooled transmitter used for Empire and world-wide short-wave broadcasting and overseas telephony, is also installed at Radio Centre, Pennant Hills.

The whole of the transmitters at this great station were designed and manufactured by A.W.A.

A.W.A. Receiving Centre, at La Perouse, Sydney.

On the heights of La Perouse, overlooking Botany Bay, is located the Sydney Receiving Centre of A.W.A.—the most important and the largest receiving station in the Southern Hemisphere.

Wireless traffic is here received from a network of stations throughout the world. Messages from ships' stations in the Pacific and Indian Oceans and from the Coastal Radio Stations on the south-eastern seaboard of Australia. Two-way wireless telephony conversation is maintained between La Perouse and the trawlers operating off the N.S.W. coast; the latest news of the world is received from the English high power station at Rugby, while reception is effected of broadcast programmes transmitted from English, American, and Continental high power Broadcasting Stations. The enormous ranges to-day attained by short-wave working is demonstrated by the reception at La Perouse of experimental communications from short-wave stations in Great Britain and Europe, the United States and Canada, Africa, Asia, and the Dutch East Indies.

The La Perouse Station maintains communication with all the short-wave

A.W.A. Receiving Centre—Continued

stations in the Pacific, including Rabaul, New Guinea; Suva, Fiji; Noumea, New Caledonia; and San Francisco, while effective communication is also maintained with ships' stations equipped with short-wave apparatus, crossing the Pacific and Indian Oceans.

The system of centralising wireless activities as conceived and developed by Mr. Fisk, Managing Director of Amalgamated Wireless (A/asia.) Ltd., has resulted in there being three large wireless centres in N.S.W.—the Transmitting Centre at Pennant Hills, the Receiving Centre at La Perouse, and the Control Centre at A.W.A. Headquarters, 47 York Street, Sydney.

The following nine services are operated at La Perouse:—

The Beam Feeder Service from Melbourne.

The Coastal Radio Service communicating with the Coastal Radio Stations at Brisbane, Adelaide, Perth, and Townsville.

Radio Service with Suva, Fiji.

Island Radio Service communicating with New Guinea and Papua.

Marine Wireless Services with ships at sea.

Short-wave long distance Marine Services.

The Trawler Telephony Service for communicating with trawlers operating off the N.S.W. coast.

The reception of press messages from the British high power station at Rugby, and from stations in other parts of the world.

The reception of broadcast programmes from Great Britain, the Continent of Europe and America, for re-broadcast by Australian Broadcasting Stations.

Messages from the Company's Island Radio Station at Rabaul, New Guinea; the A.W.A., Suva, Fiji, Station and the Beam Feeder Transmitting Station at Braybrook, Melbourne, are received at La Perouse and automatically relayed to Wireless House, York Street, where they may be automatically recorded by mechanical means or aurally received.

The Receiving Station at La Perouse has become famous throughout the world for the many noteworthy interceptions carried out there. From the time Squadron-Leader Kingsford-Smith left San Francisco until he reached Australia, operators at La Perouse were in touch with the 'plane, and in this achieved a record in 'plane to earth communication.

During the flight of the "Southern Cross" from Australia to England messages were received at La Perouse station from the time the 'plane left Sydney until she was passing over France. On another occasion A.W.A. operators at La Perouse were in two-way communication with the German steamer "Bremen" when she was establishing a record run across the Atlantic. Messages transmitted by Commander Byrd's Antarctic Expedition have been regularly heard by A.W.A., and, by way of reciprocity, the company transmitted a special programme to the Polar explorers.

A.W.A. Receiving Centre—Continued

The telephony tests between Sydney and Schenectady, New York, and between Sydney and Java, and between Sydney and London, carried out by Mr. Fisk, were effected through the La Perouse station so far as concerned the reception of the voices at the Sydney end.

The whole of the modern wireless equipment at both La Perouse and Pennant Hills was designed and manufactured by Amalgamated Wireless (A/asia) Ltd.

A.W.A. Radio Centre, Melbourne.

At Braybrook, Melbourne, is situated Radio Centre, Melbourne, owned and operated by A.W.A. This is the second largest Radio Centre in the Southern Hemisphere, and its Australian manufactured equipment is of the very latest design.

The transmitters comprise a 5 k.w. broadcasting installation for the transmission of programmes from Broadcasting Station 3LO, a 3 k.w. transmitter for communication with ships at sea, and A.W.A. coastal radio stations. There are also two 5 k.w. short-wave transmitters used in connection with the Beam Feeder service. These are the latest transmitters designed and manufactured by A.W.A., and though not in full service as yet, a highly satisfactory service is carried out daily between Melbourne and Perth, Adelaide and Brisbane.

The broadcast programmes emanate from the studio of Station 3LO in Melbourne; the Marine transmitters are operated from the A.W.A. Receiving Station, VIM, in the Domain, while the feeder transmitters are operated by "remote control" from the Company's Beam Offices in Queen Street, Melbourne. Messages from ships at sea are intercepted at the A.W.A. Receiving Station in the Domain, where the operators by means of "remote control" actuate the marine transmitters at A.W.A. Transmitting Centre, Braybrook.

Broadcasting.

A.W.A. were pioneers of broadcasting in Australia. As early as August, 1920, Mr. E. T. Fisk gave a public demonstration of wireless broadcasting in Sydney to an audience of more than 100 at a meeting of the Royal Society of N.S.W. In October of the same year, he arranged a complete public broadcast concert in the Queen's Hall, Federal Parliament House, Melbourne, to an audience of some hundreds of people. This was the third large public demonstration of broadcasting that had taken place in any part of the world. In January, 1921, a weekly broadcast programme was transmitted from Melbourne by A.W.A. and was heard by experimenters and others at distances up to 1000 miles.

Broadcasting Station 2FC was opened on December 23rd, 1923, and this was followed by the inauguration in 1924 of Broadcasting Services at Station 3LO

Wireless Progress in Australia 1930



Front and rear view of the grounds and buildings comprising the new Radio-Electric Works of Amalgamated Wireless at Ashfield, near Sydney.

Broadcasting—Continued

Melbourne and Station 6WF Perth, while in the following year Broadcasting Stations 4QG Brisbane and 5CL Adelaide came into operation. All the above stations were designed by the engineers of A.W.A. Ltd., and the highly technical equipment manufactured at the Company's Radio-Electric Works, Sydney.

The high standard of transmission maintained by the principal Australian broadcasting stations to-day is primarily due to the research and experimental work carried out by the engineers of A.W.A. The manufacture of broadcasting transmitters is a highly technical phase of industry, and the Company is to-day producing broadcasting transmitters which compare more than favourably with those manufactured overseas, which demonstrates what can be done in the field of wireless when a definite policy of Australian manufacture has been laid down.

Overseas Broadcasting.

Experiments in wireless telephony have been carried out by Mr. E. T. Fisk for over a period of five years, and during that time many records have been achieved both in regard to overseas wireless telegraphy and overseas broadcasting. To further develop overseas broadcasting and telephony, the Company designed and manufactured at its Radio-Electric Works the 20 k.w. Short Wave Transmitter now installed at Pennant Hills, and it was by means of this transmitter that many of the overseas records since established have been effected.

To Australia fell the honour of transmitting the first Empire Broadcast Programme. On September 5th, 1927, the transmission was effected through A.W.A.'s overseas experimental station VK2ME, Pennant Hills. The reception in Great Britain was remarkably successful, and the programme was re-broadcast by the British Broadcasting Corporation to crystal users and other listeners throughout Great Britain. It is estimated that over one million listeners-in heard the programme.

This was followed on October 17th, 1927, by the second and what might be termed the first world-wide programme through Station VK2ME, the programme being arranged by Station 2FC. This was the first occasion on which programmes were transmitted on dual wave lengths—the normal wave length of Station 2FC, 422 metres for local reception, and that of the special experimental Station VK2ME, 28.5 metres, for overseas reception and re-broadcasting by the British Broadcasting Corporation.

The world-wide interest occasioned by the Eucharistic Congress in Sydney was increased by A.W.A. transmitting the proceedings to England and America through the Company's Experimental Station VK2ME, and the successful re-broadcasting in the latter country.

Overseas Broadcasting—Continued

Another notable transmission was effected on January 10th, 1930, when the singing and talking portions of the Paramount "talkie" film, "The Love Parade," starring Maurice Chevalier, were transmitted from the Prince Edward Theatre, Sydney, to Commander Byrd. The transmission was effected on the 20 k.w. overseas transmitter designed and manufactured in Australia by A.W.A.

About half an hour after the transmission, Commander Byrd signalled back via San Francisco and A.W.A. Radio Centre, Pennant Hills:—

"2ME, Sydney. As Paramount's most southern representatives, at Antarctica, we are pleased to report your fine broadcast of the Paramount Sound Picture, 'The Love Parade,' enjoyed and greatly appreciated. This is the first sound reproduction received here. Admiral Byrd and inhabitants of the Antarctica join us in thanking you for your programme and best wishes.—Joseph Rocker and Willard Van De Veer, Paramount's Cameramen in Byrd's Antarctic Expedition."

Short Wave Telegraphy and Telephony.

The successful development and application of short-wave wireless telegraphy and telephony has revolutionised long-distance wireless communication.

In 1922 the Wireless Research Engineers of A.W.A., working under the guidance of Mr. E. T. Fisk, commenced experimental work in Sydney in connection with short-wave wireless communication, resulting in the achievement of many long-distance records. In January, 1924, the first successful transmission of low-power short-wave signals was effected from England to Australia from the Marconi Station at Poldhu, Cornwall, to Mr. Fisk's Experimental station at Vacluse, Sydney.

During 1924, the Company installed a specially designed short-wave transmitter on the S.S. "Niagara," trading between Sydney and Vancouver, and at A.W.A. Radio Centre, Pennant Hills, near Sydney. So successful were the results that the S.S. "Niagara" was in touch with the Radio Centre regularly throughout the voyage to Vancouver and return, a distance of 7,000 miles, which constituted a record in Marine Wireless communication.

Another notable achievement by A.W.A. in short-wave low-power wireless communication was the record distance attained by the short-wave transmitter installed on the Commonwealth liner the "Jervis Bay" in September, 1926. During the whole of the voyage from London to Sydney and return, the "Jervis Bay" was daily in communication with A.W.A. Radio Centre, Pennant Hills. This is the longest distance worked by a merchant ship, and it is worthy of note that the short-wave apparatus was wholly designed and manufactured in Australia at the A.W.A.'s Radio-Electric Works.

Transmission of Pictures.

The successful transmission of pictures by wireless from Australia to England by Amalgamated Wireless during the later part of 1929 attracted much attention. The first pictures transmitted were those of Mr. Scullin (Prime Minister of Australia), Mr. Ramsay MacDonald (Prime Minister of England), and Mr. E. T. Fisk.

Experiments are being continued, and the time is approaching when the transmission of pictures by wireless will be the regular procedure. The distance covered by A.W.A. in these achievements is about treble that of any previous wireless picture transmission.

Overseas Telephony Experiments.

Radio history was made on November 1st, 1928, when Mr. Fisk added still another achievement to the many brilliant pioneering demonstrations of the Company. Representatives of the leading Sydney newspapers and Mr. Lawton, ex-Consul-General for America, took part in the first demonstration of two-way wireless telephonic communication between Sydney and New York. At the same gathering telephonic communication was also effected with Java, the voices from both New York and Java being as clear as if the speakers were talking in Melbourne or Brisbane.

The test was in every way an undoubted success, representing probably one of the most remarkable wireless achievements that have been carried out in Australia, or indeed in the world.

On December 19th, 1928, a successful wireless telephone test was carried out between Sydney and Amsterdam, Holland. On that occasion, the Secretary of the British Peace Delegation spoke with Sydney. During the following week, experiments were carried out between Sydney and Berlin, and conversation was successfully exchanged.

On September 1st, 1929, the first wireless telephone conversation between an Australian and English Minister of the Crown was carried out, when the Prime Minister of the Commonwealth, Mr. Bruce, carried on an easy and lengthy conversation by wireless telephone from A.W.A.'s Offices at Sydney with Lord Passfield, Secretary of State for Dominion Affairs, at the latter's home, fifty miles distant from London.

Sydney Town Hall lit from Genoa via Beam Wireless

One of the most spectacular wireless demonstrations of recent years was that achieved by the Marchese Marconi in collaboration with Mr. E. T. Fisk, on the occasion of the opening of the Radio and Electrical Exhibition at the Sydney Town Hall on March 26th, 1930. Aboard his yacht, the "Elettra," in Genoa Harbour, Marchese Marconi pressed a key, and one-seventh of a second later a festoon of 3000 coloured lights blazed forth in the Sydney Town Hall.

During the few weeks prior to this event, Amalgamated Wireless' and Marconi's engineers were in constant communication by wireless telephone, and every detail was scheduled.

At the time fixed, Marconi was informed by a Beam message from the Sydney Town Hall that all was in readiness. He immediately depressed a switch, thereby transmitting the necessary signals from his yacht. These were received at the Marconi receiving station at Dorchester, England, passed by landline to the Beam station at Grimsby, England, and thence flashed round the world to Australia. The signals were received at Amalgamated Wireless' Beam station at Rockbank, Victoria, and thence conveyed by 600 miles of landline to the Sydney Town Hall.

Up to this time the lighting in the Exhibition Hall was dim, but at the instant Marconi released his signals in the far away Italian Mediterranean, the switches operating 3000 lamps came into operation and the Sydney Town Hall was flooded with light. The success of the experiment was greeted vociferously by the large audience at the Town Hall. Marconi was at once notified by Beam Wireless of the successful lighting of the hall, and immediately replied, "Very best congratulations to all concerned."

This experiment is one of many that have been conducted between Marchese Marconi in Europe and Mr. Fisk in Sydney. In 1918 Marconi transmitted to Mr. Fisk the first direct wireless message between England and Australia. In 1927 they established a direct Beam wireless service between Australia and Great Britain.

Automatic Wireless Distress Transmitter.

A remarkable demonstration was given by Amalgamated Wireless recently of a radio transmitter invented and designed by the Company and manufactured in Australia, for sending out distress signals from small coastal vessels not equipped with wireless. The device is known as the Automatic Wireless Distress Transmitter, and is contained in a cabinet 3ft. 6in. high by 15in. square; it is thus easily placed in the chart room of even a small steamer.

In a moment of emergency the captain or any member of the crew, by operating a switch, causes the appliance to send out the International Alarm Signal, followed by the S.O.S. Within 30 seconds any person, though completely ignorant of wireless or of the Morse Code, can transmit an arrangement of letters which causes the position of the ship—latitude and longitude in minutes and degrees—to be transmitted.

The signals may be picked up by any vessel equipped with wireless, and, without any attention, the transmitter continues for 20 minutes to send out the distress signals together with the name of the ship and her position.

By winding a spring the device will continue in action for another 20 minutes if required, and as long as the spring is kept wound up, the transmitter will work continuously for 10 hours before the battery is run down.

An arrangement is also available by which a signal can be transmitted indicating that no further help is required.

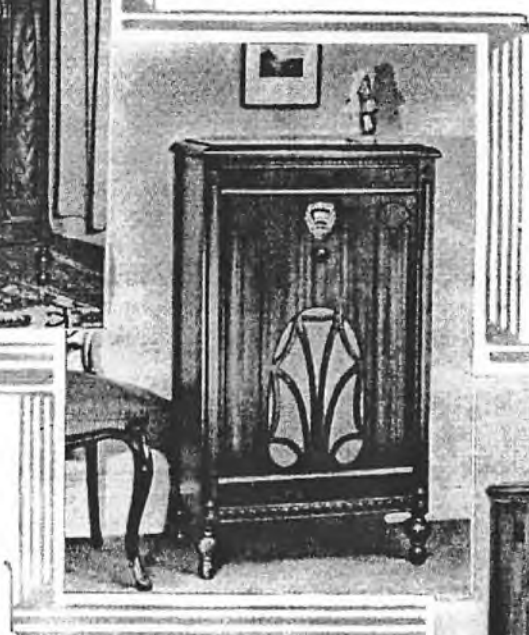
There are 168 vessels in the interstate trade on the Australian coast, none of which is fitted with wireless, the chief reasons being the cost of maintaining an operator and the value of the space necessary for his accommodation. The Automatic Wireless Distress Transmitter occupies practically no space yet meets all the requirements of the ordinary small coasting vessel, several of which have foundered within recent times without even being able to send out a message stating the cause of the disaster.

The device has been tested by the Commonwealth Navigation Authorities and the signal has been received by shipping and land stations on 7,272 occasions and for distances up to nearly 2,000 miles, although the actual range of the transmitter is nominally 100 miles. It is understood that the Navigation Authorities regard the Automatic Distress Transmitter as generally satisfactory.

The *Lisk* Series RADIOLAS



A.W.A. Duoforte Ninety



A.W.A. Radiola Forty



Radiola Console Model

Designed and Manufactured in Australia by
Amalgamated Wireless (A/asia) Ltd.

A.W.A. Radio-electric Works.

A.W.A. could not have made such headway had it not early taken the opportunity of establishing efficient manufacturing facilities in Australia. To such proportions have its manufacturing activities developed that to-day the Company's Radio-Electric Works at Knox Street, Sydney, replete as they are with the most modern production machinery specially laid out for the mass production of wireless apparatus, are inadequate to meet the production demands made upon them.

In pursuance of the Company's policy of expansion, it has recently completed the purchase of a new site and buildings on Parramatta Road, Ashfield, five miles from Sydney, for the development of its manufacturing activities.

The land, laid out in attractive lawns and gardens, contains an area of approximately four acres, with a frontage to the Parramatta Road of 303 feet. There are three modern factory buildings containing 75,000 square feet of floor area, and there is ample room for future extension of the existing buildings and for the erection of additional buildings as required.

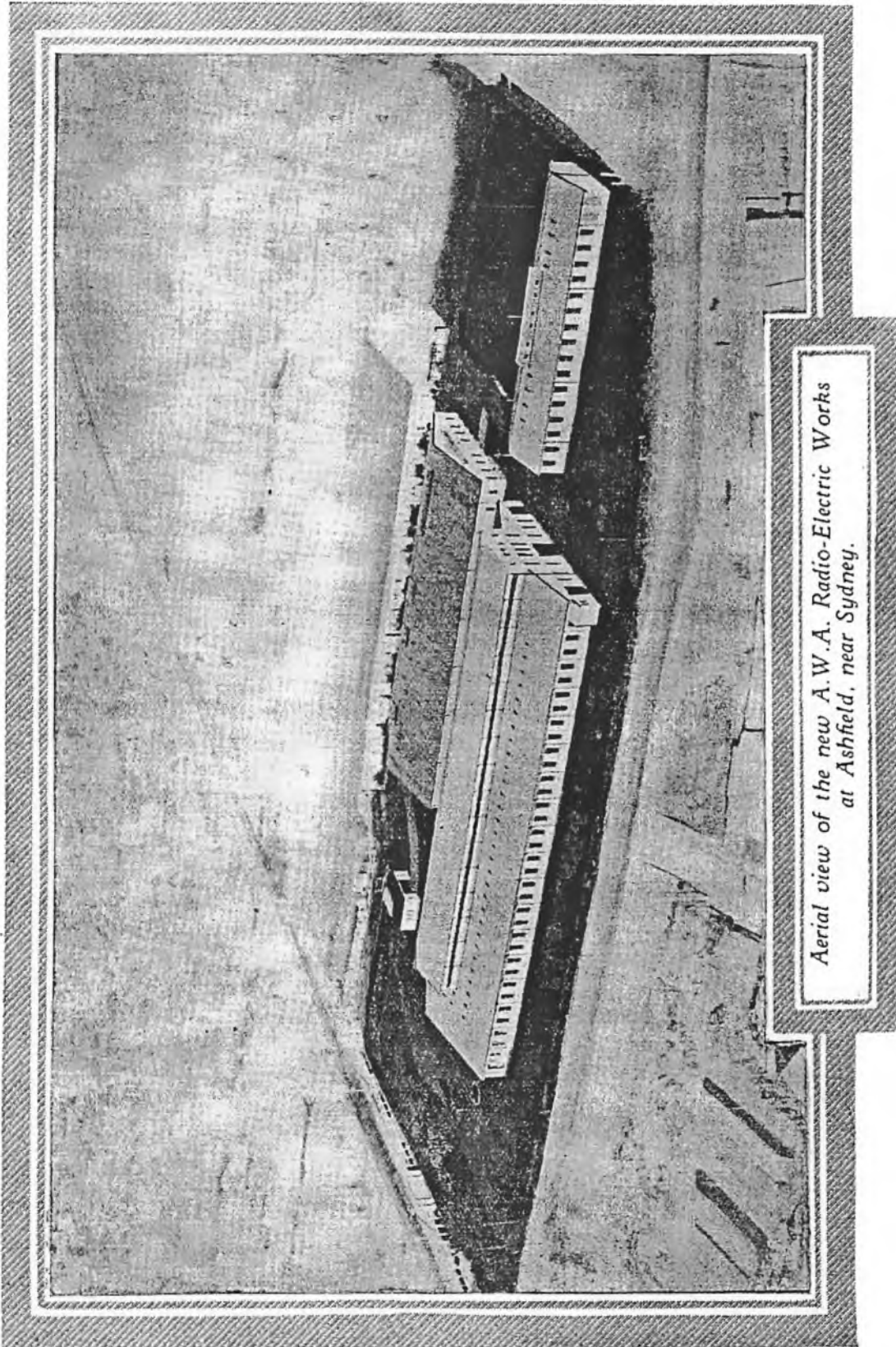
This is not a sudden growth of manufacturing activity, but the outcome of seventeen years' steady development in the design and production in Australia of all classes of wireless apparatus.

The wireless equipment in use on most of the ships of the Australian Mercantile Marine was produced at the Company's works, as well as such highly technical apparatus as the Beam Feeder Transmitters, installed at the A.W.A. Stations in the capital cities of Australia; the wireless apparatus installed at the Coastal Radio Stations dotting the seaboard of Australia, and the Company's Stations at New Guinea, Papua, Fiji, and at the various islands in the Pacific.

The principal Australian Broadcasting Stations are equipped with A.W.A. Transmitters, while the 20 k.w. Transmitter at A.W.A. Radio Centre, Pennant Hills, used for the Wireless Telephone Service to Great Britain and the Continent of Europe, and for overseas broadcasting, was designed and manufactured at the A.W.A. Radio-Electric Works.

Amalgamated Wireless is one of the few Australian companies which has found both a home and an export market for its products. As far back as 1916 complete wireless transmitting and receiving stations from the Company's works were shipped to New Zealand, East Africa, China, Japan, and the

Wireless Progress in Australia 1930



*Aerial view of the new A.W.A. Radio-Electric Works
at Ashfield, near Sydney.*

Wireless Progress in Australia 1930

Pacific Islands, and during the last few years a considerable quantity of Australian-made wireless apparatus has been sent abroad by the Company.

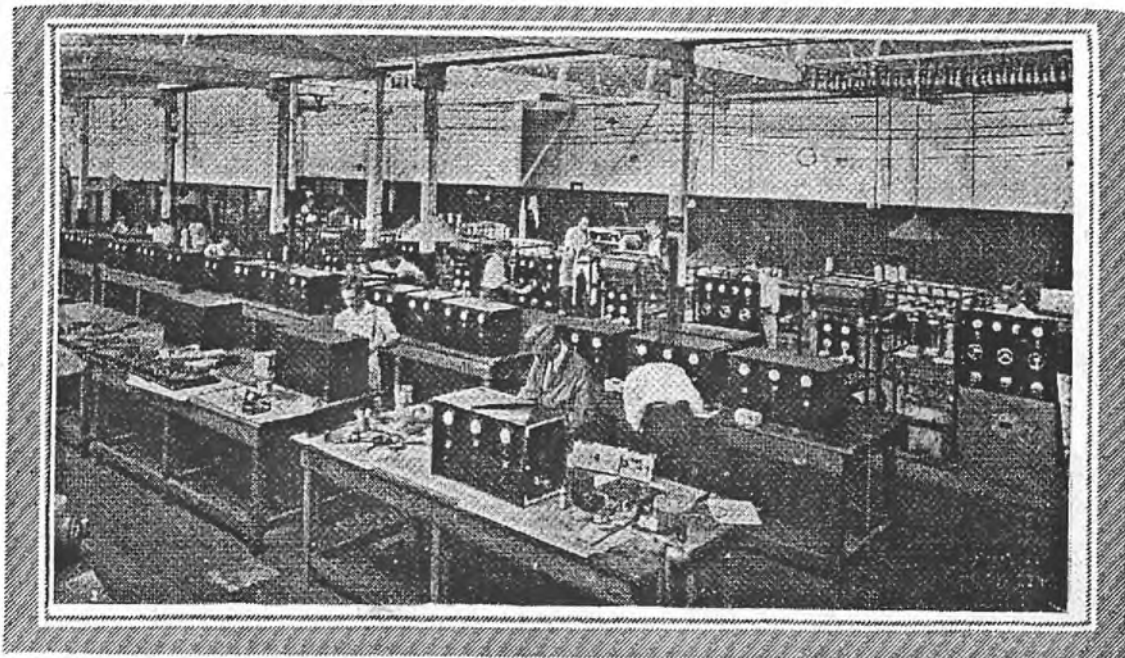
A modern 5 k.w. short wave telegraph transmitter and receiver was recently manufactured for the New Zealand Government, for installation at Tinakori Hills, Wellington; while modern A.W.A. transmitting equipment was lately installed at Lord Howe Island, thereby effecting economical communication between Lord Howe Island and Australia.

Modern wireless equipment has been installed at Suva Radio, while a $\frac{1}{2}$ k.w. short wave transmitter was installed at Apia (Samoa). A short wave transmitter is now in course of manufacture for installation at Nukualofa, in the Tongan Islands.

The Company's Australian manufactured apparatus is everywhere recognised by experts as being the equal in design and performance to apparatus produced overseas.

Thousands of "Radiola" Broadcast Receivers have been manufactured during the last six years, and such satisfaction have they given that to-day throughout Australia the "Fisk Series" Radiola is regarded as the finest Australian broadcast receiver.

The training of a specialised staff and the building up of Australian wireless manufacturing facilities are in keeping with the national aims of A.W.A., and should prove of value to Australia in times of both peace and war.



Manufacturing Transmitters at A.W.A. Radio-Electric Works, Sydney.

1930

RAYCOPHONE

5



ONLY RAYCOPHONE HAS

1

Raycophone is engineered throughout by Ray Allsop, founder of Station 2BL. It performs brilliantly in every test of sensitivity, selectivity and reproduction.

Raycophone gives you that real thrill which comes with owning a set which reaches out to the furthest limits of broadcasting. After a set of less power, it's just wonderful.

3

Raycophone has screen grid valves, 245 power valve, and Magnavox Dynamic Speaker, and its sincerity of tone is fully equalled by the beauty of its cabinetry.

2

Radio entertainment by Raycophone represents the finest entertainment value in Australia to-day. And Raycophone is yours for a small deposit and regular weekly payments.

4



Let us arrange a Free Home Demonstration without obligation, or send descriptive literature.

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1930

There is no Substitute for
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New Screen Grid
Stromberg-Carlson
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In radio there is no makeshift for *Quality*. It you want true reproduction you must have an instrument of superb tone.—A Stromberg-Carlson will gratify your fondest musical ideals and lend genuine grace to the room in which it is placed.

Ask your local Dealer to demonstrate to you the New Dante 36 Console. It is a masterpiece in appearance, selectivity and tone and it is equipped with the latest feature in Radio — TONE CONTROL. Remember, Model 36 Dante!

Stromberg-Carlson
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range in price
from

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Absolutely complete with all Accessories.



Important:
In the interests of the public, Stromberg-Carlson Radio Receivers are sold only through Dealers holding an Authorised Dealership Certificate, which is a guarantee of their ability to service our Receivers both before and after our twelve months' warranty against defective workmanship has expired.

EVERYONE FOR AMPLION

1931

AMPLION AB.7 SPEAKER

THIS Speaker is similar to the AB.6 type, but is housed in an Australian cabinet of beautiful design and finish. A cord is fitted, being connected to the "medium" terminals. If it is desired to alter, it will be necessary to unscrew back of cabinet to gain access to terminal strip.

Dimensions, 15 $\frac{1}{2}$ in. high, 15 $\frac{1}{2}$ in. wide, 8 $\frac{1}{2}$ in. deep.
Weight, 9 lbs.
Dimensions of carton (approx.), 17in. x 17in. x 11in.

Price - - - £5/10/0



AB.7

AMPLION STANDARD CABINET CONE (Balanced Armature), Model AB.6, Oak

THE cabinet, as illustrated, is of attractive design in oak, and is of robust construction. It is fitted with a 12in. paper cone, cellulose sprayed, and the unit is our special BA.2 Unit, with a sensitivity far above normal at low adjustment, to be made while the unit is in operation. When used with a good type of Radio Set, music and speech is rendered at full volume and without the slightest trace of loss of naturalness. The degree of amplification is remarkably well sustained, both for the deep bass notes and for the highest frequencies.

Dimensions (overall), height 15 $\frac{1}{2}$ in., width 15 $\frac{1}{2}$ in., depth 8 $\frac{1}{2}$ in.
Cone, 12in. diameter.
Weight packed in carton (approx.), 17 lbs. Average net weight (approx.), 11 $\frac{1}{2}$ lbs.
Dimensions of carton (approx.), 17 $\frac{1}{2}$ in. x 17 $\frac{1}{2}$ in. x 11in.

Price - - - £6/10/-



AB.6

AMPLION MODEL AB.6 CHASSIS

DESCRIPTION: As illustrated, this has a substantially constructed framework of especially treated oak or mahogany, 2in. x 3in., two pieces per side, glued and pinned tenoned joints, with corner triangular supports, 1 $\frac{1}{2}$ in. x 1 $\frac{1}{2}$ in. of Oregon pine.

The Cone is of cellulose sprayed paper, the edge of which is firmly glued to a continuous wool spill, which in turn is glued to a special cardboard front, fitted with cork cushions.

The Unit, our special BA.2 Balanced Armature Unit, is supported on a brass channel as shown above, and the driving wire is attached to the cone by an extremely efficient locking device.

Dimensions (overall), 13 $\frac{1}{2}$ in. x 13 $\frac{1}{2}$ in. x 4in. Cone, 12in. diameter.
Weight (approx.), 5 lbs. nett.

Price - - - £3/15/-



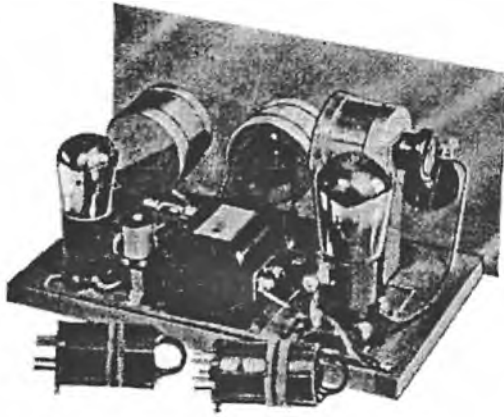
AB.6 CHASSIS

HINTS ABOUT THE AB.6 AND AB.7 SERIES

A MOST useful feature about the AB.6 and AB.7 series is the provision of three terminals which provide alternative connections giving a choice of three different impedance values, so that the unit may be matched to any of the types of output valve in current use. The three methods of connection are known as "Low," "Medium," and "High" resistance respectively, and these words are clearly engraved on the cover plate; the electrical constants are as follows:

Connections between Terminals marked	Impedance at 1,000 cycles	Inductance	D.C. Resistance of windings	Anode Resistance of output Valve recommended
Low	4,100 ohms	.65 Henry	500 ohms	Less than 4,000 ohms
Medium	7,000 ohms	1 Henry	700 ohms	4,000/10,000 ohms
High	22,000 ohms	3.5 Henries	1,200 ohms	over 15,000 ohms

Leaders **AMPLION** Since 1885



Spring & Summer Business! Keep it Going with the Improved DUFFY SHORT-WAVER

Gives the Supreme Thrill of Listening to Short Waves—
Simple to Operate.

Reaction Control Exceptionally Smooth.

Supplied either in Kit Form or Completely Assembled
in Cabinet.

KIT OF PARTS.—Including Panel and Shield, ready drilled,
blue prints of circuit wiring diagram, and coil winding
data.

PRICE — — — — £4/10/6

SET ASSEMBLED IN CABINET.—Including valves, ready
wound coils, etc., but not including Batteries or Loud
Speaker.

PRICE — — — — £8/17/6

All Assembled Sets are tested personally by Mr. J. Duffy at
Station VK3HR. Send for descriptive schedule.

Also stocked—The Pilot Super Wasp Short and Long Wave
Receiver for either AC or Battery operation, in kit
form or factory assembled and tested.

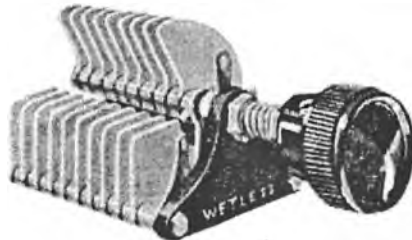
Loudspeaker Reception has been obtained from:

- | | |
|--------------|---------------|
| GESW England | F3ICD Saigon |
| FYA Paris | W2XAF America |
| DOA Germany | PLW Java |
| VEBCL Canada | RFN Russia |

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BRANCHES IN ALL STATES.

QUALITY FOREMOST!



● Wetless Midset Condensers are sturdily built,
and are suitable for either neutralising or
balancing. The plates are of lacquered brass, and
each condenser is provided with a special stop.



● Wetless Tubular type paper Condensers are
the greatest innovation in radio this season.
They are very compact, they require a minimum
of space, and are provided with very handy pro-
tects of tinned copper wire.

IS the foundation of the popularity of WETLESS products, amongst manufacturers and home set builders, in every State of the Commonwealth. Wetless condensers have been used with confidence since the inception of radio broadcasting in Australia and every radio man, of standing, knows that a condenser bearing the name "WETLESS" will always give the maximum of satisfaction in performance. For true economy and an end to your condenser troubles, insist upon the quality article bearing the name

WETLESS

1931

from the 'Edgar V Hudson' Wireless Catalogue of 1931



THE "TROUBADOUR" MANTEL RECEIVERS

ALL ELECTRIC

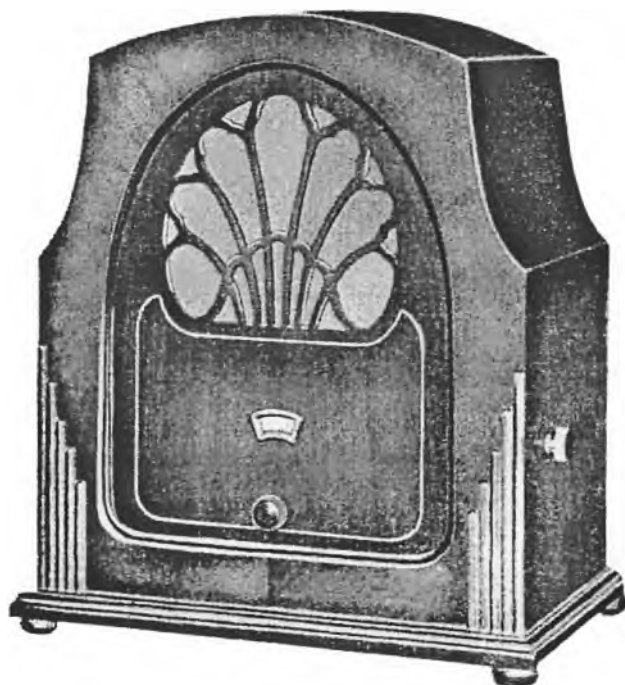
Three Models available in handsome two-tone wainut compact. "Mantel" Cabinet easily moved from room to room. Each embraces the special Troubadour Features—Screen Grid Radio—Single Dial Control—Volume Control—Tone Control—and All Nickel Finish Chassis, the emblem of quality.

TWO VALVE MODEL (and Rectifier)

The ideal small local Station Receiver, giving all Stations clearly and with excellent volume and exquisite tone. Employs Screen Grid Detector and Power Pentode Output and with Dynamic Speaker matched for the Valves. High grade construction throughout, not built down to a price. Dependable and fully guaranteed.

THREE VALVE MODEL (and Rectifier)

The De Luxe local station receiver with just that ability to bring in Interstate Stations that pleases. Double tuning and double Screen Grid giving selectivity and sensitivity with a Super Power Valve handling the attainable volume with clarity and wonderful tone. Dynamic Speaker, of course, included. Built like a rock and sensitive as a violin.



FOUR VALVE (and Rectifier) VARIABLE MU MODEL

The Latest Radio Achievement

Electricity Meter Mfg. Co. Ltd, always in the very forefront of Radio developments are the first in the Australian Market with a Receiver embodying the use of the Variable Mu. Screen Grid Radio Valves, Screen Grid Detector and high Voltage Pentode Output. The whole chassis is of distinct and radically new design, now exclusive to Emmco, but so fundamentally good that others must eventually copy. Totally novel improvements are:—New air cooled Power Pack—Completely insulated and rubber sprung gang condenser—Safety Electric Power Socket connection—Combined Pick-up Switch and Volume Control—Dynamic Speaker Plug Connection for all leads. The variable Mu. Valves allow of high sensitivity for Interstate reception without distortion of local Stations due to overloaded detector, and only has to be heard to be appreciated. The Interstate Receiver "De Novo and De Luxe."

1931



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TORCHES, LAMPS, REFILLS AND WIRELESS BATTERIES

1931

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Since Broadcasts began - more Mullard Radiovalves have been used in Receiving Sets throughout the Empire than any other British Valve--*Mullard—the Master.*

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* 2, 4 and 6 volts D.C.
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PHILIPS SPEAKERS

THE SEVENETTE

THIS is undoubtedly the finest type of magnetic speaker on the market. It is extremely sensitive and at the same time can carry large volume without showing signs of distress. It incorporates the special Philips 4-pole balanced armature unit, ensuring an excellent frequency response.

The coil is tapped, the tapings being brought to a switch which forms an effective tone control. The attractive case, which fully protecting the cone and the unit, also forms an efficient baffle.

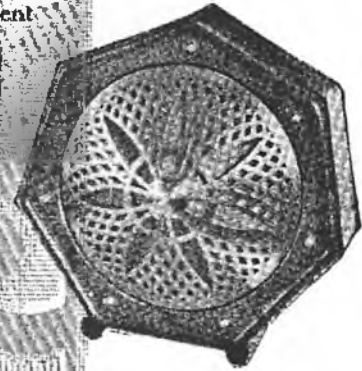
No precautions need be taken with regard to the polarity of the input phone tips.



THE PETER PAN

THE unit in this speaker is similar to that employed in the "Sevenette." The case is of non-resonant material forming an efficient baffle. The cone

is fully protected by the specially designed front plate. The triple tone control is incorporated in the lead.



THE NEW 2109

A DYNAMIC SPEAKER which, when used with a good receiver, gives uncannily natural reproduction. It has the great advantage of requiring no additional power for the field, it being supplied by a special permanent magnet. The one-piece cone is of treated fabric and there are no glued joints.

Type 2109 may be used with practically any make of receiver.

Type 2108 is without input transformer, for use with Philips radio-players.



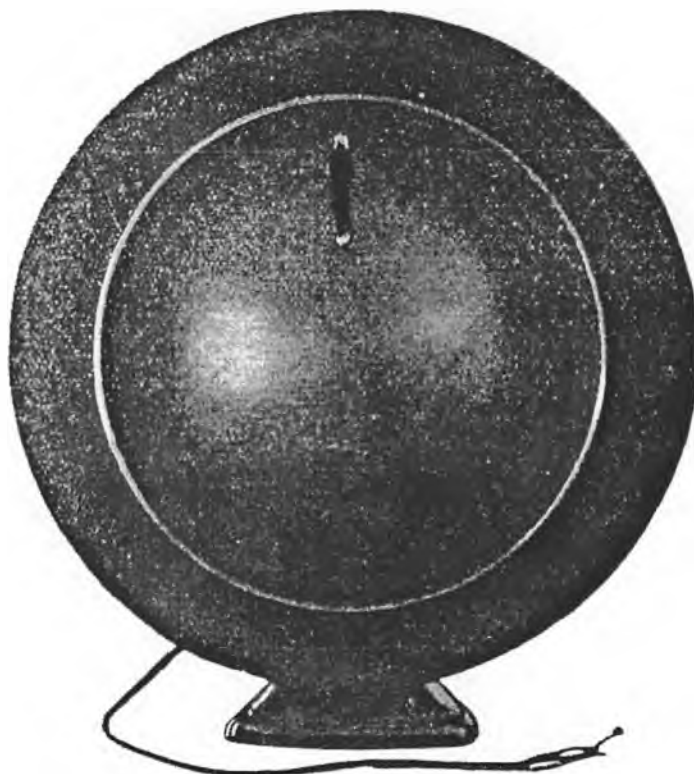
THE TWENTY-TWENTY

THE most popular "open cone" speaker on the market. Like other Philips magnetic speakers it incorporates the famous 4-pole balanced armature unit. A two-way tone switch is placed on the speaker. In common with all Philips types, it is able to carry large volume and comparatively heavy currents.

A special support permits the speaker to be either stood upon a table or hung from the wall or picture rail.



1931



Junior Price—Senior Reproduction

Every attribute of a really fine Loud Speaker is incorporated in the "PCJJ" Junior made by Philips. It is the younger brother of the "PCJJ," and operates on the same principle. The balanced magnet system actuating a full-floating parchment cone has been found to give perfect transformation from electrical to mechanical impulses. Thus, large volume is obtainable with perfect clarity and complete absence of blast.

Apart from its super-efficiency, the Junior is handsomely finished in a judiciously selected colour—Maroon—and looks well wherever placed. Ask your dealer to demonstrate it to you.

£5 : 5 : 0

PHILIPS
NEW RADIO

Real Volume with Philips New Power "Miniwatts"

Built essentially for power, the B405 and B409 Miniwatts will take all you can give them in volume, and put it into the PCJJ Speaker as clear as a bell.

Both of these valves have a phenomenal Mutual Conductance (2.4 and 2 mA/V respectively), which means greater amplification. At the same time, the negative grid bias necessary is not excessive.

The B409, which we term "High Gain," is excellent for last stage work, whilst the B405 power valve will handle even greater volume with perfect clarity.

CHARACTERISTICS:

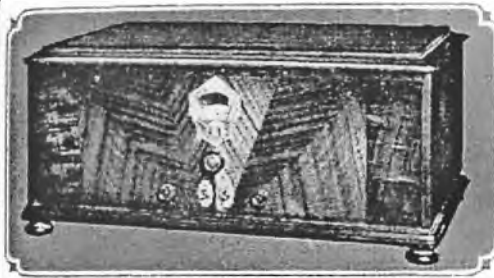
B409		B405	
Fil. Volts ..	4	Fil. Volts ..	4
Fil. Amps. ..	.15	Fil. Amps. ..	.15
Ampl. Factor	9	Ampl. Factor	5
Slope	2 mA/V	Slope	2.4 mA/V
Impedance ..	4,500 ohms	Impedance ..	2,100 ohms



1931



Battery Operated Receivers



No. 500 TABLE MODEL

Cabinet is finished in walnut veneers, and has a lift-up lid. The "B" and "C" dry-cell batteries are contained inside the cabinet. This model is used with an external loud speaker.

Great Distance—Tone—and Battery Economy!

No. 502 STANDARD CONSOLE

This model is beautifully finished in highly figured walnut veneers, and is equipped with lift-up lid with automatic stop.

All battery equipment can be housed inside bottom of cabinet.

Dimensions are: Height 3ft. 6ins.; Width, 2ft. 2in.; Depth, 11in.



Made in Australia by Standard



Telephones & Cables (Australasia) Ltd.

1931

SCREEN GRID PENTHODE

Electric Threes and Fours



Featuring:
TRouble PROOF POWER PACK
DYNAMIC LOUD SPEAKER
NOISELESS R.F. VOLUME CONTROL
PICK-UP CONNECTION

Prices: F.O.B. Sydney

Model 301	Local Three Valve model	-	£28-19-6	complete
" 401	Interstate Four Valve model		£35-12-6	"

1931



Featuring:
TROUBLE PROOF POWER PACK
DYNAMIC LOUD SPEAKER
NOISELESS R.F. VOLUME CONTROL
PICK-UP CONNECTION

Prices: F.O.B. Sydney
Screen Grid Penthode, Electric Three - £32-10-0
" " " " Four - £38-10-0
S.T.C. Electric Six, with Push-Pull Output £52-10-0

1931

"41" Series WITH TONE CONTROL



Featuring :

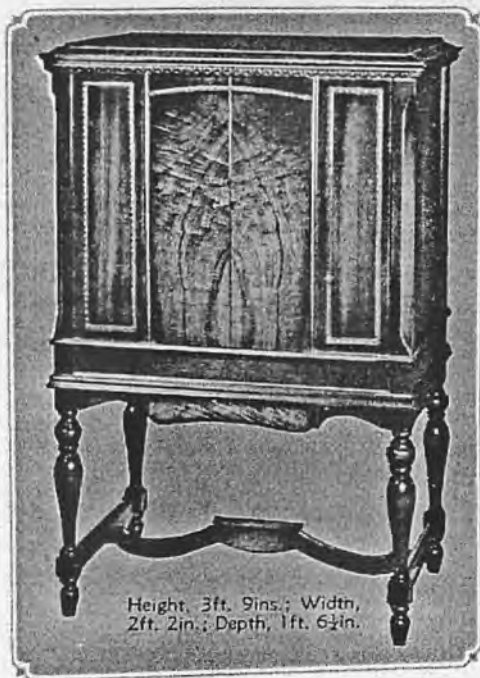
- 2 Screen Grid Radio Stages
- Screen Grid Power Detector
- Pentode Output
- Gramo. Pick-up and Local-Distance Switches
- D.C.C. Wound Power Pack

Available in Console Cabinet illustrated above
and two consoles overleaf.

1931



"70" SERIES WITH PUSH PULL



Height, 3ft. 9ins.; Width,
2ft. 2in.; Depth, 1ft. 6½in.

No. 703.—De Luxe Console, complete with
Dynamic Speaker.



Height, 3ft. 6ins.; Width,
2ft. 2in.; Depth 11ins.

No. 702.—Standard Console, complete with
Dynamic Speaker.

**Masterpieces
for tone and
Exceptional
Distance
Range**

Made in Australia by Standard



Telephones & Cables (Australas)

1931

EXCEPTIONAL DAYLIGHT RANGE



Featuring:

- 3 Stages New High Gain Radio**
- Grid Power Detector**
- 2 Stages Audio with Push Pull Output**
- Aerial Selector Switch**

Available in Console Cabinet illustrated above
and those overleaf.

AIRZONE FINE RADIO



No. 370.

THE most lovely piece of Radio furniture that has been seen in Australia. It is a perfect production artistically and is a masterpiece of Cabinet construction from the Factory of master craftsmen. It is constructed with the same care and materials as the finest of grand pianos and the finish is in keeping. Its quietly reserved lines give it dignity and distinctiveness.

It is built for those who definitely want the finest in Radio, and whose taste obliges them to put into their homes only what is beautiful. It is the "Broadwood" and the "Brinsmead" of the Radio world.

The Set itself is of Five Valves and Rectifier, using 224, 3-235's, 247 and 280. The Chassis is much above average in workmanship and performance, and like the Cabinet, is intended for the discriminating public through reputable dealers, who are glad and willing to enhance their reputation by giving the public Radio of the finest type.

£39/17/6

Twelve Months' Guarantee.

Obtainable from:
HEIRON & SMITH (Salonola) LTD., King Street,
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HILLSMITHS RADIO, Pitt Street,
And Others.

*Designed and made by AIRZONE (1931) LTD.,
16 Australia Street, Camperdown, Sydney.*

"Music Week" is August 27th to September 3rd—Listen in.

So Very Much Better



The
new
Deluxe

Jubilee

DYNAMIC SPEAKER

Retail
Price

85/-

"For the Critical Ear."

Remarkably faithful tonal quality embodied in a new and exquisite Chromium-plated, rustless finish. A veritable masterpiece of acoustic and manufacturing perfection.

At all Radio Dealers throughout the Commonwealth

Factory Representatives:
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THE BATTERY

FOR YOUR RADIO

THE CLYDE BATTERY

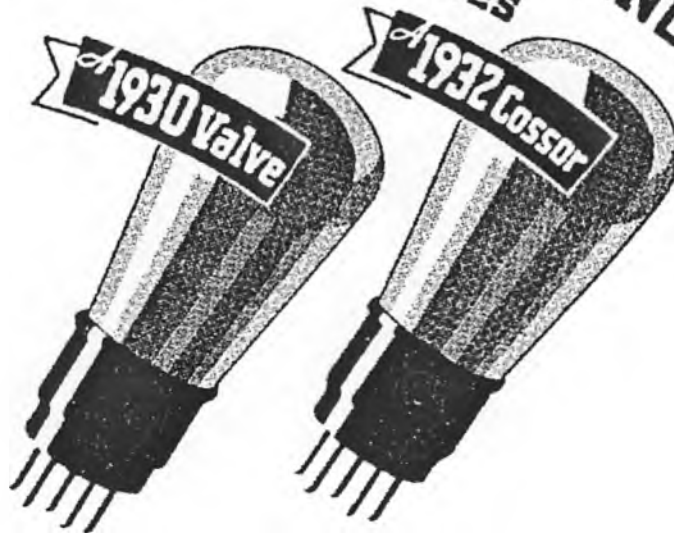
TRUE Battery confidence is reflected in the Clyde, a Radio Battery that has stood the test for the last decade. Made from the finest ingredients, manufactured to the highest standard in the world, the Clyde has earned a nation wide reputation for long life, high capacity and **DEPENDABILITY**.

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Clyde Batteries for Radio, Cars, Tractors, Buses, Home Lighting, Train Lighting, Power Schemes, etc., are made by The Clyde Engineering Co. Ltd., Granville, N.S.W., largest manufacturers of storage batteries in Australia. Obtainable at all Radio Dealers and Garages.

CLYDE

FIND THE DIFFERENCE ...in these two Valves



...they look alike-but that's all

Listen to the difference—that's the easiest and most reliable way to discover how much better 1932 Cossor Valves really are.

Listen and you'll hear definite proof that in the last two years, and even in the past few months, Cossor scientists have made very important discoveries—discoveries which enable these 1932 Valves to make many an old set better than when it was new.

Ask your radio dealer to let you *listen* to the difference 1932 Cossors can make to your set. Prove to yourself that you will never get the best from your radio until you use these modern valves.

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VALVES

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1932



Darelle sweeps the Radio World . . .
WITH THE

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A 4-VALVE SUPER MET.

This new product from the hands of Darelle engineers, embodies every single quality typical of Darelle—yet at a price so low that anyone can afford it.

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Compact — Beautiful cabinet work — Full vision tuning —
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OTHER DARELLE MODELS INCLUDE
5, 6, and 7 Valve Receivers in Standard
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AND THE PRICE
COMPLETE IS

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Radio-Phonograph Combinations, 5, 6, and
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Manufacturers to the trade of high grade components, including
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The NEW
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Full Vision Dial

The AVON Dial can be read from a
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Full Vision, Fixed Light, Geared
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Every separate cell in the New **EVER-READY WONDER BATTERY** is contained in its own individual insulating tube, immune from any possible leakage of current.

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See the New **EVER-READY WONDER BATTERY** — the outcome of over thirty-years' research—the product of the world's dry battery pioneers.

Manufactured by
THE EVER-READY CO. (GT. BRITAIN) LTD.
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AUSTRALIA'S BEST BATTERIES

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73 STATIONS LOGGED With GENALEX Receiver

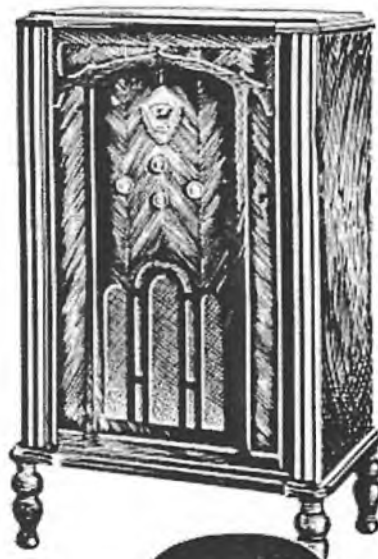


THE claim that Genalex Superheterodyne Receivers will bring in more stations than any other type of set with the same number of valves operating under similar conditions has been proved up to the hilt. No less than 73 stations in the ordinary broadcast band have been logged by a standard "Genalex" set—all with perfect clarity, beautiful full tone and freedom from interference.

Hear the finest of radio receivers at any "Genalex" Dealers.

Models from £25/10/-

Easy Terms arranged.

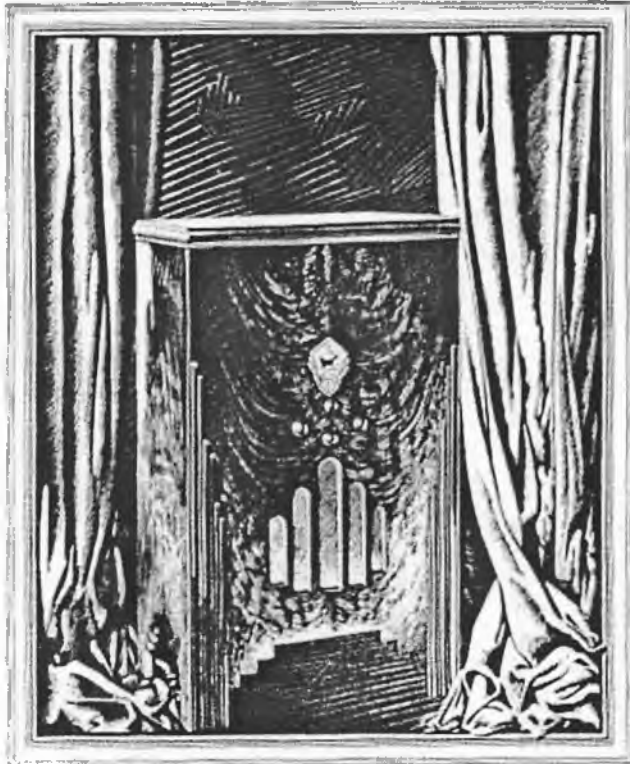


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*Embodying the
Famous English Made
Osram
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RADIO RECEIVERS

BRITISH GENERAL ELECTRIC CO. LTD.
"MAGNET" HOUSE, 104-114 CLARENCE STREET, SYDNEY. And at SCOTTISH HOUSE, NEWCASTLE



Announcing
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 ... All Electric
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Chassis, dynamic speaker and cabinet, all built in Australia. . . . Valves, the celebrated English Osram. Thus the proud claim that "Genalex" is made entirely within the Empire—a claim to be proud of, since all the world knows that Empire-built is honestly built.

Here in the "Genalex" Super-heterodyne "6" is a Receiver guaranteed to bring in every State and overseas stations. Here is "split-hair" selectivity, "B" class stations on the lower band coming in clearly and free from interference.

Here is amplification sustained uniformly from the highest to the lowest wave-length. Here is tone, dulcet-clear whether subdued to a whisper or amplified up to a clarion call.

Here in one, is radio enjoyment as you have always desired it—brought to you in cabinets of distinction and priced to meet the stringency of to-day.

De Luxe Cabinet (as illustrated) 44 10 0
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Hear the "Genalex" Receiver at any "Genalex" Radio Dealers, or at The B.G.E. Exhibition of Radio and Electrical Appliances.



Split-Hair
 Selectivity

Long-Range
 Reception

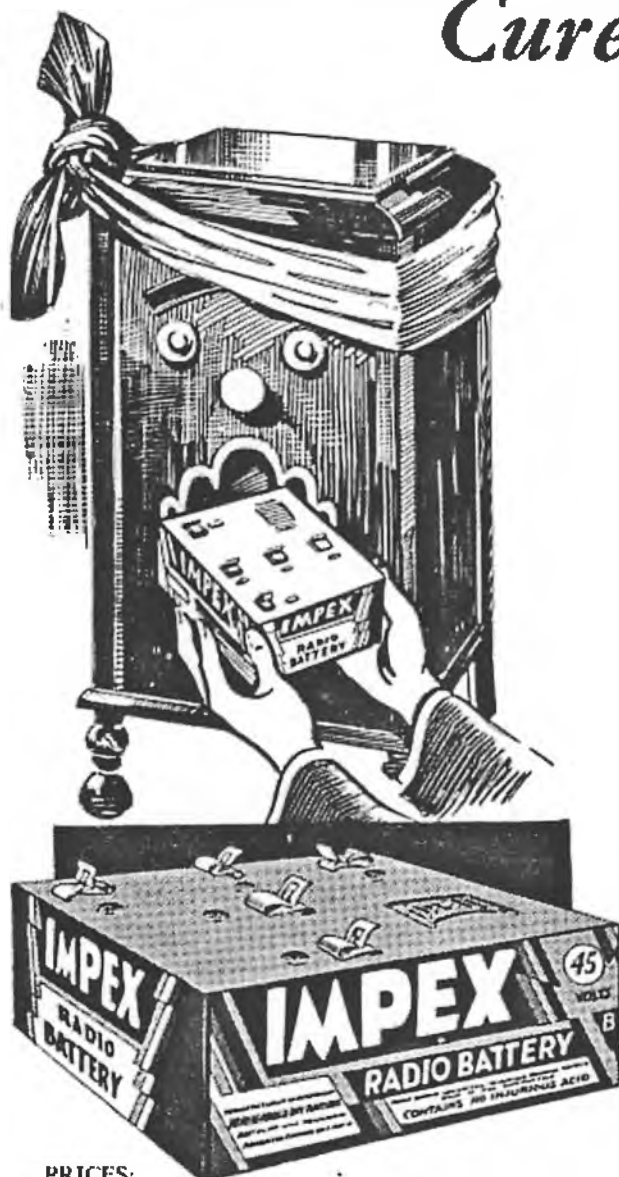
RADIO RECEIVERS
BRITISH GENERAL ELECTRIC CO. LTD.

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Cure: "IMPEX"



Static is often blamed for noises which are really caused by the battery. Innumerable listeners have given up trying for distant stations—they are even getting inferior local reception—as the undetected result of hattery noise.

Battery noises come from the faults of internal construction. We know precisely what those faults are, and we completely overcome them in making Implex Batteries. To do so we use purer chemicals, better metals, finer design and the patent processes used by Herberholds of Holland—the largest battery makers in Europe—whose knowledge is available to us in its entirety.

In a recent test of Implex "B" Batteries by an independent authority, no noise was recorded by an audibility meter even after the batteries had been discharging continuously for 712 hours.

Try Implex—get better tone quality and greater distance—without "imaginary static." From all good radio and electrical dealers.

IMPEX

DRY BATTERIES

CONTAIN NO INJURIOUS ACIDS

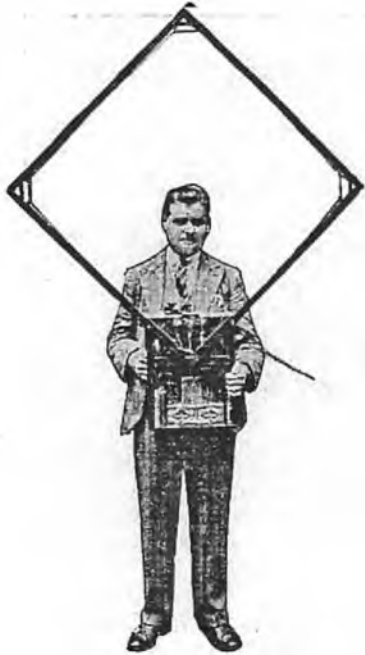
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THE WALKING

or "THE ROVING MIKE"

Don. B. Knock has had many and varied experiences throughout his career, from fighting with the Russian White Army during a hectic year or so after the Great War, to installing short-wave radiophone stations in the far North-West of Australia. A series of novel and humorous experiences are recounted by him in this article. We believe it will be read with more than passing interest by "Radio Monthly" readers.—Editor.

something in the way of a real and interesting change.

In 1925 the writer was one of the technical staff of the B.B.C. on a relay station in the North of England, and had occasion to take part in a very interesting "stunt" broadcast. In conjunction with the Radio Society of Great Britain, the B.B.C. arranged for a broadcast from the famous "Flying Scotsman," which leaves King's Cross station, London, nightly for Aberdeen. A mail coach next to the locomotive was fitted with a 50-watt telephony transmitter and an aerial system running the length of the coach. The microphone was suspended in the cab of the locomotive, and an announcer accompanied driver and fireman on the footplate. The radiation from the aerial system was picked up in the "wired wireless" manner via a reserved telegraph or telephone line, which naturally at no period is any great distance away from the railway track, and the modulated signal was continually monitored on a special receiver at the London end of the line. The output of this receiver was fed by land-line to the control-room at 2LO, the heart of the B.B.C. network, and simultaneously with the 2LO transmitter radiating the signal every B.B.C. station throughout the British Isles was able to feed the same programme locally. As the train roared along through the night at speeds approaching 85 miles per hour, not only were the comments of the announcer, driver and fireman heard, but such sounds as the click of wheels over the metals, the rapid swish overhead of a bridge, the swift rumble of the train through some small station, and the slam of the firebox door. As the train entered a tunnel the strength of the transmission diminished as the telegraph lines drew further away over the hillside, and returned as the train drew near the other mouth of the tunnel. It was a most interesting and successful "stunt," and will long be remembered by those who took part in it.

Then there was an occasion when Sir Alan Cobham gave flying instruction to a lady pupil at Hendon aerodrome. The plane was fitted with a telephony transmitter, and Sir Alan used a microphone strapped to his

cause there seems no reason to agree that the system used in England can be successfully applied to Australian requirements.

Taking our "B" services, we consider that, just for the reason that private enterprise means keen competition, the standard maintained to-day by any individual station must definitely be a high one, and that standard as maintained by many Australian "B" class stations is in our opinion second to none the world over. Even so, in some ways even private enterprise is not enterprising enough to make the most quickly of modern technical applications of broadcasting with a view to giving the listener something novel and interesting. In the earlier days of broadcasting the fact of an "OB" or "outside broadcast" was something out of the general run of things, and the listener found it a welcome change to be taken out of the studio for a while and to listen to some programme or other taken from some point over the land-line. To-day that is all a very stereotyped business and is accepted as a well-established form of broadcasting. What interests the listener most to-day in our opinion is what is described as "stunt" broadcasting, providing that the "stunt" is put over successfully and without any guesswork as to what it is all about. In this respect probably the American services lead, but we recollect that long before broadcasting reached the stage of reliability it is at to-day that England was busy giving listeners

FOR weeks the whole world has been talking about the forthcoming opening to the public of the Sydney Harbour Bridge, or at least that part of the world comprising Australia. Rumours of special and extensive plans for broadcasting during the big day of celebration developed into definite arrangements, and the culmination of affairs was that to private enterprise in the form of Station 2UW was entrusted the big job of letting the rest of Australia know just what was happening. Everyone interested in radio broadcasting to-day knows what a great success the undertaking proved to be, and how through the day of March the 19th 2UW, through the chain of 23 stations, kept thousands of listeners scattered all over Australia with not an idle moment. It was in connection with this big day of celebration that an idea long thought about materialised, and what had of necessity been looked upon by the writer as a technical experiment evolved into a valuable commercial success. We often have emphasis laid upon the statement that Australia is behind the rest of the world in broadcasting technique, but from our own viewpoint, which includes actual broadcasting experience with the B.B.C. in England in the earlier days, we are only too pleased to dispute such statements—at least where many of our Australian licenced or "B" class stations are concerned. Of criticism of the National Service we prefer to keep aloof, be-

BROADCASTER

By Don B. Knock

chest. Down below on the 'drome, a short wave receiver tuned into the 'plane transmitter, fed the output over the line to the London control and thence to all B.B.C. stations. The success of this experiment was followed by the memorable occasion when the famous Savoy Orpheans dance band went aloft in an air-liner and put their dance music over the air from the air.

Although England led the way with "stunt" broadcasts, we believe that very little is done in that country nowadays in that line, and we must turn to America for the latest novelties. In America the walking transmitter has been called into use as a most valuable asset to regular broadcasting programmes. The first occasion on which a portable short wave transmitter demonstrated its adaptability to enabling broadcasts from inaccessible places was in connection with a parachute jump from an aeroplane. At Curtis Field, Long Island, one day a parachutist climbed into the cockpit of a 'plane. Strapped to his back was a small rectangular box and over his face a mask-like harness. The box contained the small radio telephone transmitter and the harness the microphone. Up to 5000 feet climbed the 'plane, and then the transmitter was set in operation and the parachutist jumped. As he floated slowly to earth he told the whole of America, via the broadcasting networks, just what it feels like to float through a mile of space. Countless thousands were thrilled by his first-hand description, and thus a new era in broadcasting started.

It was realised that by means of low-powered transmitters, announcers, carrying their own miniature stations, could follow rowing races, golf players or any events which required a wide area of coverage. This idea was put into good use when the Graf Zeppelin made her maiden trans-Atlantic voyage in 1929. Floyd Gibbons, America's well-known news announcer, wandered all over the landing ground at Lakehurst carrying the same parachute set used previously and described the conclusion of the great flight through a nation-wide network of broadcasting stations. Since those days successful broadcasts have been made by specially designed low-

powered transmitters from submarines below the surface, and such portable equipment is used practically every day at some place or other in America.

In view of this method of getting at normally inaccessible places for broadcasting purposes, as the day of the opening of the Sydney Harbour Bridge loomed nearer it was at once realised that in some way or other a "Walking Broadcaster" could possibly be of some use during the day. Mr. F. E. Buckell, Manager of the Osram Valve Department, British General Electric Co. Ltd., and the writer had previously discussed

this subject of "stunt" broadcasting via a completely free to move portable short wave transmitter, and a further discussion led to a conference in the office of Mr. Oswald Anderson, Manager of Station 2UW Sydney. Mr. Anderson's enthusiasm for the suggestion completed the subject, and it was decided that the "Roving Mike" should on March the 19th put in the day at Manly, where in connection with the widespread celebrations many items of interest would be available, such as a tour through the streets, with interviews of prominent people, the Olympic Games from the Manly Oval, and the swimming carnival from the baths in the evening.

There was just a week to go when the construction of the transmitter was



¶ The "Roving Mike" and the two members of its crew all ready for the start.

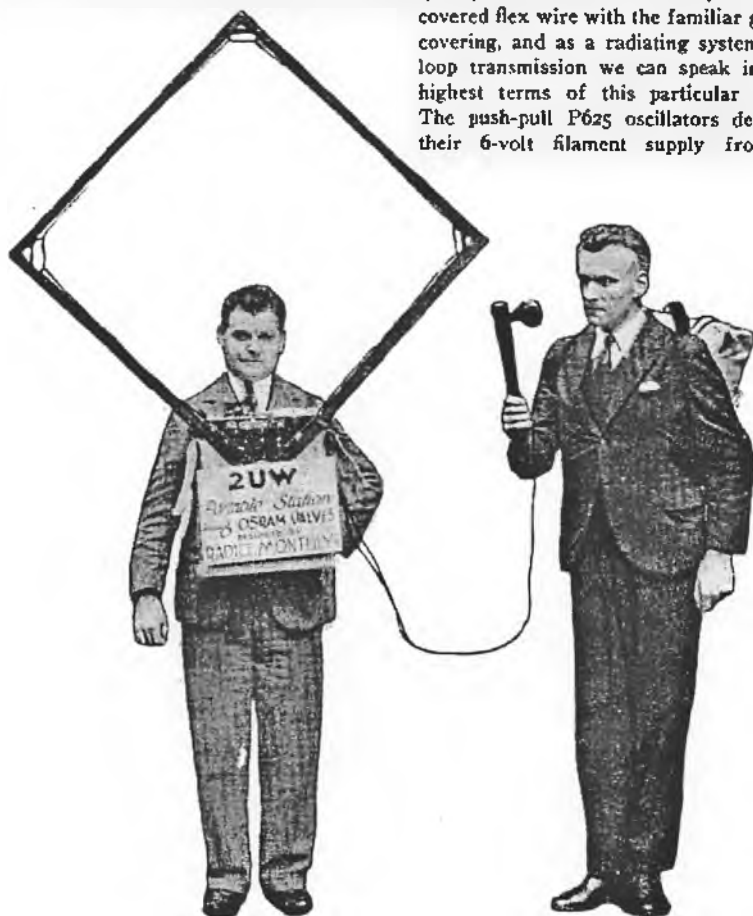
started, and owing to the only frequency available being considered by the writer as hardly suitable, it was with some fears for the success of the venture that the job was undertaken. It turned out that actually the frequency used was ideal. It was necessary to design the transmitter so that everything could be easily carried by two persons and yet provide freedom of movement and access to the microphone. The photographs show how this was achieved. The writer carried the transmitter and Mr. Buckell, the announcer, the microphone, and the B batteries supplying plate current.

It was obvious that in order to provide no handicap in movement that the whole equipment had to be arranged in some form of carrying cradle, and, with minds harking back to the days of yore, the ever useful and reliable army pack suggested itself as the means to the end. Accordingly the transmitter

itself was made of the correct physical dimensions to just slip into one pack, which the writer carried on the chest, and the B battery container to fit another, which Mr. Buckell carried in regulation style on his broad back. Two lengths of double flex between announcer and operator provided for connection to the plate supply and the microphone.

As many of the amateur transmitter fraternity will be interested in a few details of the transmitter these are given, but for commercial reasons exact specifications are withheld. The transmitter used two Osram P625 valves in the pure and simple push-pull "T.N.T." circuit. The radiating system is the oscillator "tank" circuit extended in the form of a loop aerial made to the correct dimensions for the frequency used, and the Telefunken method of modulation is employed. The loop aerial (tank) consisted of Lewcos special silk covered flex wire with the familiar green covering, and as a radiating system for loop transmission we can speak in the highest terms of this particular wire. The push-pull P625 oscillators derived their 6-volt filament supply from a

Diamond type No. 36 starter and ignition battery. This battery, along with all other batteries excepting the plate supply, was housed in the frame of the transmitter itself and operated by a control switch on the transmitter panel. For mobile use we consider these Diamond starter batteries ideal and the sort of power unit that instils a feeling of complete confidence; for the test we put the one in the "Walking Transmitter" to on this memorable day involved 10 hours practically continuous working. At the end of the day, which was 11.30 p.m. when we finally switched off, this battery was only showing the slightest voltage drop after the heavy load, and the next day it seemed all the better for use. Two Osram P625's with the filaments in shunt pull just half an ampere, which is a hefty load for continually working a primary cell. The modulator is an Osram L410 valve, with grid bias provided from a Diamond 9-volt cell, and the 4-volt filament operated by two Diamond 4½-volt C batteries in parallel. The microphone is energised by another 4½-volt C battery. It was essential that there should be no chance of grid leak breakdown, and against this contingency a Renrade 5-watt non-inductive 25,000 ohm resistor was provided. This was found to keep perfectly cool the whole time, and we can heartily recommend them to the amateur transmitter as a thoroughly reliable job for such a purpose. A Radiokes volume control of the new wire-wound type provided for gain control on the mike, and if any "ham" doesn't think this necessary with a hand mike and no speech amplifier when using Telefunken modulation on a T.N.T. oscillator, then let him try without and note the results! The mike used was a Stromberg-Carlson solid back Post Office type with a little doctoring. This doctoring was purely external, in the form of doing away with the mouthpiece and wrapping the shell of the mike in layers of sheet rubber taken from an old car inner tube. This was necessary to damp the mike enough to stop resonance. That very important question of plate supply presented itself, and we wondered how heavy a few fair-sized B batteries would feel after an hour or two walking about Manly under an Australian sun! It was essential to get somewhere around 300 volts and yet make everything compact, and at the same time to be able to feel that the plate "juice" wasn't going to fail. In the quest for a compact battery,



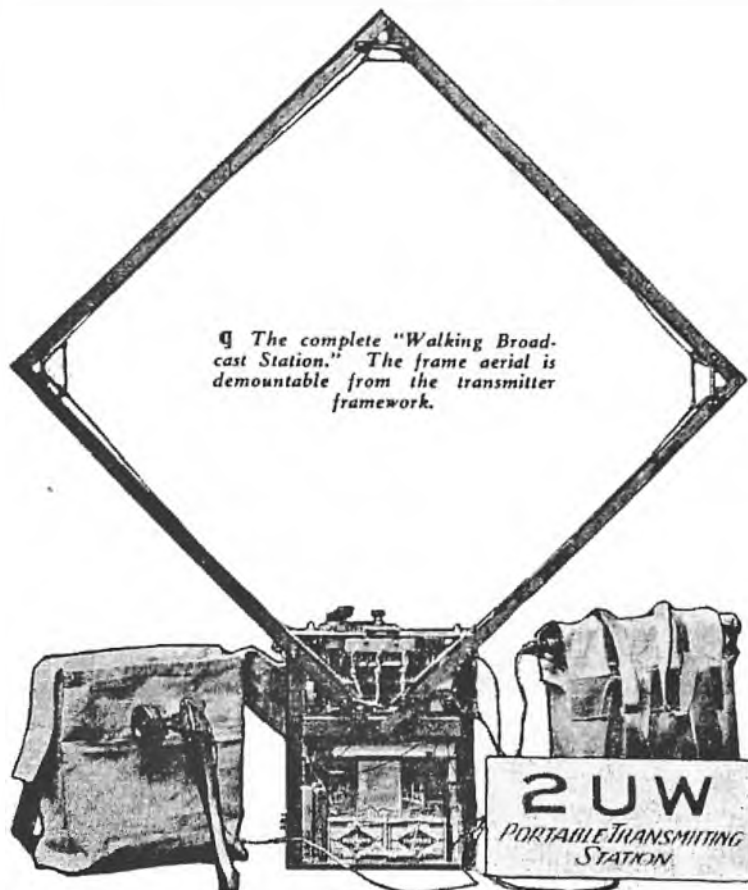
¶ The extreme compactness of the "Roving Mike" is splendidly illustrated in this picture. Mr. Buckell, on the right, carries the high voltage supply in his pack. Otherwise the entire transmitter is contained in the extremely small outfit carried by Mr. Knock.

Mr. Hobden, of the Eastern Trading Co. Ltd., came to the rescue with the neat little Impex 60 volt units, now manufactured in Australia. With five of these in the cradle we had our 300 volts, and we wondered what would happen when the oscillators got busy eating the current up. What did happen is a tribute to Australian battery manufacture. Throughout the testing periods of the previous days and the long ten hours of almost continuous working the Impex power supply drove the oscillators at a drain of 40 milliamperes, and at the end of the big day were almost as fresh as if nothing had been taken out of them.

It was, of course, necessary to have a short wave receiver working in conjunction with the "Walking Broadcaster" to feed the 2UW land-line point, and we are indebted to the whole-hearted co-operation of Mr. Syd. Maguire, of VK2XY, for providing this link. The receiver Mr. Maguire used is one of his own design modelled after the lines of the original "All Empire" battery receiver designed by the writer in 1928, thousands of which we know are in use to-day all over Australia.

The first actual two-way test of the transmitter took place from the writer's station VK2No with VK2XY. The night chosen was particularly bad for static, and owing to the rather low frequency used doubts were had as to whether the signal would bridge the intervening six miles through hills and houses, considering that only a loop aerial constituted the radiating system. Despite static, VK2XY heard every word spoken into the mike clearly, acknowledging receipt on the amateur 20 metre band. We subsequently heard that these test transmissions were received strongly over the Harbour in Mosman.

The night before March 19th a little gathering arrived at the residence of Mr. Watt, Editor of *Radio Monthly*, over in Manly, with two cars carrying Mr. Buckell, the writer, Mr. Maguire, and the equipment. The receiver was connected up with a kit of Cossor 4-volt valves, screen grid RF, triode detector and two audio stages, and special Diamond mobile type 45-volt battery units totalling 135 volts, and a handy Clyde 4-volt radio accumulator. 25 feet of bare wire was hung out of the window one storey above ground for a receiving aerial, and around midnight Mr. Buckell and the writer donned the "Walking Broadcaster" and started off



on a test tour around the streets. The results were phenomenal. At no time was the transmission less than full speaker volume, all the way along the ocean front, down on the water's edge and along the Corso. The tramp of our feet along the quiet streets sounded like a route march, and as we approached the sea front the people listening at the receiver could distinctly hear the breakers and the roar of the surf. The few people around the streets must have considered that we were strolling Martians armed with death rays or some other device as we loomed in sight, and very soon the inevitable small boys appeared as if by magic from nowhere. The writer confirmed the reception reports by taking over the receiver from Mr. Maguire while he set off with Mr. Buckell on a second test jaunt. Eventually the tired party sought slumber with confidence for the dawn.

7 a.m. found us down on the Manly wharf under the brilliance of a beautifully blue sky. It was at this wharf that the 2UW line terminated, and an enclosure was made with oil drums to

exclude curious persons. Standard Telephones Ltd. sent along one of their public address systems, which provided four hefty exponential speakers overlooking the entrance to the wharf. The output from the short wave receiver was taken through a line transformer to the line and also shunted across the public address system input. The result of this was that the P.A. system speakers told of the "Walking Broadcaster's" doings, and that 2UW could take the transmission over the line in the control-room as they required. It was a most uncanny feeling as Mr. Buckell and myself started off on the first occasion from the wharf. The P.A. speakers set up a howl owing to feedback from the mike until we got about 40 feet away, and then as we went further and further away, talking as we walked, the echo of Mr. Buckell's voice struck back with surprising force on our ears. We could hear what Mr. Buckell was saying in the form of a strong echo for a distance well over half the length of the Manly Corso.

During this first jaunt 2UW was busy with broadcasting from the Sydney Har-

WALKING BROADCASTER

(Continued from Page 15)

hour Bridge, and we put in the time giving the crowd of people around the P.A. speakers a series of observations of happenings on the Ocean Beach. On one occasion Mr. Buckell, on being requested, counted up to ten to test modulation, and we were afterwards informed that down in front of the speakers at the wharf the assembled crowd roared "Out" on the tenth count. A guide joined us and introduced us to important Manly people, who gave their boost for Manly through the mike in turn, and last and by no means least was the picturesque personage known as "Sweet Nell," who seemed to have a political point of view on Bridge happenings! In the rapidly increasing heat we strolled all over Manly, and after describing the start of a procession for the Oval returned for lunch and a much needed rest.

The afternoon found us at the Oval, where Olympic sports were in progress, including running, pole vaulting, lacrosse and baseball. Prominent members of the forthcoming Olympiad, due in Los Angeles, U.S.A., this year, said their say into the mike, and for a while we were able to take the harness off our shoulders and recline on cool green grass whilst describing events.

The big event for Manly came in the evening, where Australia's great swimmers, "Boy" Charlton and Noel Ryan, were to give a display of speed work, but before that happened we had an opportunity of giving something of a display ourselves. The owner of the well-known speed boat "Miss Speedy" asked us if we would care to take the "Roving Mike" out round the bay with him. We naturally agreed, and, with



¶ Missed her bows by a hair's breadth.

Buckell, in between taking showers of spray, persisted with his running commentary, although on one occasion he distinctly held his breath as the bulk of the Curl Curl ferry loomed threateningly. Seeming to miss her bows by a hair's breath we felt easier at mind—the gentleman at the wheel certainly knew his speed-boat. After arriving back at the wharf we were greeted with cries of "Wonderful! everything came through perfectly . . . the best stunt yet." This was great news, and we were very sorry that at the time 2UW was off the air for a respite after the hard day with a very full programme.

Crowds gathered round the "Walking Broadcaster" as a little later on we started along the front towards the baths for the big event, as by this time in the evening the unusual stunt had caused a great deal of comment. 2UW was taking us again by the time we moved off, and the 23 stations in the Trans-Australia link also. All went well for a while, Mr. Buckell indulging in the usual formalities of commentation, and then we reached the turnstiles, where considerable difficulty was caused in getting through with the loop aerial, etc. As we made our way to the starting point, every few steps the loop would crash against cross beams in the roof of the baths. Naturally I concluded that this portion of the transmission would be spoilt, but it transpired that no trouble was noticed at the receiver, such was the strength of the transmission put out by the transmitter. Fortunately, and most desirably for work of this nature, the modulated signal of such an oscillator is broad, which is just what is wanted for ease of reception. We stood for an hour or so at the baths, during which time an official obliged by describing the events for us, as we were not conversant with many of the contestants. At 11

p.m. the swimming came to an end, and we continued on our way back to the wharf, where Mr. Maguire was still faithfully at his receiver controls, and with a final "good-night" we switched off and willingly removed our now pressing encumbrances. The experiment had turned out to be an assured success, and we packed the gear up with a glow of satisfaction and the knowledge that a lot of useful ideas and modifications for the future had been gleaned.

We know that smooth organisation is necessary to make sure of the success of "stunt" broadcasting by the use of the "Walking Broadcaster," and that it cannot be undertaken in a haphazard manner. Those undertaking such work must essentially be experienced short wave engineers with plenty of knowledge of the exigencies of mobile work. The pick-up point for the land-line work must be tested out for reception at the point at the frequency it is desired to use, otherwise a short wave receiver may prove to be useless owing to some form of external interference. On the wharf at Manly we found that at intervals (fortunately rare) Mr. Maguire was sometimes unable to hear anything through great interference from the sparking commutator of an electric motor somewhere. We were unable to find the offending motor, and the swarthy owner of a suspected fruit store looked most hurt when we suggested that the refrigerator might be the cause.

It is intended to carry on the work in the interests of "stunt" broadcasting with the use of certain suitable frequencies, depending upon the conditions



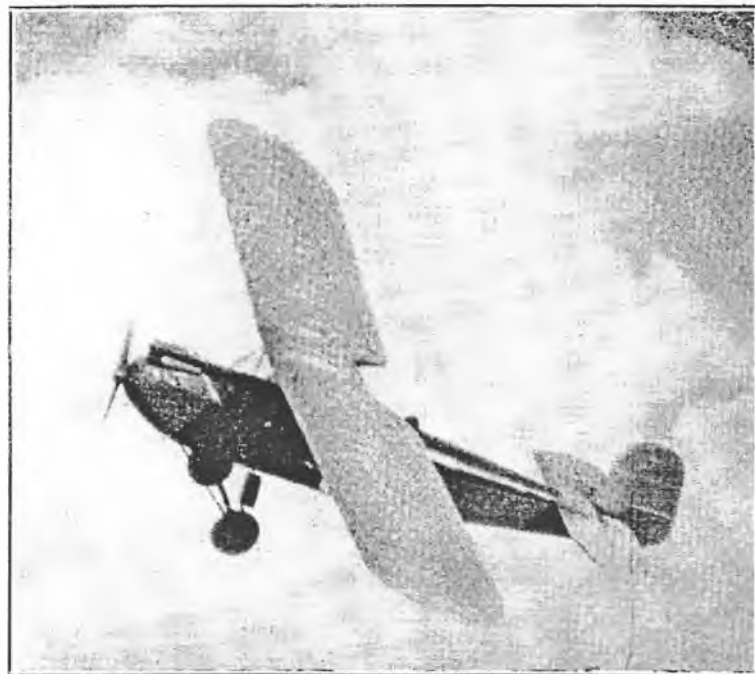
¶ Some embarrassment was caused by overhanging shop signs.

fears for the safety of the loop aerial, etc., hung on for dear life as the aquaplane roared away from the jetty. Mr.



¶ "Sweet Nell" has political opinions.

the mobile unit is to work under, and we predict that in the near future listeners to certain stations will find



Mr. Milton Kent in his Westland Widgeon secured some excellent shots of the Osram balloon over Manly. Mr. Kent has specialised for years in aerial photography.

WALKING BROADCASTER

(Continued from Page 40)

themselves eavesdropping on some rather novel transmissions which we are planning.

The writer, in conclusion, tenders his thanks to Mr. Frank Buckell, who will carry some memories of an arduous day as announcer through the "Walking Microphone" home to England with him this month; to Mr. Maguire, of VK2XY; to Mr. Reg. Rose, who supplied the Diamond batteries; Mr. Hobden, of the Eastern Trading Co. Ltd., for the supply of Impex batteries; the Liverpool Electric Cable Co. Ltd., for the Lewcos wire used in the transmitter; the B.G.E. Co. Ltd., for the valves; Mr. C. D. Maclurean, Cossor valve representative for Australia, for the Cossor valves used in the pick-up receiver; Mr. Oswald Anderson, of 2UW, for his interested co-operation, and Standard Telephones Ltd. for the tie-up with the P.A. system.

And to cap the day's happenings, what a shock we got when we reached the Sydney Harbour Bridge at midnight on the way to home and a much wanted sleep (not the kind of shock of the static breed that has since come to light in connection with the bridge), but the fact that we had overlooked that thousands of cars would be waiting to

make the first dash across the moment the great structure was opened for traffic. They were waiting alright—and it took us on that never to be forgotten occasion exactly an hour and ten minutes to get across, foot by foot, through clouds of blinding dust and the accompaniment of poisonous exhaust fumes and the protestations of burning clutches. Still, that bridge is something to be proud of, and the celebrations of that day gave us a new interest in the utility of short wave transmission!

WATCH THE BROADCASTING BILL.

(Continued from Page 40)

sibility, and it must be met. Without hesitation, *Radio Monthly* denounces the suggestion.

If these C Class stations are self-supporting, they will be robbing the B's of their legitimate means of existence, and the Government will be using public funds in competition with private enterprise. If they turn out to be non-paying propositions, it will mean that public funds are being used to bolster up an inefficient form of entertainment when they could be used to improve the programmes of the A Class stations. However this C Class idea is looked

at, no redeeming feature can be found for it, and *Radio Monthly* hastens to sound this warning note.

70 per cent. like B Programmes

It is hardly necessary to prove the popularity of the B Class stations, but *Radio Monthly* is indebted to Mr. Oswald Anderson, manager of Radio Broadcasting Ltd. (2UW), for the results of an interesting investigation into the respective merits of the A and B Class stations. At the instance of Mr. Anderson, 648 persons in the western and eastern suburbs of Sydney, North Sydney, and from King's Cross to Vaucluse, were interviewed. Of this number, 123, or 19%, preferred no particular station; 111, or 17%, preferred the A Class stations, and 414, or 64%, preferred the B Class stations. This means that for every one who preferred the A Class stations, nearly four preferred the B Class. In Victoria, the position was even more pronounced. So far as the canvass has progressed, 11% have no particular preference, 14% prefer the A Class stations, and 73% the B Class. In other words, more than six times as many Victorian listeners (of those interrogated) have a preference for the B Class programmes over the A Class.

Government Must Be Watched.

Here is something which cannot be overlooked. The B Class stations have been built up patiently at the cost of much brain fag and the expenditure of much private finance. The listening public will not tolerate an attack upon them by a Government department, especially when a Ministry is in power which was placed there for the express purpose of defending the rights of private citizenship as against socialisation and Government encroachment. The Broadcasting Bill, which comes before Parliament next week, and the general policy of the Postmaster-General are happily, not really, representative of the considered judgment of the Government, but they must be watched with the utmost care none the less.

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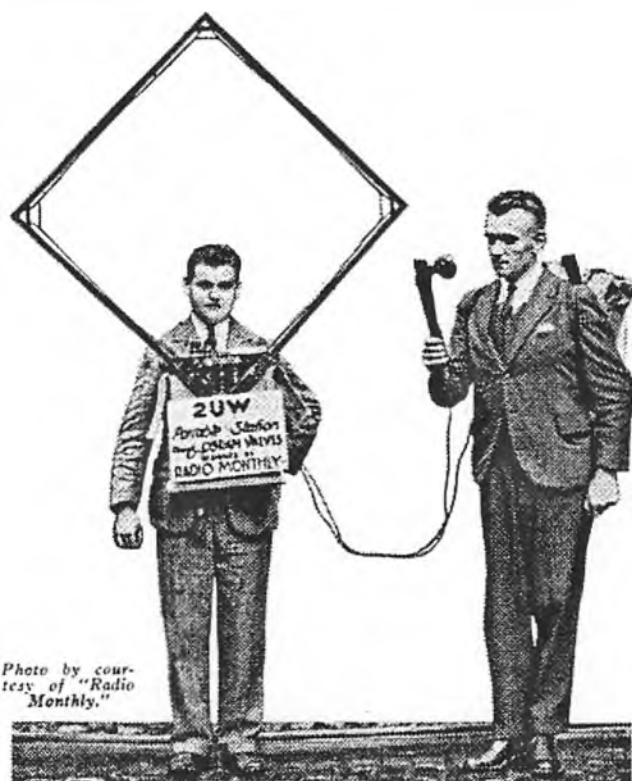


Photo by courtesy of "Radio Monthly."

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The "Roving Mike"

and

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For ten hours on Bridge Day, the "Roving Mike" wandered the streets, beaches and sports grounds of Sydney, and even went speed-boating. It transmitted interviews with celebrities, and descriptions and the sounds of the day, to 2UW for broadcasting and relaying. At times no fewer than 23 stations throughout Australia were transmitting the "Roving Mike's" messages. From first to last, signals were full and clear. Full share of the credit goes to Impex Batteries, which formed the 300-volt "B" battery power supply, functioned perfectly, and after the transmission recuperated rapidly.

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RADIO Monthly

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RADIO Monthly

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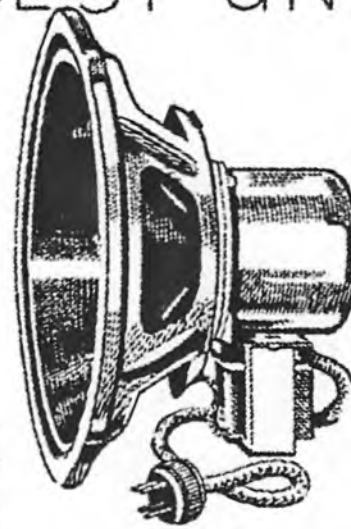
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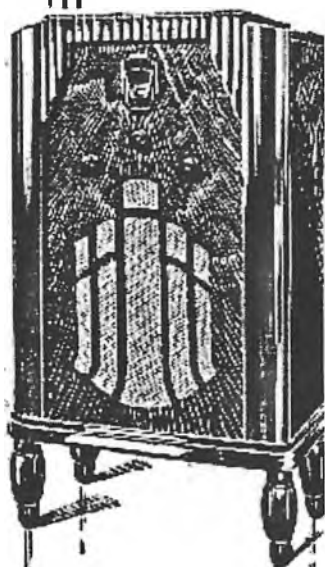
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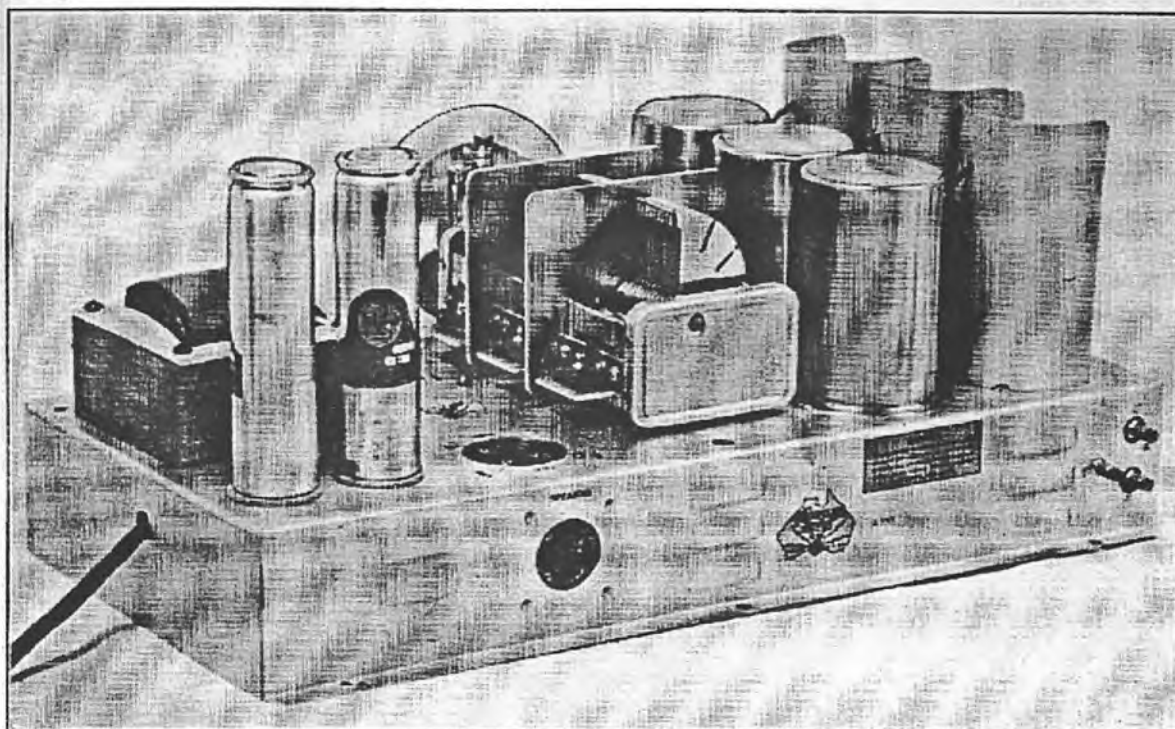
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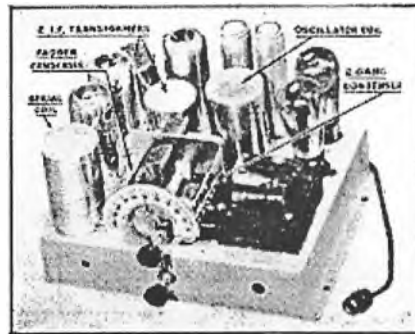
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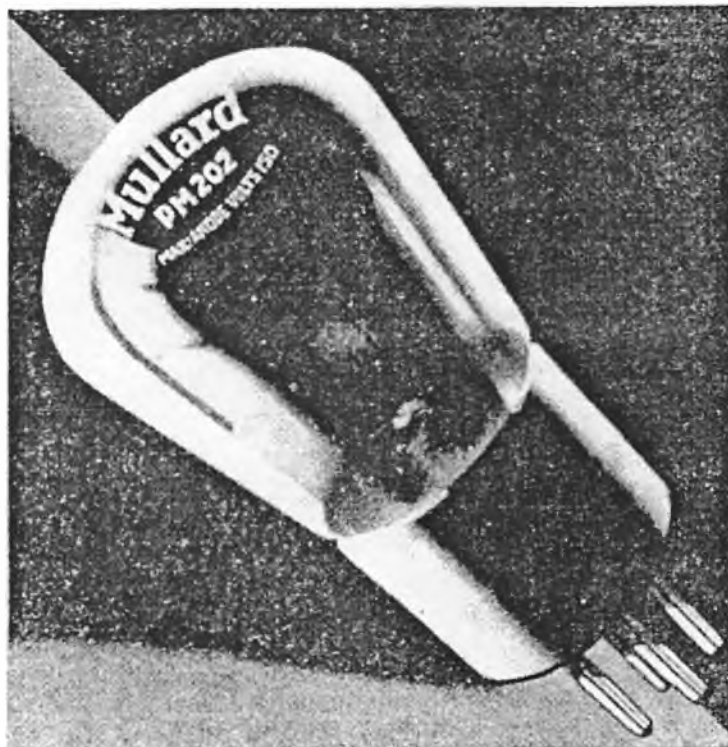
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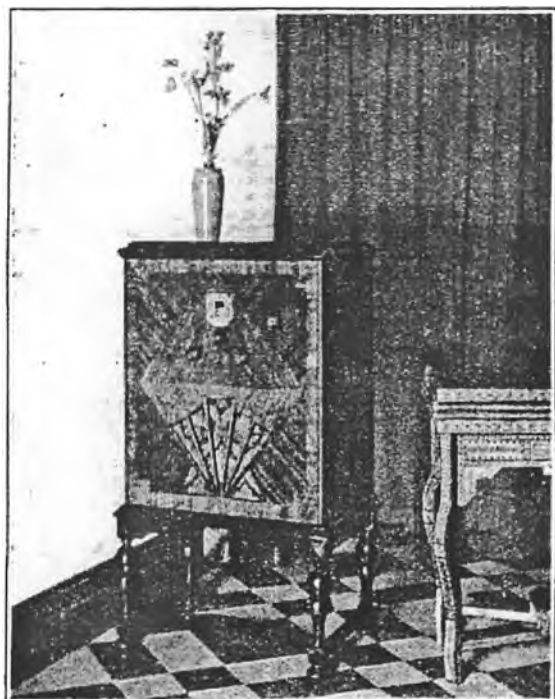
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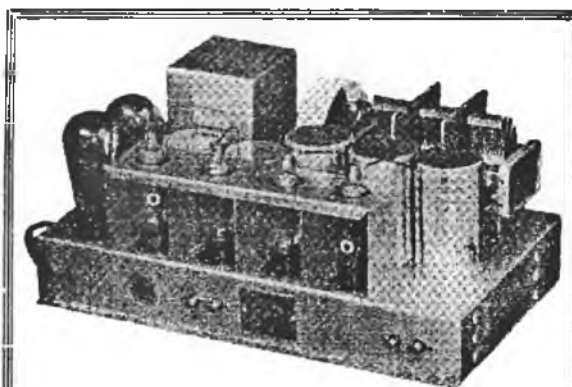
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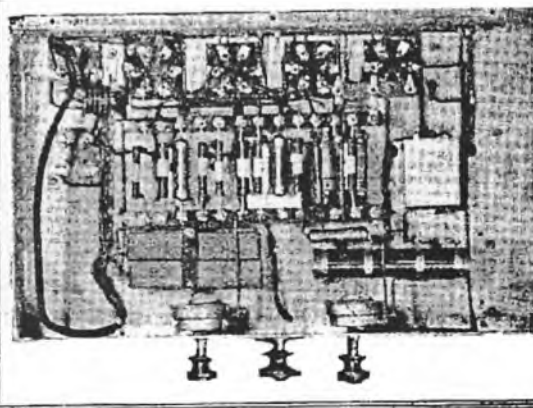
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PHILIPS.—3 Philips A443 Screen Grid Tubes, 1 Philips 6X43 Pentode.

R. ROBE.—1 40-Volt Dry Batteries.

CLIDE BATTERIES.—1 6-Volt Accumulator.

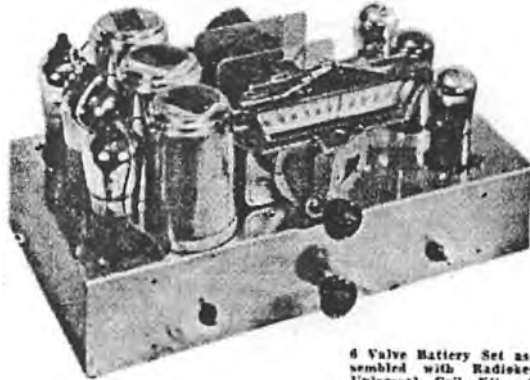
SPEAKERS, LTD.—1 Amphen Fernagnetic Dynamic Speaker.

FOR PUSH-PULL AUDIO—EXTRA PARTS REQUIRED.

RADIOKES.—1 Radiokes Improved S.P.A.T., 1 Radiokes Improved S.F.A.C.

W. J. McLELLAN.—1 1 Mfd. Fixed Condenser.

PHILIPS.—3 Philips A413 Tubes.



6 Valve Battery Set assembled with Radiokes Universal Coil Kit. A marvellous performer.

DISTRIBUTORS FOR N.S.W.:

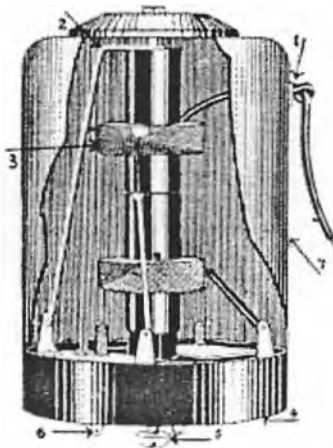
Ditch and Gerber, Ltd.; Noyes Bros. (Sydney), Ltd.; Martin de Lussan, Ltd.; Fox and MacGibboney, Ltd.; Lawrence and Hanson Electrical Co., Ltd.; Harringtons, Ltd.

RADIOKES
The Name to Know in Radio!

Outstanding Developments

RADIOKES PRECISION PRODUCTS

1. Grid lead through can.
2. Can earthed to cathode.
3. Small Coil, efficient and sharp tuning.
4. Bakelite moulding houses trimmers.
5. Simple single hole mounting.
6. Lugs protected by moulding. Chassis acts as bottom screen.
7. Neat can.



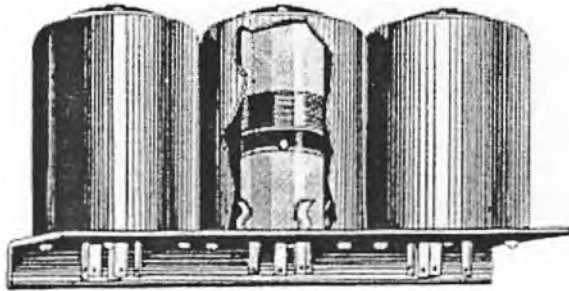
RADIOKES NEW INTERMEDIATE FREQUENCY TRANSFORMERS.

Look at the illustration of this New Intermediate Transformer, see all the features shown on this sketch. Can you get all these in any other make?

That is why, if you want the absolute best, you should specify Radiokes. The Intermediate Transformers are for top of chassis mounting and give a perfect layout and splendid appearance.

Type No. 5-6 465 K.c., 5-7 650 K.c.,
5-8 175 K.c.

THE NEW SUPERHET. TUNING UNIT, TYPE No. 5-1, comprises 3 Coils, Aerial, R.F., and Oscillator, all of which conform to the new series specifications. The whole 3 are mounted on bracket for sub-panel mounting in the receiver. They are wound on bakelised-cloth low-loss formers. Simple mounting device, and convenient soldering lugs projecting through the bakelite base at the bottom of the can.

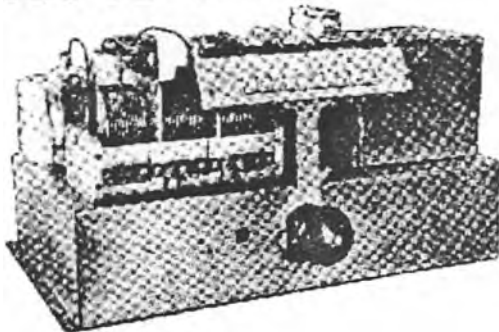


Write in to-day to Metropolitan Electric Co. Ltd., Tracy House, Cleveland and George Streets, Redfern, enclosing 1s.6p. in stamps to cover postage of a free copy of the New Radiokes Book, which embodies the full range of the most recent developments in "Radiokes Precision Products."

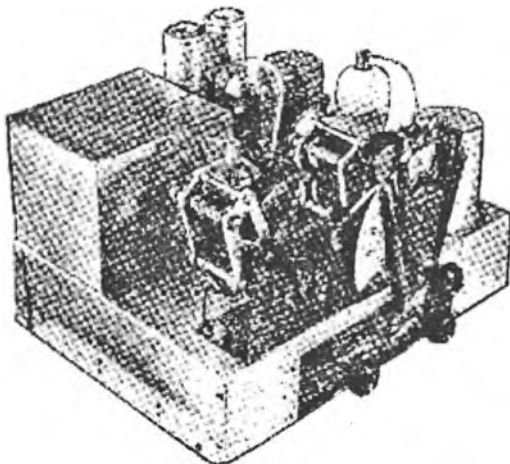
RADIOKES

The Name to Know in Radio!

The Challenge -
Against high noise level
in Superheterodynes
 BY
RADIOVISION



*Radiovision Superheterodyne 3 (and rectifier).
 The special economy model with the daylight
 performance.*



*For use with any receiver. The Radiovision Short Wave
 Superhet Converter enables your broadcast receiver to
 cover from 15 to 20 metres.*

THE Superheterodyne is undoubtedly the Broadcast Receiver of the future. Treated intelligently, the development of the famous superheterodyne principle in its modern form, provides the complete answer to the exacting demands of broadcast entertainment. Some versions of the modern Superheterodyne pay primary attention to freak reception of foreign stations operating on the normal broadcasting band—to the accompaniment of unwanted noise background and the exclusion of actual entertainment. To satisfy the need for the combination of Perfect Tonal Quality, satisfying selectivity and reasonable distance capabilities comes the

RADIOVISION SUPERHETERODYNE
 "The Superhet. that is Better"

RADIOVISION (A'sia) LTD.

N.S.W. Factory Representative: **DOM. S. KNOCK.**

Phone: 8 5749

2nd FLOOR, WINGELLO HOUSE, ANGEL PLACE, SYDNEY.

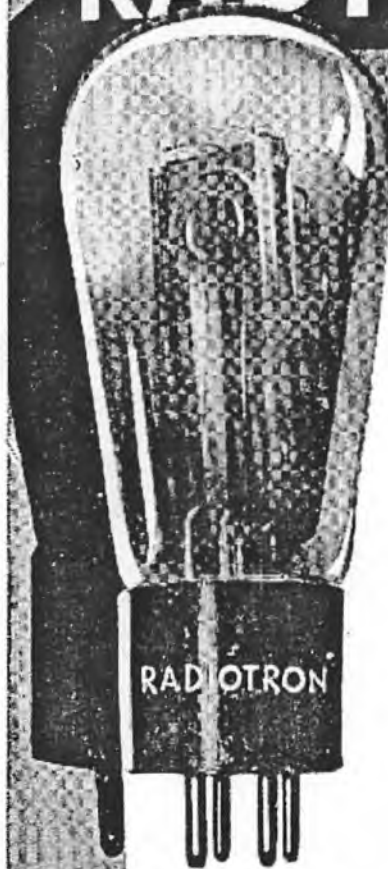
When the talk
turns to Radio —

it will be found that those getting
the best reception are utilising
Radiotron Valves in their receivers.



RADIOTRONS

THE WORLD'S STANDARD
OF PERFORMANCE !



For over ten years they have been
recognised throughout the world as
the standard valves of the entire Radio
Industry.

For long life, consistent performance,
distance and durability, Radiotrons are
unequaled.

Take home a set of Radiotrons to-night,
and mark the difference in reception.

Obtainable at all Radio Dealers

AMALGAMATED WIRELESS (A.SIA) LTD.

1932

Put **NEW LIFE**
into your Radio—
TO-NIGHT!



- Valves are vital for the best performance of your radio set—exceptional care must be taken in their selection. Poor valves can nullify the result of the most careful receiver engineering. Since the commencement of broadcasting, Radiotrons have been endorsed by the leading radio manufacturers as giving the maximum in selectivity, sensitivity and tone quality.

UX224A
UY227
RCA230
RCA231
RCA232
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RCA235
UX245
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New valves will improve the performance of your receiver. Insist upon Radiotrons.

AMALGAMATED WIRELESS
(AUSTRALASIA) LIMITED



RADIOTRONS

THE WORLD'S STANDARD OF PERFORMANCE

1932

Compare—and be convinced of the superiority of

RAMCO PRODUCTS

DIRECT FROM MANUFACTURER TO PUBLIC

NO SHOP RENTS

NO OVERHEAD

Easy Terms Arranged.

THE RAMCO 4-VALVE RECEIVER

At £15/10/-



Easy Terms Arranged.

No outside aerial required.

Maximum of power without hum.

Excellent sensitivity.

Beautiful Tone and Very Selective.

Floor Model Art Moderne Cabinet.

THE RAMCO 6-VALVE SUPERHETERODYNE

SPECIAL FEATURES:

Super Sensitivity Hairline Selectivity
Beautiful natural tone

Price is low — but quality very high

Price is £27/10/- COMPLETE,
in refined Floor Model Cabinet.

Guaranteed 12 months—Valves 3 months.



MANUFACTURERS OF RAMCO PRODUCTS

RADIO ACCESSORIES MANUFACTURING CO.

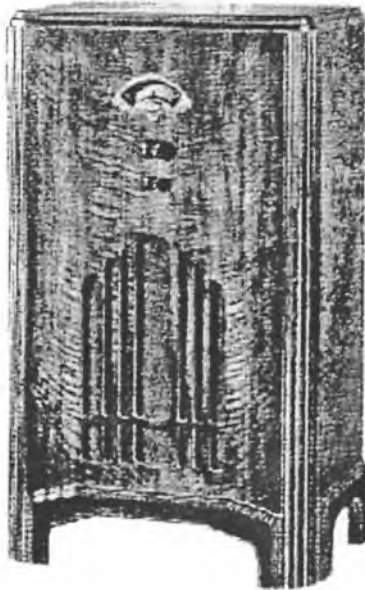
155 BOURKE STREET
SYDNEY

'Phone: FL 1323

Write or ring and our representative will call.

1932

ANNOUNCING Raycophone Modernised Superheterodyne MODEL 53E---FIVE VALVES



The Superhet that is years ahead—commences where others leave off.

Features significant advances in Superhet technique. A genuine one hundred per cent Superheterodyne, embodying Raycophone quality throughout.

Features a Triple-Grid First Detector and Triple-Grid Variable Mu Valves, also High Impedance Dynamic Speaker.

Buy your radio wisely—investigate, compare.

You will choose Raycophone for the lasting satisfaction promised by the greatest name in Radio. Hear Raycophone in your own home. Telephone Harringtons or your nearest Radio Dealer.

Console Model	£28/17/6
Mantle Model	£26/17/6

Of all Harringtons Dealers, and
HARRINGTONS, LTD.

Sydney, Melbourne, Brisbane, Adelaide,
Perth, Hobart, Newcastle, and
Katoomba.

RAYCOPHONE FOR 1932

Raycophone still ahead on quality! Supremacy more firmly established!

RAYCOPHONE 62E gives the market a new leader! By beauty of cabinet, by majesty of performance, by stereoscopic beauty of tone, its position cannot be challenged.

Special features include:—

PIANO FINISH CONSOLE in genuine Beale Veneer:

Exclusive STEREOSCOPIC TONE;

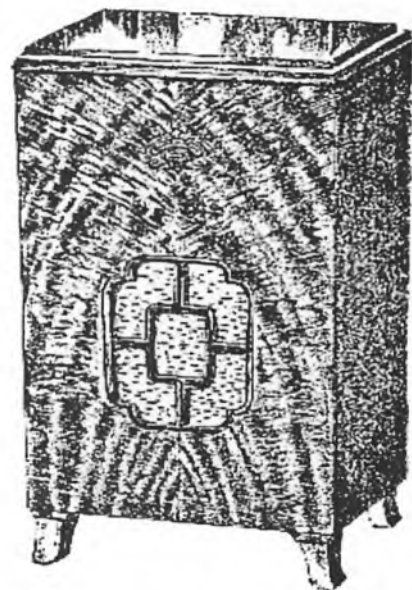
WIDE DIAL SEPARATION of B Class Stations;

PRECISION CHASSIS, utilising genuine Radio rons, specially matched—six valves in all.

Price: £37/10/-. Easy Terms.

In 1931 Raycophone made money for the Dealer—and satisfaction for the purchaser. For 1932 the promise is even greater. Raycophone presents the newest and most saleable series of Radio Receivers ever offered to the Radio Dealer and to the Radio Public.

Harringtons
PHOTO · RADIO · CASE · MERCHANTS



Wholesale—213 CLARENCE STREET.

Retail—386 GEORGE STREET, SYDNEY.

BRANCHES ALL STATES.

1932

THE "OLYMPIC FIVE"

with the
NEW SUPERPHONIC VALVES.

*A TRULY REMARKABLE SET
AT A REAL ECONOMY PRICE*

Keenly Selective and with Wonderful Tone.
Full Interstate Range.

CASH PRICE ONLY
£19/19/0

EASY TERMS:

£2. 19 - Deposit and 52 Weekly Payments of 7/1.

ALL SETS GUARANTEED FOR TWELVE MONTHS
FREE HOME DEMONSTRATION AND INSTALLATION

Heiron & Smith (Salonola) Ltd.

105 KING STREET
SYDNEY



April 21, 1932

RADIO Monthly

Page Forty-Five



12 Months' Guarantee
(excepting valves)

FREE { Demonstration
Installation

The "Salonola"

WONDER FOUR

*PARAMOUNT IN PERFORMANCE
and PRICE*

This Marvellous Set incorporates all the latest 1932 features.

VARIABLE MU and SCREEN-GRID VALVES
DYNAMIC SPEAKER — BEAUTIFUL CABINET
UNRIVALLED TONAL PURITY
UNSURPASSED SELECTIVITY

Cash Price £23/10/-, or Deposit £3 and
12 Monthly Payments of £1/16/11

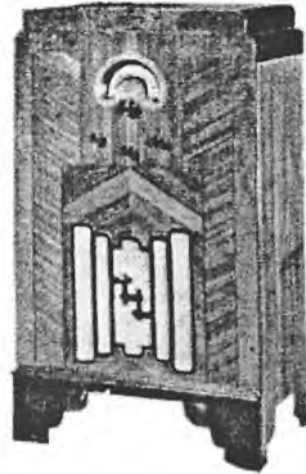
HOME RECREATIONS (AUST.) LTD.

105 KING ST., SYDNEY
'Phone: M 2355

88 HUNTER ST.,
NEWCASTLE

LOOK INSIDE THIS CABINET

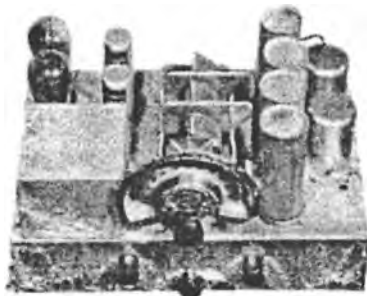
The attractive well-finished cabinets in which Seyon Sets are housed are but the finishing touch to receivers which have been thoroughly built, detail by detail, from the highest quality components. Added to clever design, these factors result in performance which gives lasting satisfaction. If you are a judge of radio, look inside the cabinet.



and you'll see why the

SEYON IS SUPERIOR

- SEYON "FOUR" for excellent reception of local stations £21-0-0
- SEYON "FIVE" by bringing in interstate stations, widens the field of entertainment £25-0-0
- SEYON "SUPERHET. SIX" caters for the modern demand for a set of extreme selectivity, capable of picking up all interstate stations, however distant £35-0-0



THE "SEYON" SUPERHET. SIX CHASSIS

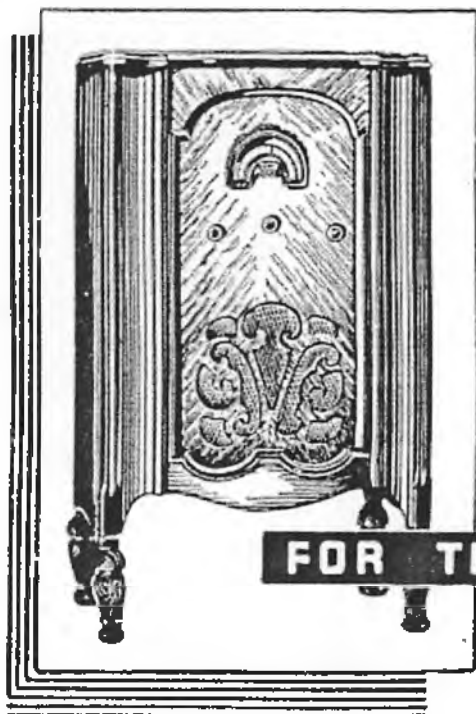
115 CLARENCE STREET, SYDNEY
Showrooms: 39 York Street.

NOYES BROS.

(SYDNEY) LTD.

Ring B 7581 (10 lines) and Noyes Bros. will arrange for a local dealer to demonstrate in your own home.

'Phone: B 7581 (10 lines)
11 Watt Street, Newcastle



It is here
... the ideal
Radio Receiver

FOR THE COUNTRY

MODERN apparatus is an absolute essential in the life of the man in the country ... For this reason, Stromberg-Carlson has designed a special Battery-operated Radio Receiver giving results equal to those obtained from a high-class all-electric model ... Daylight reception of interstate stations at full strength, low battery consumption, single dial control, and life-like tonal reproduction are just a few of the attributes of this remarkable instrument ... The Model 802 will give better reproduction and access to more broadcast programmes because it incorporates the Superheterodyne Principle of which Stromberg-Carlson Engineers are the Australian pioneers.

● Stromberg-Carlson

**BATTERY
OPERATED**

Superheterodyne

FOR LONG DISTANCE
DAYLIGHT RECEPTION

Stromberg-Carlson Model 802 Battery-operated Superheterodyne, complete with the new 2-volt Valves, Batteries and all accessories

£45'12'6



SPENSER
MODEL



CONVERTIBLE MODEL



AND FOR TOWN

Or wherever ALTERNATING
CURRENT is available

THERE IS NOTHING FINER THAN A

Stromberg-Carlson

532 or 632

Superheterodyne

WRITE or RING
NOYES BROS. (Syd-
ney) Ltd., who will
arrange for a local
dealer to demonstrate
in your own home.

SPENSER 532 16 Valves and Rectifiers	£35/15/-	CONVERTIBLE 532 16 Valves and Rectifiers	£39/10/-
SPENSER 632 16 Valves and Rectifiers, complete with Automatic Changer)	£40/-/-	CONVERTIBLE 632 16 Valves and Rectifiers complete with Automatic Changer)	£43/10/-
Complete Phono-Radio Assembly. £15/15/-			
<small>Fully Equipped Easy Terms available if required</small>			

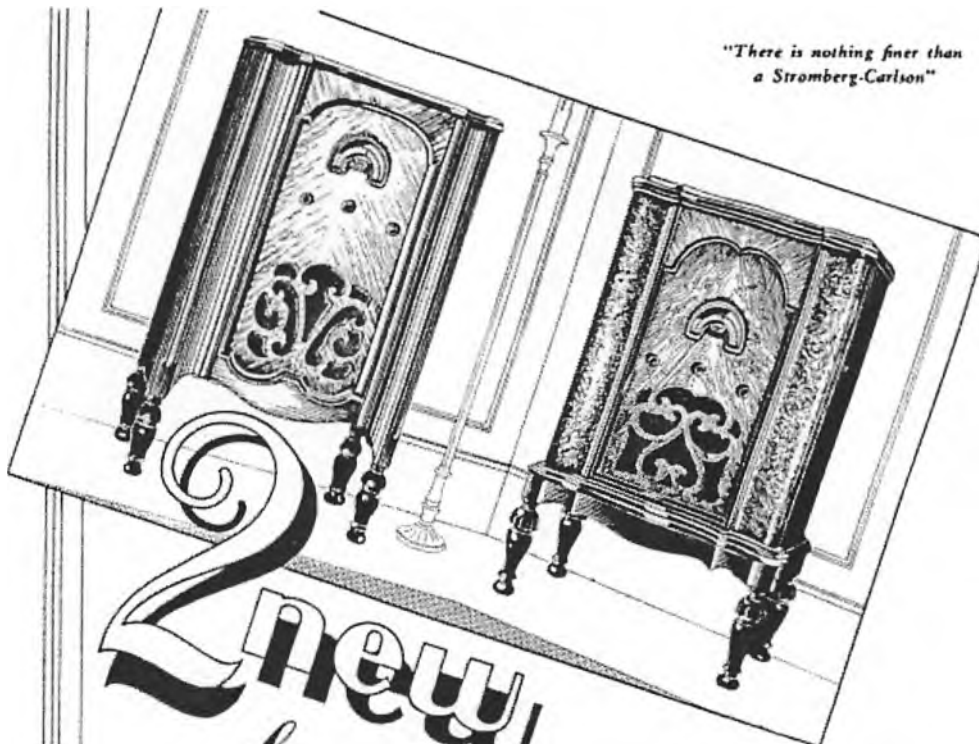
OBTAINABLE FROM

NOYES BROS. (Sydney) LTD.

WHOLESALE DISTRIBUTORS

115 CLARENCE ST., SYDNEY. 'Phone: B7581, 10 lines).

Showrooms: 39 YORK ST., SYDNEY. 11 WATT ST., NEWCASTLE. ELIZABETH ST., BRISBANE



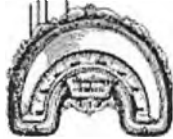
"There is nothing finer than
a Stromberg-Carlson"

New Superheterodynes

... give greater
variety of Entertainment

and, by their marvellous selectivity, ensure positive freedom from the overlapping of one broadcast programme upon another, thus offering unrivalled reception of all stations in the crowded wavebands.

Stromberg-Carlson Superheterodynes incorporate the most up-to-date improvements known to radio engineering for the betterment of broadcast reception. A home demonstration will show their marked superiority and efficiency.



Made in Australia and sold through local Authorised Dealers
by

Stromberg-Carlson

"The stumps scores were won by 'Dainty Girl' at 10 to 1"



It probably happens to you. Just as you are listening to some piece of interesting news another station, which you have not quite succeeded in tuning right out, suddenly increases in volume and "drowns" what you want to hear.

When that occurs it's time you changed your valves. Worn out or inefficient valves are generally the cause of "cross modulation" in a receiver, and it is this "cross modulation" which results in overlapping stations and difficult tuning.

Replace those inefficient valves with Cossors — the modern valves designed for modern broadcasting conditions. Cossors will restore your set's efficiency and end your wireless worries.



AT THE RADIO SHOW
Ask about Cossor Valves
AT STAND No. 19

Wholesale Distributors:
W. G. WATSON & CO., LIMITED
279 CLARENCE STREET, SYDNEY
BRANCHES ALL STATES
Inst. Rep. for A. G. Cossor Ltd., London
C. D. MacLurean 26 Jamieson Street, Sydney.

...one more reason why you should
CHANGE TO COSSORS



COSSOR
100% BRITISH VALVES

1933

POWERFUL **LASTING**

"THE BEST AT THE SHOW" **VISIT STAND 7**

E.M.F. PRODUCED **60 VOLTS** RECEPTION

DIAMOND

BATTERY

№ 505 **LAST LONGEST** **№ 505**

SILENT **EFFICIENT**

WIDDIS DIAMOND DRY CELLS PTY LTD SYDNEY and MELBOURNE

Factory Representatives: Reg. Rose & Co., (Tel. BW2114-5-6) Kembla Bldg., Margaret St., Sydney

ANNOUNCING



**The EFCO "LYRIC"
DRUM DIAL**

Suitable for SHORT or LONG wave reception in the one cabinet. Panel showing Lyre Bird can be removed and individual customer's design inserted, also name placed above in panel. Available in clockwise or anti-clockwise movements. Scale in TAN or OPAQUE WHITE. Escutcheon finished on bronze. Size 4 3/4 in. x 2 1/4 in.

PRICE . . . 13/6 RETAIL

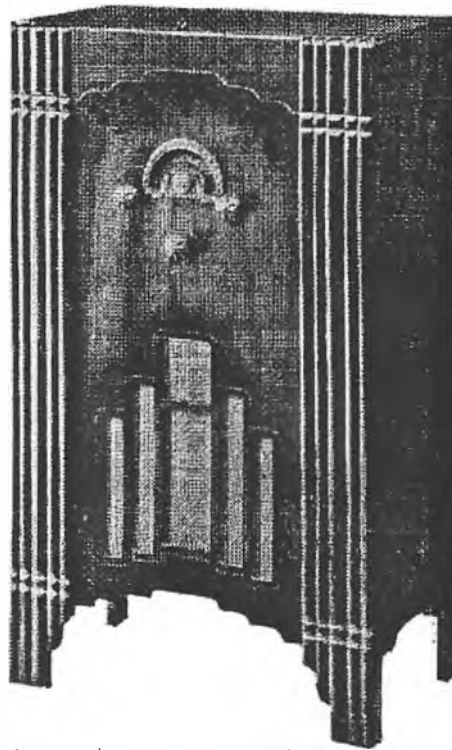
THE EFCO MFG. CO. LTD.

LW 1105. **PRINCES HIGHWAY, ARNCLIFFE, N.S.W.** LW 1105.

OBTAINABLE AT ALL WHOLESALE RADIO DEALERS.

1933

WARNING! Don't buy a Radio that is classed as cheap. It will pay you to buy a moderately - priced good set.



£1 Deposit

5/- Weekly
For 18 Months

Terms apply to Metropolitan Area only.

CASH PRICE
£18/18/-

The Radio you have long-awaited for
at the Price you were willing to pay
available to you on Sydney's Lowest Terms.

The New M.S. Super 1933

5 Valve RADIO (including Rectifier)

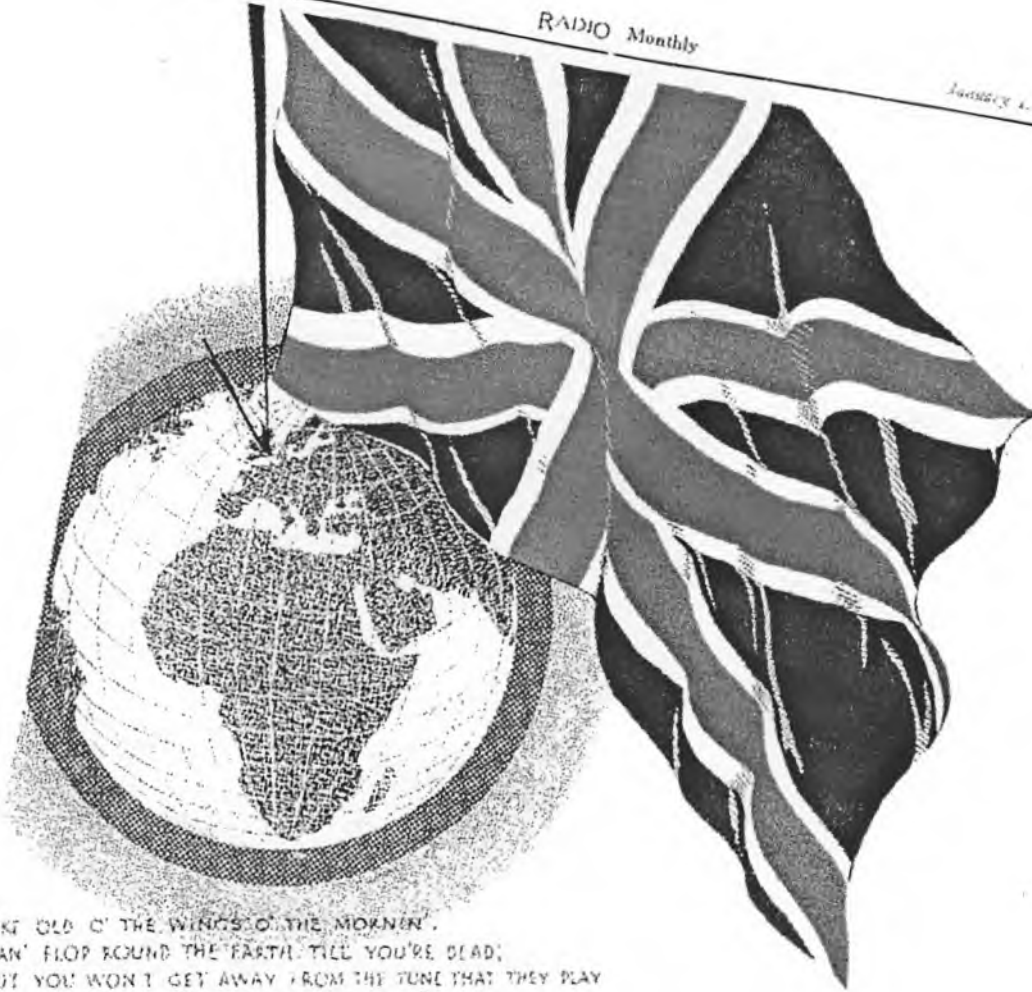
- Here is the very latest product of one of the leading radio factories of Australia. It can be truthfully said this wonderful receiver embraces every worth-while improvement known to modern radio science. You purchase this new receiver with that full confidence. A glimpse at the chassis inside will convince you of the perfect construction of this new radio . . . even to the smallest detail. Tonal perfect. Interstate Reception. Smooth tuning-in to each station. Free Installation and Service. 90 Days Guarantee on Valves. 12 Months' Guarantee on Set.

FREE INSURANCE AGAINST FIRE AND BURGLARY

Hear this New Receiver at **MODERN RADIO**, 28-30 Martin Place,
or at **Mick Simmons' Audition Rooms**, at Haymarket.

MICK SIMMONS LTD.

720-2 GEORGE STREET, HAYMARKET, SYDNEY
AND 28-30 MARTIN PLACE, SYDNEY



"TAKE OLD 'O' THE WINGS OF THE MOONIN',
 AN' FLOP ROUND THE EARTH, TILL YOU'RE DEAD,
 BUT YOU WON'T GET AWAY FROM THE TUNE THAT THEY PLAY
 TO THE BLOOMIN' OLD RAG OVERHEAD." — *London*

● Synchronising with the opening of the Empire Short Wave Broadcasting Station, the voice of which is heard in every far-flung corner of the British Empire, Mullard has introduced a range of 2-Volt Battery Valves—PM12 (Screen Grid), PM 11E (Detector), PM 2A (Power), and PM 22A (Pentode)—which are particularly suitable for short wave reception. Thus equipped with British Valves, you may hear at its best the great Empire Short Wave Station, which broadcasts from the heart of the Motherland to every part of the world over which the Union Jack is flying.

MULLARD VALVES

PRODUCT OF ENGLAND

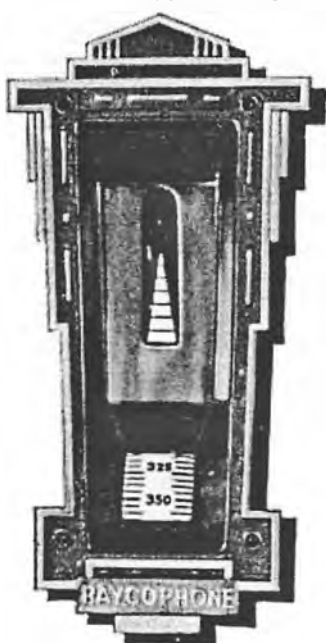
Representatives of The Mullard Valve Company (Australia), Limited, 117 Pitt Street, Sydney, Australia.

Printed and Published by the Proprietors, Bellini Publications, Ltd., 157 Pitt Street, Sydney, Australia.

VISUAL TUNING DOMINATED THE RADIO EXHIBITION!

AMONGST VISUAL
TUNING DEVICES

RAYCOPHONE STANDS OUT SUPREME!



EXTREMELY SENSITIVE, the Raycophone Meter will operate on an extremely weak signal; in fact, if the signal from any broadcast station is strong enough to be heard, it will be shown on the Weston Meter.

A **PRECISION** product manufactured by the Weston Electrical Instrument Corporation, designers of the world's finest precision meters.

FRICTIONLESS, FOOLPROOF, the whole of the movement takes place within the sealed glass tube of oil. The operation of the meter takes practically nothing from the efficiency of the set.

DESIGN: The meter is actuated by the amplified incoming signal carrier waves, and this action is to turn a metal shield within the oil-filled tube. This shield is cut at an angle in such a manner that a triangle of light coming from the electric light bulb behind the tube becomes visible to the person operating the set.

OPERATION: What the compass is to the mariner, so the fascinating amber triangle of light of the Weston Tuning Meter is to the radio listener; as the magnetic needle points directly north, so the meter puts you dead on to your selected station—and in **SILENCE!**

When we turn the dial dead on to the station, the triangle will be at its greatest; if we turn a little further, the triangle starts to drop. Immediately the station is tuned you turn up the volume control and get perfect reproduction.

Other features of Raycophone for 1933 are **AUTOMATIC VOLUME CONTROL, SILENT TUNING, FREE INSURANCE COVER, BAND-PASS STAGE, ACOUSTICALLY CORRECT PIANO FINISH CABINET, NEW MULTIPLE ELEMENT VALVES.**

Complete range of 7, 6, 5, and 4 Valve A.C. Super heterodynes; also 6 and 8 Valve Battery Supers.



HARRINGTONS

Sydney, Melbourne, Brisbane, Adelaide, Perth, Hobart,
Newcastle, and Katoomba.

1933

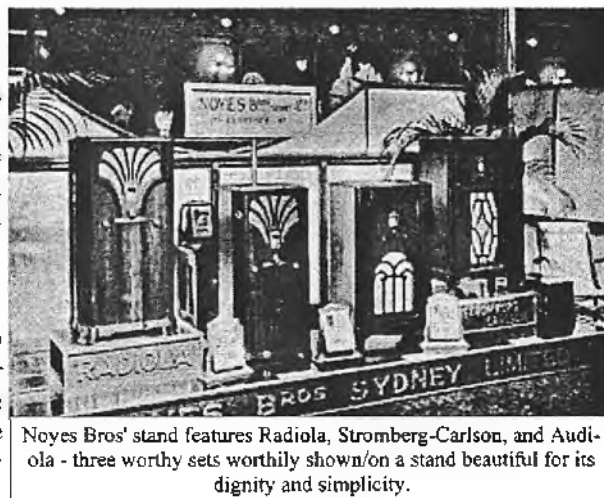
The 1933 RADIO EXHIBITION BREAKING ALL RECORDS

Radio Monthly April 1933

The public, the trade, the broadcasters-in fact, anybody who is at all interested in the development of radio - will be glad that this year's Electrical and Radio Exhibition is surpassing all expectations. All previous records have been smashed, and hardened officials themselves are amazed at the extraordinary public response to this wonderful Show. On all sides we hear of record crowds, and much more pronounced interest in everything radio, than there has been in the past.

just to give a few figures:-

On the opening day of the 1932 Exhibition, 1600 people attended; this year 3200, or exactly double the number of last year, were in attendance. On the second day of the Show. 4666 people paid for admittance, as against 2568 the previous year, which figure was regarded as wonderfully good at that time.



Noyes Bros' stand features Radiola, Stromberg-Carlson, and Audiol-a - three worthy sets worthily shown on a stand beautiful for its dignity and simplicity.

Quite aside from the excellent handling of the publicity on this occasion, it is more than evident that, as each year advances, radio is getting a firmer grip on the imagination of the people, and the standard of programmes to-day is infinitely higher than it was even a few months ago. whatever we may think about the present system of license fee

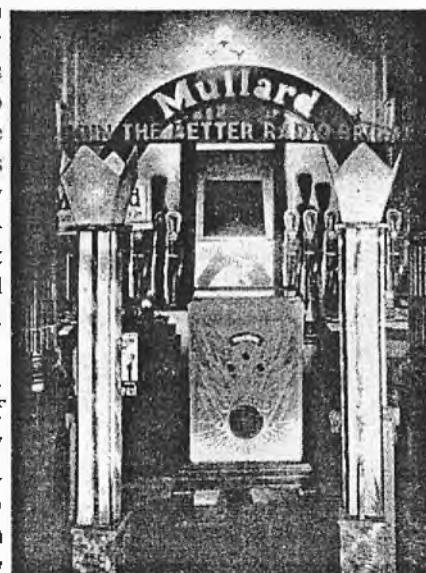


The new Raycophone models are splendidly displayed at Harrington's stand, noticeable for the large number of people who pause to admire

distribution, it is beyond question that the Australian Broadcasting Commission, through its National stations, has created a far greater public appeal than formerly. Sprinted up by this unexpected competition, there have been significant changes in B Class organisations, both individually and generally, and this has shown its result in a wider public appreciation of the excellent fare that has always been provided by these stations. These two factors, of course, react to the advantage of the Radio Exhibition, in the fact that many of the critics of broadcasting have been won over, and many newspapers which hitherto offered a marble front to this comparatively new mans of en-

tertainment have thawed out sufficiently to afford a fair measure of support to an industry which is providing work for thousands of Australians, and mental education and musical entertainment to hundreds of thousands more.

A casual stroll through the Exhibition reveals many new things. chief among which are the radical advances in cabinet designs in many of the new models presented this year. Beale and Company, Ltd., particularly are to be congratulated on the beautiful range of cabinets they are showing. On every hand there is ample evidence of the distinct advance of 1933 model receivers over those of last year. Philips Gold Seal Valves give us a new conception of what radio is developing into; not only does efficiency count. but appearance, as has been proved so many times by our American cousins, is also of the utmost importance.



Mullard, as usual makes most use of available space. The exhibit is a credit to the designers



Typical of push and go the Reg. Rose stand at the exhibition features the well known Diamond Batteries, with Diamond Dan, the battery man, well to the fore. Though there is no Harbour Bridge this year, full advantage has been taken of all available space.



On all sides we hear approval of the excellent layout of Stromberg chassis. This is amply backed up by the handsome appearance of the cabinets. The big dial shown above is emblematical of the Stromberg feature - "no two-spot tuning"

It would be idle to attempt to enumerate in detail everything that is to be seen by everybody at the Radio Exhibition, since a comprehensive catalogue is on sale at a moderate price in the Hall itself. But we could not omit to stress the absorbing interest of the P.M.G. Department's exhibit, the broadcasting exhibit of A.W.A., and the stand of the Australian Broadcasting Commission. On the first mentioned stand the public is given a fair idea of the astounding extent to which telegraphic communications have been developed.

This in itself is illuminating to the lay mind, because it brings to the light of day mysteries which usually intrigue the mind of the man in the street; but it is more important still in the fact that it shows something of the workings of a department which the public is, unfortunately, only too ready to criticise on the score of its alleged shortcomings. The ship to shore communications and the overseas radio telephony conversations engineered by A.W.A. must have produced many hundreds of visitors to the Exhibition, while the excellent advisory service rendered by the A.B.C. to the listeners with complaints shows at once a desire to really assist them and to demonstrate a common-sense attitude in place of their customary aloofness.

Summed up, in our experience of other Radio Exhibitions since the first one held in 1926, we have not yet seen anything so interesting or so informative as that at present being held. Perhaps its success is due to its excellent organisation; perhaps it may be attributed to the shoals of publicity which has appeared during the last week or two, or it may be that the public is becoming as radio-minded as its fellow citizens in Britain and America, or it may be a combination of all these things; but whatever is the cause, there can be no doubt about the fact



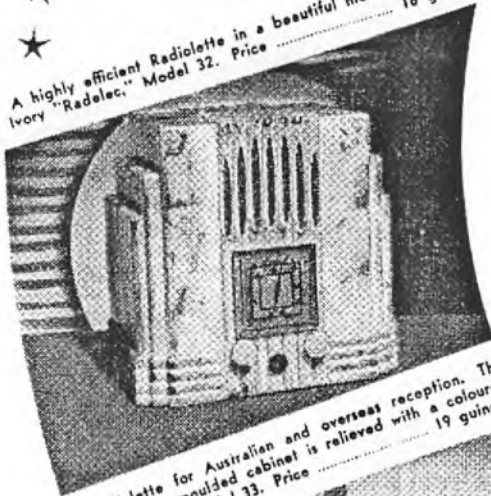
Warburton Frankli, do full justice to the Stromberg-Carlson and Audiola lines they are handling. The exhibit is fittingly laid down, with an atmo-

that the success of the Exhibition demonstrates forcibly the hold that broadcasting has taken upon the people of Australia.

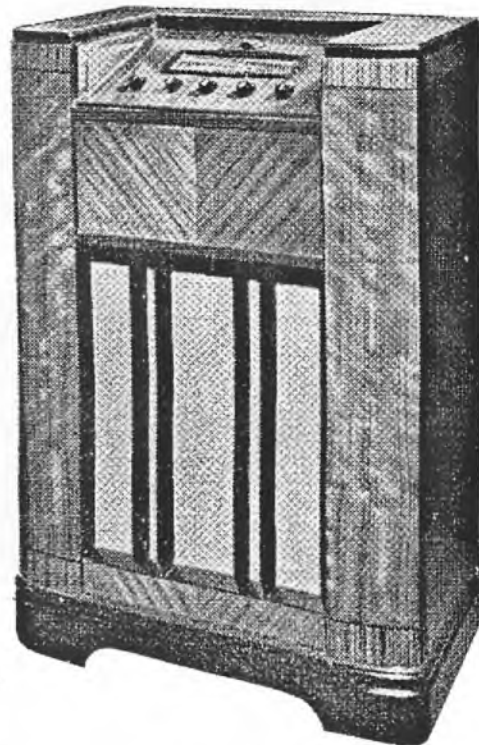
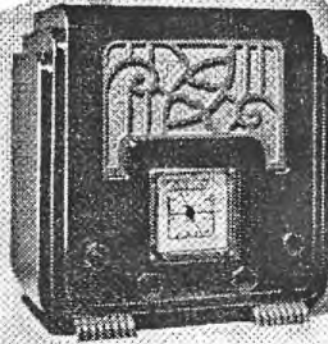
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The owner of a Radiola derives greater pleasure from broadcast programmes and is assured of that lasting satisfaction which only a high quality product can give.

★
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A highly efficient Radiolette in a beautiful moulded cabinet of Ivory "Radelec." Model 32. Price 16 guineas



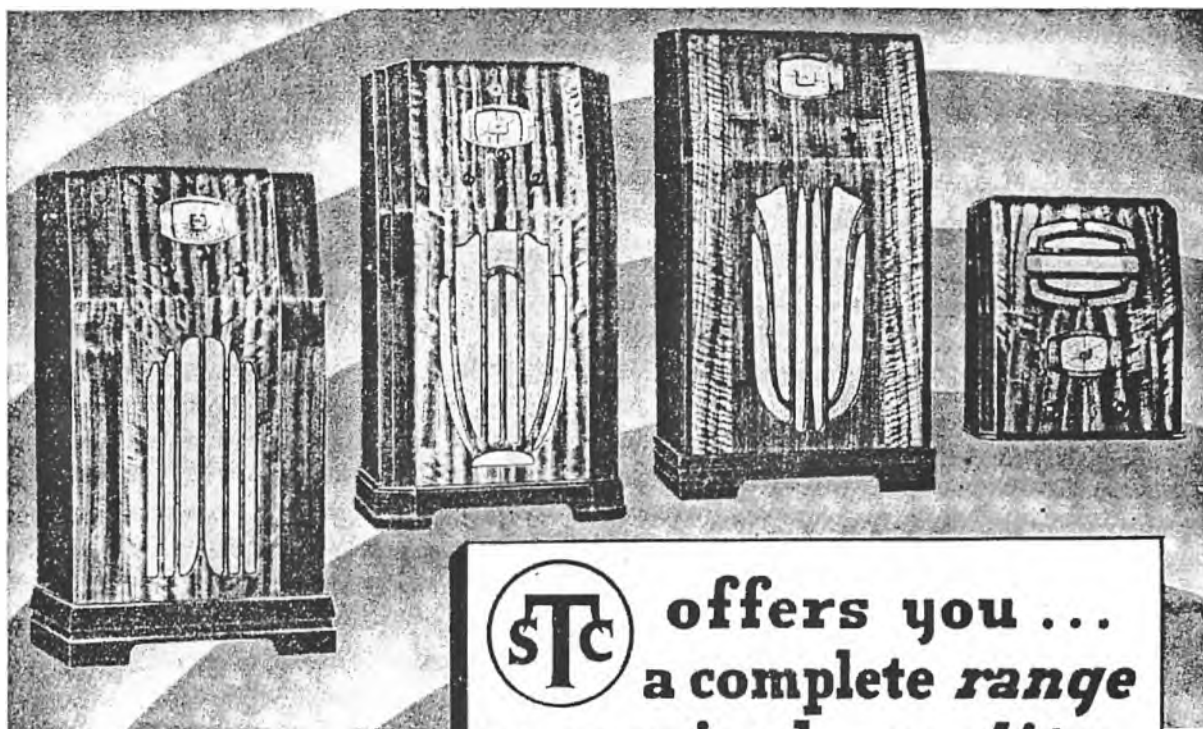
A Radiolette for Australian and overseas reception. The lustrous black moulded cabinet is relieved with a coloured fret and base. Model 33. Price 19 guineas



In the Radiola range there are types for all city and country requirements. Each model is outstanding in its class—prices from as low as 15 guineas for electric models and 19 guineas for battery operated and world range models . . . Your nearest Radiola distributor will gladly arrange a demonstration and explain an easy deferred payment plan.



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PRICE LIST :

Model	Type	Price
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530	5 metal valve Dual Wave Console	28 gns.
513	6 metal valve Console	29 gns.
623	6 metal valve Dual Wave Console	34 gns.
510B	5 valve Battery Console	28 gns.
520B	5 valve Dual Wave Battery	33 gns.
677B	6 valve Battery	34 gns.
780B	7 valve Battery Dual Wave	39 gns.

Quick turnover, easy sales, satisfied customers . . . that is the happy state you will find if you make S.T.C. receivers your primary interest. There is an S.T.C. receiver to satisfy every prospective buyer, both in price and in scope. The circuits utilised are of the latest design.

Each and every set has a quality of tone and a range of reception second to no other radio of its class in Australia. S.T.C.'s popularity in the past is proof of their ability to build radio sets that will give the maximum of service and satisfaction.

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Experts know that it takes more than merely good components to reach perfection in radio. Sound manufacturing experience with the most modern precision test equipment are just as vital.



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says the Engineer

Every Briton model is built to a standard of quality by modern production methods. Every stage of construction is subjected to the searching tests of the latest scientific instruments before the final seal of approval is placed upon the completed set.

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Darling Downs (Qld.) Distributor: A. W. Chensell, Russell St., Toowoomba.



West Australian Distributor: Ray J. Sharpe, 860 Hay St., Perth.

Tasmanian Distributors:
McCann Bros., 180-184
Elizabeth St., Hobart.

New Zealand Distributors:
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Co. Ltd., 127 Cashel
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MOULDING MATERIALS

Plastics for Many Purposes

HOW often the average person, when seeking the romance of fiction, overlooks the romance of fact?

Tourists will travel many miles from the beaten track to witness the mystic art of some Ancient Magician. They watch with awe and wonder while they are deceived by his cunning legerdemain—such is fiction.

How few realise, that at their own doorstep they may see the reality of modern magic, created by that modern magician—the chemist.

Through exhaustive research; by careful study, and with infinite patience, he has mastered the science of the transformation of matter, and discovered a new material, which in a little more than a decade has found a place in nearly every phase of our daily life—such is fact.

Not long ago, a group of business executives were discussing current conditions. After touching upon taxes, farm relief, and production problems, the conversation swung around to materials, one of the men present asked, "What is Plastics," and the answer to this one question led to numerous other queries, all of which indicated a keen interest in the subject of plastic materials, and a desire to know more about them.

It occurred to us that this conversation might serve to enlighten many others. In reply to the first interrogator, we said: "More than a quarter of a century ago Mr. L. H. Baekeland announced to the world the discovery of the Bakelite Resinoid, a 'man made' material produced from the interaction of carbolic acid (phenol) and formaldehyde. The initial material resembled amber in appearance, but possessed an unusual combination of properties and characteristics far different from existing materials. Down the years scientific research has permitted the development of new formulas, employing various fillers and solvents, so that to-day the list of plastic materials number many thousands."

"How extensively are these plastic products used?"

"From babies' teething rings to table tops, fishing reels to fireplaces, cameras to clocks, paints to pencils, typewriters to talking pictures—in fact there are one or more applications in every industry."

"We group these numerous plastic materials into six broad classifications—

1. Moulding materials.
2. Luminated rods, sheets and tubes.
3. Cast resinoids in sheets, rods, tubes and special forms.
4. Varnish, Lacquer, enamel and cement of the baking type.
5. Synthetic Resins for paint and varnish products of the air drying type.
6. Special resinoids—for water proofing fabrics, for dentures, bonds for abrasive wheels, and for impregnation of brake linings, etc."

Plastic material uses seem to be endless, as illustrations, let us follow through an average day with an average family and find, perhaps to our amazement, the number of times we are apt to come in contact with this unique chemical creation.

As you begin the day with your morning shave, you encounter plastics first in the handle of your shaving brush and the box containing your safety razor. The material is also an indispensable part of the electric water heater.

At breakfast, your wife pours you a cup of coffee: the handle she takes hold of on the percolator is plastic moulded, as well as the button under the table she presses for service, and the twin outlet plug from which are carried the wires to the toaster.

You drive your wife down town for a morning's shopping. Before leaving, she gives the baby a teething ring to keep him contented while she is away. Of course, it never occurs to her that this childhood necessity is of the same material as the automatic fire extinguisher which stands silent watch over her home.

After lighting a plastic bowl and stem pipe, or perhaps it's a cigarette or cigar holder, you step into your car and can find within reach thirty or more parts, either entirely or partly made of it, such as the timing gear, distributor head, gear shift ball, horn button, etc.

The morning is cold and as you speed along the windy stretches between your home and town you button your overcoat snugly about you. Doubtless you would be surprised to know that the buttons on the coat are also made of this material.

Your wife stops at the butcher's to do the day's marketing. Little does she realise that the handles of the butcher's knives, or the pen or pencil she is using to check off various items as they are purchased, are plastic moulded. She steps into a booth to phone the dentist, confirming her appointment; again she encounters this remarkable material in the form of the telephone mouthpiece and receiver shell.

At the dentist's, not only the instrument handles and the arms on the chairs, but numerous other parts of his equipment are made of the material with so many uses.

In the meantime, you have arrived at the office, you take yesterday's date from the calendar pad on your desk. The frame that holds the pad is plastic moulded, as are also various parts on the typewriter and adding machine.

In the factory you find the material in still another form—large silent pinions are helping to reduce the noise and clatter of the shop. Investigation would reveal its use for grinding wheels, lathe hand-wheels and a dozen other places in your plant. Even in the laboratory it forms the "stage" for the microscope.

Your Chief Engineer informs you that, by adopting these materials, he has been able to produce one of the most intricate pieces you manufacture in a single operation, thus eliminating the assembly of many metal parts and effecting a substantial reduction in cost.

A telephone message from a customer makes a short train journey necessary. Your safety on the trip is partly due to this material, for the block system is protected by insulation made of plastic. On the switch board that controls the lighting system of the car there is a dash-pot composed almost entirely of plastic. Even the bulbs and bases of the electric lamps are cemented together with plastic in still another form.

Your customer gives you a large order and you plan to celebrate by taking your wife to the matinee.

On the way home you board a crowded trolley car. You grasp a strap hanger, the handle of which is made of this unique material.

After luncheon there is an hour to spare and you while away the time playing a game of billiards. Here again is plastic moulded for balls and the bridge is made of it.

At the theatre this modern chemical creation has even entered the field of music, for the mouthpiece on the clarinet, chin rest on the violin, the keys of the piano are all produced from this material. During the play a Spanish dancer enters gracefully from the wings and in her hands she is dexterously manipulating a pair of castanets made of plastic material.

Upon arriving home you find a letter from an old friend, inviting you to accompany him on a trip into the bush. You stroll into your den to look over your fishing rods and rifles: again you encounter this material, for the reel on the rod and the butt plates on the guns are formed of plastics.

Returning to the drawing room you join your wife for an evening's radio concert. Should you examine your Radio receiver you will find it is almost entirely made of plastic material probably including the cabinet.

MOULDINGS—PLASTICS.—(Cont.)

The clock strikes midnight; it is time to retire, and as you rest your head upon the pillow it may seem that you have exhausted the possibilities of this wonderful material—but have you? The bed you sleep in is lacquered with synthetic resin varnish, and the castors under the bed are made of plastic moulding material.

Hidden in the inventive minds of man are thousands of new uses for Plastic Materials. Perhaps the foregoing narrative has suggested to you some new application. It has already proven the solution to innumerable problems—why not yours?

Progress of Plastics in Australia

Moulding in Australia can look back over at least 10 years of steady progress and the industry is established now on a very firm and broad basis. To give an idea to what proportions this industry has grown, the following are some of the mouldings produced.

Radio cabinets, radio valve bases, radio knobs, radio escutcheons, valve sockets, volume control covers, and numerous other radio components, telephone sets, lavatory seats, door handles, furniture handles and fittings, fishing reels, bottle caps, condenser cases, cigarette containers, ash trays, ink stands, cosmetic containers for face powders, soaps, lip salve, etc., table lamps, cups, saucers, plates, jugs, salt and pepper shakers, tumblers, flower pots, golf clubs, domino sets, toilet roll holder, electrical switches, adaptors and apparatus too numerous to mention.

One of the greatest boons to modern mass production is the plastic moulding process. Through the medium of the hydraulic press and the use of multiple cavity dies, manufacturers have found plastic mouldings a new means of increasing the rate and decreasing the cost of production, and they are now equipped to render prompt and helpful information to present and prospective users of plastic moulded materials.



Marquis

MOULDERS TO THE AUSTRALIAN RADIO INDUSTRY

- Knobs
- Plugs
- Valve Sockets
- Coil formers
- Switches
- Potentiometers
- Escutcheons
- etc., etc.

In order to enjoy the greatest possible demand, a product must be more than a little in advance of its competitors . . . in appearance, performance and value.

No doubt that is why Marquis Mouldings have been the most popular since the beginning of radio in Australia.

The Presses

Presses are of two general classes, hydraulic and mechanical. Of each class there are two types, the "hot plate" and the "semi-automatic." Removable or hand moulds are used in presses of the "hot plate" type, and the moulds are invariably bolted to the platens in the case of the "semi-automatic." The platens of the presses are heated by means of electricity or steam and in some cases by gas. In practice the hot moulds are charged with a predetermined volume of moulding power; the mould is closed and subjected simultaneously to heat and pressure. A pressure of up to 2 tons per square inch is applied for 5 or 6 minutes or such time depending on the thickness of the section of the moulding and the shape and size of the article being manufactured, and is determined largely by experience. The moulded pieces are then ejected hot and left to cool. Occasionally, when an exceptionally fine surface finish or a "close tolerance" is desired, the moulds are removed directly from the hot press to a chilling press for rapid cooling. They are then taken to the work bench to be unloaded and recharged.

There are two different designs of semi-automatic presses, designated, respectively, as "Tilting Head" and "Retracting Ram" presses. While varying more or less in design they are alike in the respect that the moulds can be clamped rigidly in place and do not have to be handled by the operator. The moulds for presses of this type are made with channels through which steam or cold water may be circulated alternatively. The moulded pieces are automatically ejected with the opening of the press.

The choice of press to be employed is determined largely by the size and shape of the pieces to be moulded, and the number of pieces required.

MOULDS

Function of the Mould

Moulds are forms or matrices for shaping the plastic moulding material. They are made with single or multiple cavities, according to the size and shape of the piece to be produced.

Moulds are made of steel. Steel is the only satisfactory material for mould construction. Bronze or brass moulds are occasionally used for experimental pieces, but for production work there is nothing that takes the place of steel.

Moulds whether made of tool steel or special steels developed for the plastic industry should be hardened, ground and polished, the higher the polish the better the lustre on the finished piece.

Moulding Process

Standard Moulding Materials. Moulding materials are supplied to the trade ready for use. There are two different forms, fine powder, and coarse grain powder or "flake." Frequently fine powder is compressed in a "tableting" machine into pellets and thus saves time in measuring or weighing out the powder and in charging multiple cavity moulds. Each of the materials is supplied in a variety of flows and hardening characteristics which adapt them to practically any conditions encountered in production.

What Occurs During the Moulding Operations

When these materials are heated in a hot mould they flux. The hydraulic pressure applied to the mould when the material is in this state forces the plastic mass into intimate contact with all parts of the mould, permitting faithful reproduction of the mould form.

It is thus possible to obtain an infinite variety of shapes by the moulding operation.

Because of the plastic condition of the moulding material when it is in this state of flux, an interesting phenomenon is set up.

A thin film of the fluid resin is always brought to the surface of the moulded piece and it is in part due to this that the finished product reproduces with exact fidelity the surface of the mould.

While the first effect of the heat used in moulding as above described, is to soften or flux the material, it induces at the

MOULDINGS—PLASTICS.—(Cont.)

same time a "non returnable" chemical change which hardens it at a rate depending upon the size and shape of the piece and the temperature used. The "non returnable" change simply means that once the resin in a moulding has set hard it cannot by subsequent heat and pressure be converted into another moulding.

It is exceedingly important that this softening and subsequent hardening by heat be thoroughly understood by the operator. The improper co-relation between the application of heat and pressure is responsible for more spoiled work than any other one factor.

When this change has been completed, the moulding is finished, and the product cannot again be softened or fluxed by heat.

A Unique Combination of Superior Properties

Not only are moulded products exceptional in their strength, hardness, and electrical properties, but they are also highly resistant to heat. The woodflour-filled products, for instance, withstand for hours, without distortion or charring, temperatures up to 150° C. (320° F.). The tensile and impact strengths of certain of the mineral-filled products are unaffected for short periods by temperatures up to 235° C. (455° F.). Again, not only are these products highly resistant to water, but also to oil, to the common solvents, to mild alkalis, and to organic and dilute mineral acids. They are disintegrated, on the other hand, by strong sulphuric or nitric acid, or strong alkalis.

The electrical industry early recognised the value of plastics products as the solution to numerous insulation problems.

The automotive industry selected the moulding material for ignition parts, not alone for its good electrical properties, but because of its high resistance to heat, water and oils, and the accuracy and economy with which it can be fabricated. These characteristics have long been sought in structural materials generally; thus it is that we find moulded products widely employed for purely mechanical purposes, replacing metals, woods, and a number of other natural materials. The high impact materials are especially adapted for parts which must withstand rough handling, such as golf club heads, handles and ledger covers.

Because of their high corrosion resistance, these materials are also used for parts of apparatus in the chemical industry, such as moulded fittings for pipe lines conveying acids that would attack and destroy iron or brass.

It is this unique combination of superior properties that accounts for the many and varied ways in which moulded products are rendering valuable service.

Machines

For machining moulded products diamond cutters give the best results. "Stellite" and chrome-tungsten-steel alloy cutters also give good service.

Tools for machining should be similar to those used for working brass. These permit a scraping action rather than a cutting action and are better than tools used for machining steel.

Several manufacturers are now making drills especially designed for drilling moulded parts. These drills are made with an extra clearance on the edge of the flutes, to reduce friction and prevent overheating. A drill speed of 3,000 r.p.m. should be used for small diameters.

It is well to determine the number of holes that can be drilled in pieces of a given type before the drill becomes dull. Instructions can then be given the operator to change drills at this point. Avoid excessive pressure when forcing the drill into the material as this tends to heat the drill and destroy the cutting edge.

Such approved machining practice prevents rejects and greatly increases the life of the tools.

Special Materials

Uncommonly exacting service conditions have called forth special materials to meet them.

Thus there have been developed materials of exceptional water-resistance. Discs moulded from one of these materials, after immersion in water for a year, show a diameter increase of less than 0.001" per inch and no surface effect. In boiling water for a year the increase is only about 0.003" per inch, and the surface effect very slight.

Still another type of material shows only slight surface effect from immersion for twenty-four hours in boiling 5 per cent. caustic soda solution.

A special material of the mineral-filled type has been developed for use in moulded ash trays. Here there is exceptional heat resistance at the surface of the moulded tray. Such trays do not blister.

There is a "low loss" material especially useful in radio condenser forms and housings. It has a low power factor (audio 1.6 per cent., radio 0.75 per cent.) which suffers little change after a day's immersion in water. This material has a high volume resistivity (about 10⁸ megohms per cubic centimetre) which drops off much less with rise in temperature than in the case of ordinary materials.

A special material developed for magneto insulation is finding use in aircraft ignition, where a material of high insulation resistance, high dielectric strength, and improved resistance to carbonisation under a low amperage arc is necessary. When moulded this material is less rigid than the regular materials. It has been found of advantage for use when moulding a relatively thin wall of material around a large metal insert.

Of interest is a special material which has marked opacity to the X-ray, and which finds use in the manufacture of X-ray shields.

Standard Tests for Moulded Products

Engineers have long recognised the need of standard methods for testing moulded products. Without agreement on methods, agreement in results is not to be expected.

It is well known, for instance, that, depending upon the method employed in making the test, a wide range of values may be obtained for the dielectric strength of any material. For one thing the voltage required to break down a given material is not proportional to the thickness. With moulded products it varies approximately as the square root of the thickness. It would be entirely incorrect, therefore, to assume that by doubling the thickness of a piece of insulation, the break-down voltage would also be doubled. Conversely, it would not

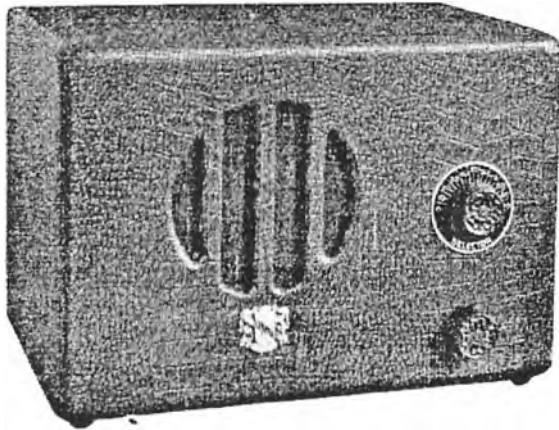
(Continued on page 307)

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1936

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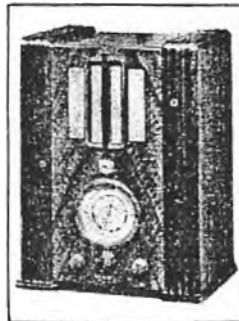
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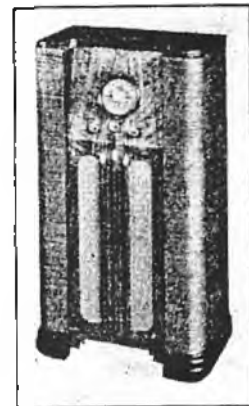
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S. McCrum.

MOULDINGS—PLASTICS.—(Cont.)

be proportionately reduced if the thickness were cut to one-half. The thickness of the piece tested is therefore a highly important factor and should always be stated when giving figures for dielectric strength. Also, the shape of the electrodes used and the rate at which the applied voltage is increased materially affect the value obtained.

Similarly the values obtained for other electrical properties depend on the conditions of test.

So also with mechanical tests; such, for instance, as the impact or shock-resistance test. This may be defined as the energy in foot pounds required to break a specimen having a cross-section an inch square; that is a square that measures an inch on a side, not a square inch of any shape or section.

To meet the need for methods of testing that would be acceptable to engineers and manufacturers generally, the American Society for Testing Materials some years ago appointed a committee known as "Committee D-9" composed of engineers from some of the leading electrical companies and the manufacturers of insulating materials, for the purpose of working out standardised methods for such tests.

As a result of the intelligent labours of this committee, "A.S.T.M." standards are to-day accepted generally in the electrical world.

Plastic Materials in Industry

Radio.

Long before listeners had heard the term radio, plastic materials were aiding the commercial producers of radio's parent, Wireless Telegraphy. When commercial wireless was being installed on ships and shore stations, plastic moulded and laminated were component parts of these sets. An advertisement of 1915 featured a large commercial set equipped with a laminated panel.

In 1916, pioneer amateurs, in constructing their spark type sets equipped with regulation telegraph keys and headphones, were also relying upon plastic materials.

Radio gave the public some inkling of its possibilities with the invention of the audion tube, and history records during this period, its first big steps forward. The first commercially manufactured receiving sets for the home made their debut.

Many of these sets were of the type where the components were assembled on a board. Practically all of these sets used plastic moulded parts. At the same time amateurs were taping the capacity of the industry for headphones, tube sockets, coil forms and numerous other parts made of plastic materials for their own "hook-ups." Moulded dials, three inches in diameter, were selling for over five shillings a piece. With the demand far exceeding the supply, radio started to grow up. About 1924, sets in wooden cabinets appeared on the market, adding handsomely finished front panels of laminated plastic material to the already established uses of the material.

Head sets gave way to horns, some of which were moulded. A host of new uses developed for plastic materials—static eliminators, lightning arrestors and inside aerial frames.

Almost overnight radio became an industry of national importance. In two years this howling, whistling era gave way to organised broadcasting. The number of stations was increased in the broadcast band—and some began to operate on higher power. To match this progress, the manufacturer of the receiving set, brought forth electrically operated receivers. The "furniture period" followed almost immediately, with consoles, highboys, and lowboys, concealing all operating parts except the dials and knobs.

With the successive steps of refinement in the receiving mechanism and radio cabinet, new uses for plastic materials were developed. Laminated translucent materials for the illuminated dials, base plates for the new metal tubes, tuning knobs of coloured materials to match the wood cabinets, and finely-moulded cabinets for the smaller sized sets are typical of improvements of the past two years.

Telephone

A review of industries utilising plastic materials in many forms would not be complete without specific mention of the application of these materials in the telephone, which is so important in the conduct of the world's business.

An industry serving millions of telephone subscribers must select its materials with care, for failure of a single part might cripple the carefully built up system. Plastic material has been used for the entire "Shell" handle, mouth and earpieces—of the popular handset telephone.

And back of the maze of equipment in every telephone exchange plastic materials are employed in dozens of places—in grasshopper fuses, relaying insulators, armatures, dividers, sender finders, selectors, as insulators for the cams of sequence switches and for pulse machine drums.

A visit to a modern automatic exchange leaves one spell-bound with the marvel of its mechanical efficiency.

Row after row of compact machines record by their almost inaudible "click" the connections that enable the city to expedite the transaction of its daily affairs. A handful of operators—plus the material of which the equipment is constructed—is responsible for the continuous performance of these machines.

Plastics for Packaging

The potentialities of plastic materials in the packaging field are tremendous.

Development can only come through the wide propagation of knowledge regarding synthetic plastics, and it is too often overlooked that the potential buyer may be quite unaware of developments or fail to realise their application to his own business.

Plastic moulded packages in addition to their attractive appearance, are tough and strong, they do not corrode, rust or affect the contents.

Distinctive colours and patterns innumerable are possible, and any symbol or trade name can be indelibly moulded in the container. Thus a manufacturer is able to maintain individuality of design and colour for his products by the use of plastic mouldings.

Some of the more important points which must be looked for by the manufacturer of beauty requisites who is contemplating new packaging materials are:—

1. General effectiveness and modernity of appearance.
2. Its ability to conform with preconceived colour schemes.
3. Light weight and unbreakability.
4. Ease of working into stylish containers.
5. Absolute chemical inertness (resistance to alkalis, etc.)
6. Commercial practicability, as regards price, in comparison with that of other materials.

Moulded products have an excellent claim to fulfilling each and every one of these requirements to an eminently satisfactory degree. In regard to variety of colour, for example, moulded plastics have no rival, the modern urea-formaldehyde resins constituting a very marked advance in gaiety of hue and texture on their dull and somewhat greasy looking predecessors.

Then again, plastic containers are light, thin, and of a clean, almost classic elegance of design.

The Development of Large Mouldings

The technique of moulding plastic materials has been developed in Australia in the comparatively short period of ten years. The earliest moulding, comprising electrical components and ash trays were limited in size by the capacity of the presses available at that time, by the lack of experience on the part of the moulders and by the limitations of the early materials. These mouldings however, rapidly became popular because of their unusual combination of physical properties, and, on account of their ease of manufacture, adaptability, pleasing finish and comparatively low cost. It was natural that the development of large mouldings should have been one of steady evolution. As moulders developed their art, larger and more complicated mouldings were produced, but time was required in which to obtain the necessary experience to evolve the large mouldings that are produced to-day.

Mould and press design and manufacture were important problems, as also was the production of a moulding powder possessing the characteristics necessary to permit of free flow into all the interstices of a large mould and which would, at the same time result in a moulding free from skin and surface blemishes, which would not distort on removal from the mould, and which would retain all the qualities associated with plastic mouldings. In order to appreciate the difficulties of the manufacture of moulding materials, it is necessary to again consider exactly what happens during the moulding process.

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INCLUDING LATEST METAL VALVES

A FULL RANGE OF A.C., A.C.-D.C. AND BATTERY-OPERATED BROADCAST and DUAL-WAVE RECEIVERS

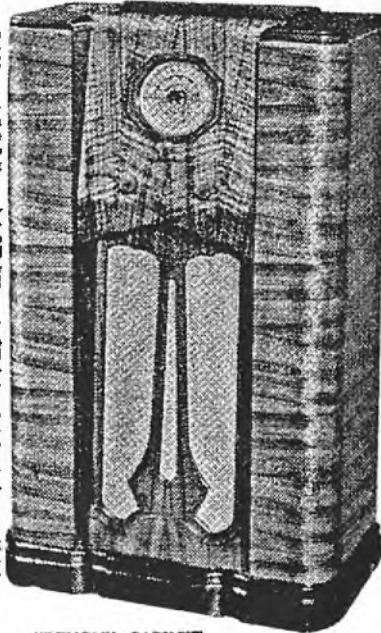
The introduction of the 1936 "Ferrodine" range places Breville still further ahead.

The successful combination of Ferrodine Iron Core Coils and the latest Metal Valves are a Breville engineering triumph.

The virtues of both developments are enhanced by circuits painstakingly designed to take full advantage of their improved characteristics.

Even "hard-boiled" dealers have been amazed at the beautiful tone of Breville Ferrodine receivers, particularly as this is obtained in conjunction with greatly increased gain, and selectivity which finally ends station overlapping. Write for full details of the Ferrodine range to the addresses given below.

Breville franchises still available in some districts. Write for details!



"DEVON" CABINET

**BREVILLE RADIO . . . EVENTUALLY . . .
WHY NOT NOW ?**

Manufactured and Guaranteed by

BREVILLE RADIO PHONES
"BREVILLE" 486 ELIZABETH STREET M 6191-2
SYDNEY SYDNEY N.S.W.

Breville Radio Pty. Ltd., 191 Queen St., Melb., Vic, Ph' MU 1548.

INTERSTATE DISTRIBUTORS:

South Australia: Stott & Hoare,
Adelaide.
Tasmania: Universal Distributors
Pty. Ltd., Hobart; Wills
& Co. Pty. Ltd., Launceston;
Findlay and Wills Pty. Ltd.,
Devonport.
West Australia: Stott & Hoare
Typewriters Ltd., Perth.

Queensland: Pike Bros. Ltd.,
Brisbane, Toowoomba and
Townsville; Wyper Bros. Ltd.,
Bundaberg; Williams Pty. Ltd.,
Rockhampton.
New Zealand: Stanley B.
Davys & Co., Wellington.

MOULDINGS—PLASTICS.—(Cont.)

The material is loaded into the hot mould in definite quantities, either in loose granular form or as compacted pellets; the mould is then placed between the heated platens of a hydraulic press and pressure applied. The moulding material becomes plastic at a temperature of approximately 375° F. and the applied pressure, which is of the order of one ton per square inch of projected mould area, forces the plastic material into the remotest corners of the mould. The powder is initially placed in the bottom of the mould, and, the forced flow is upwards and outwards. Under the combined influence of heat and pressure the moulding finally sets and becomes both infusible and insoluble.

It will be obvious that in the case of deep mouldings very great pressure will be necessary to cause the material to flow up the sides of the mould; this pressure may amount to as much as six tons per square inch. To ensure a produce which is of uniform quality throughout, it is essential that the surface of the mould should be at uniform temperature.

Small moulds present little difficulty in this respect, they are merely heated by contact with the heated platens of the press. With increasing mould size, uniform heating of the mould surface presented a problem, which has been overcome to some extent by incorporating electric heating elements in the mould itself. In addition, enormous presses having almost machine-tool precision have been developed in order that the necessary pressure might be applied to the moulding materials without disturbing the accurate register of the various parts of the mould.

Designing to Sell

In the battle for the consumers' £ s. d., an increasing number of manufacturers have turned the spotlight on their own products, with the hope of discovering some new and salient salespoints, either through added operating features, or improved design.

Under the pressure of keen competition and in an endeavour to reduce cost, many have been forced to curtail their selling efforts. Thus the product itself is being relied on to carry

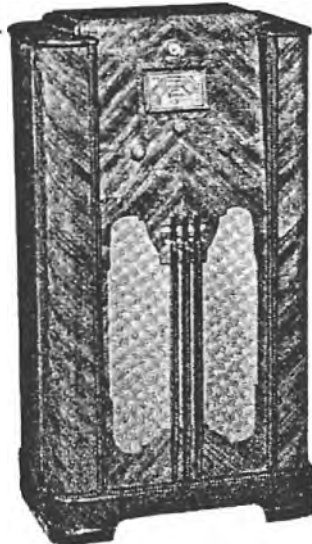
a greater portion of the sales burden. As in all movements of this kind, there are obstacles to overcome, perhaps one of the greatest impediments to change is "Tradition"; the tendency to adhere strictly to "Standard Practice," doing something in an habitual way just because experience up to this time has shown it to be effective and economical. But the world does not stand still, and change is the order of the day.

Although standardisation has its place for such things as gears and materials, there is many a manufacturer of a venerable line of merchandise who could revive sales by revamping his products. The problem now is not one of mere quantity, it is a question of how to produce a quality product at a relatively low price. The engineer, the plant manager, and other executive, who are responsible for the conversion of materials into a finished product should consider the sales features above everything else. One of the most important selling factors is design. When the consumer has the choice of a number of articles, whether it be an electric toaster, a water-cooler or a radio receiver, he selects a design. A good design sells the goods, and brings the price.

The manufacturer of an instrument used in the home re-designed his product and placed it in an attractive plastic-moulded case. His sales in 1933 were 43% above those of 1932, and 90% above 1931, and in 1934 the sales broke all records. The public's appreciation for good design has been greatly underestimated. There is ample evidence that they are influenced by style changes, and, although they may not be in a position to initiate these changes, they show by the release or withholding of their hard-earned money, whether they like it or not. An article may be made of the finest material, and be reasonably priced, it may be brilliantly advertised, but if it lacks pleasing proportion, symmetry and individuality, it will be hard to sell at a satisfactory profit. Now more than ever before, the public is seeking articles made from better materials. They are "fed-up" with inferior goods, and, above all, they want better workmanship and better design.

Readers are referred to various supplies of moulding material as advertised herein, for further information in respect to plastics.

Rivalling the Best Electric Models - HOWARD BATTERY OPERATED RADIOS



"Howard" engineers have evolved the perfect receiver for country listeners! Not only is it remarkable for tone and performance but in every way has it been designed for battery economy, even the tuning controls featuring special switches to minimise the use of dial lights, etc.

With a Written Guarantee on "B" Batteries . . .

Model 572 features one of the famous "Howard" piano-finish Cabinets and other exclusive features are the WRITTEN GUARANTEE on the "B" batteries, extended audio frequency range and the 10-in. "Rola" permagnetic speaker. Also incorporated are bass compensation for mellow roundness of low notes (even at low volume) and the new IC4 Valve (Detector Oscillator). Price, complete with batteries . . . £28/10/-

Model 589. 4-Valve Battery Superheterodyne, complete . . . £24/10/-

The Howard A.C. Range Comprises . . .

Model 648. 5-Valve Mantel Superhet. £16/16/-

Model 619. 5-Valve Console Superhet. £19/19/-

Model 620. 5-Valve Superhet, with "Magic Eye" and A.V.C. £22/10/-

Model 666. 5-Valve Dual-Wave, with "Magic Eye" and A.V.C. £27/10/-

Model 665. 5-Valve Superhet, with "Magic Eye" and A.V.C. 10-in. Speaker and pre-selector £26/5/-

Also these A.C./D.C. Sets . . .

Model 626. 6-Valve Mantel, with A.V.C. £19/10/-

Model 527. 7-Valve Console Superhet. £27/6/-

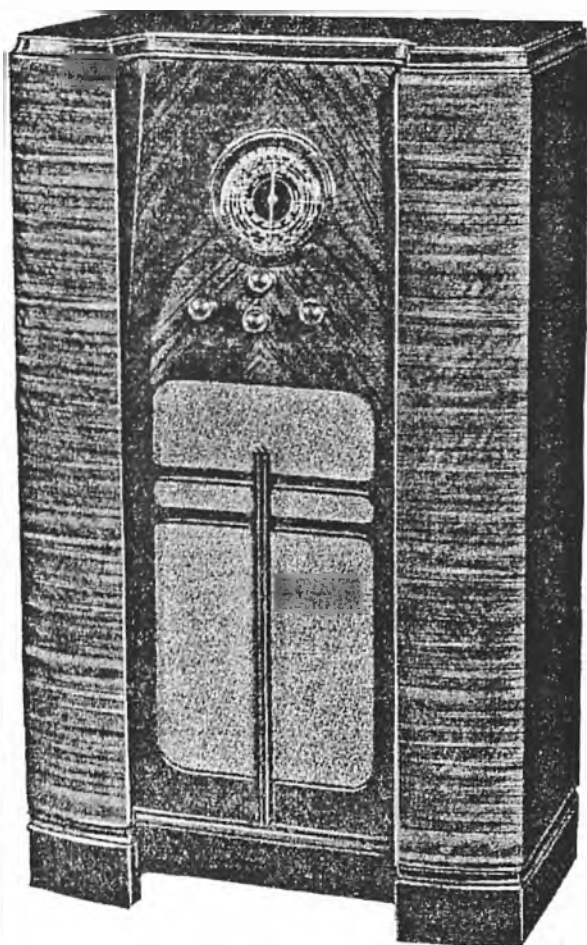
DEALERS! WRITE FOR 1936 CATALOGUE

WHOLESALE ONLY

HOWARD RADIO PTY. LTD. — Vere Street, Richmond, Vic.

Sterling

The Name That Means Trouble Free Radio



■
STERLING RADIO LTD. have achieved a reputation throughout Australia as Manufacturers of High Quality Trouble Free Radio Receivers that **COST NO MORE.**

A wide range of Sterling Models are available including A.C., Battery and A.C./D.C. Broadcast and Dual Wave Receivers, with latest features. "Edge-Lit" and Band-Spread dials, Metal valves, Litz intermediates, superb tone, maximum sensitivity, etc.

Certain territories are open for the appointment of exclusive Distributors—write for details.

■
Terms Sales Financed.

■

STERLING RADIO LIMITED

539 ELIZABETH STREET, SYDNEY.

Telephone No. M 3261

Queensland Representatives:

TRACKSON BROS. PTY. LTD., BRISBANE.

Western Australia Representative: RAY J. SHARPE, 860 HAY STREET, PERTH.



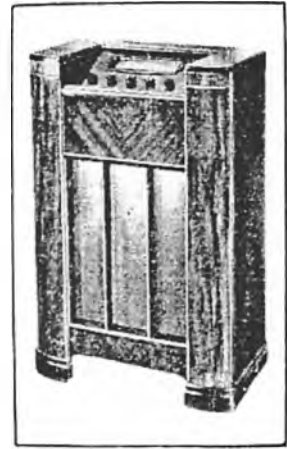
Airzone 660

EYE APPEAL

... in ...

1936 RADIO RECEIVERS

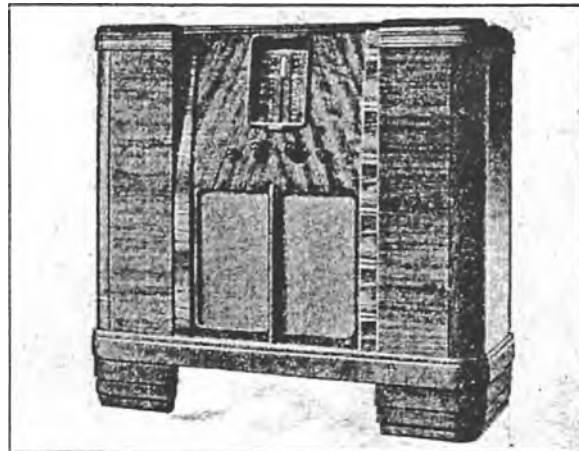
Pictured on the following pages are examples of cabinet designs in combination phono-radios, consoles, mantel models and nidgets. The selection is representative of models by well known manufacturers and is not intended to be so embracing as the yearly "Pictorial Parade" published in "Radio Retailer."



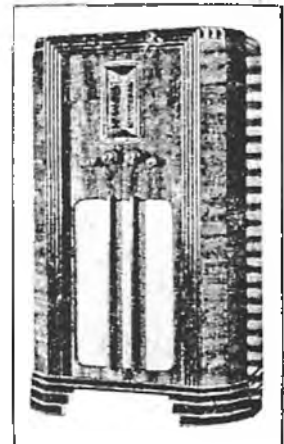
Radiola 158, 249, 250



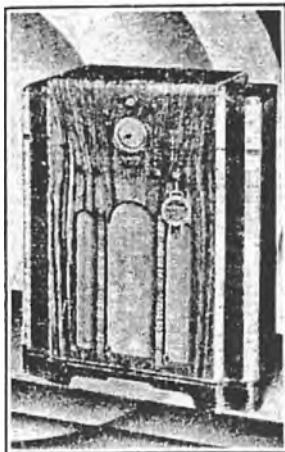
Airzone 556



Stromberg-Carlson 736, 836, NRS



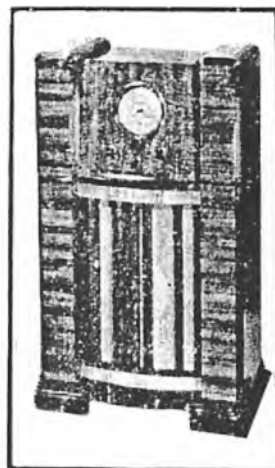
Stromberg-Carlson 666



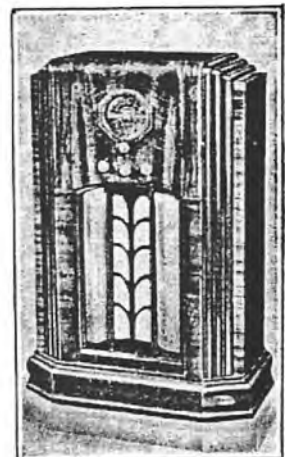
Kriesler 66 Airflow



Radioplayer 6709



Tasma 305, 310, 365, 350



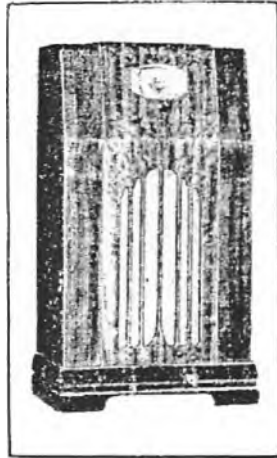
Breville Beale Edward

RADIO TRADE ANNUAL OF AUSTRALIA

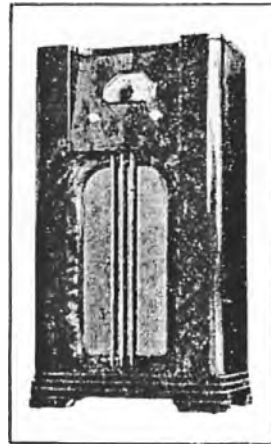
It will be obvious from a glance at this page that the dial plays no small part in to-day's radio. Circular dial scales tend to become larger, more artistically and evenly illuminated, and easier to read. Special dials, scales and escutcheons made their appearance, all with those objects in view. The cabinet work is decidedly better than previous years, some beautiful effects being obtained with richly grained veneers—all testimony to the present high standard of the cabinetmakers' craft. The lower right-hand model illustrated is carried out in moulded bakelite.



Brudmester No. 3



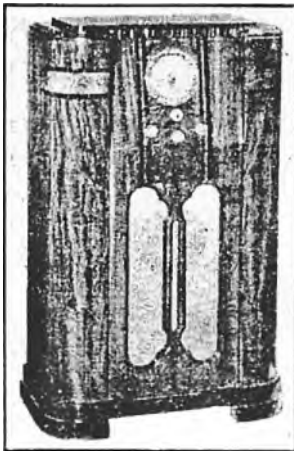
S.T.C. 580, 680



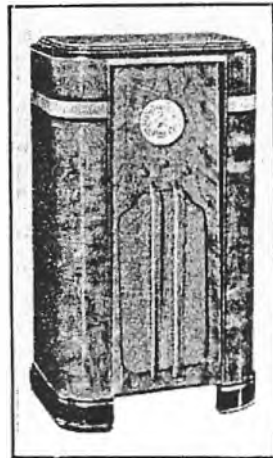
Astor 77, 88



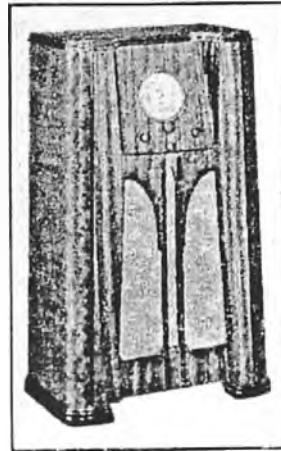
Airmaster D 36



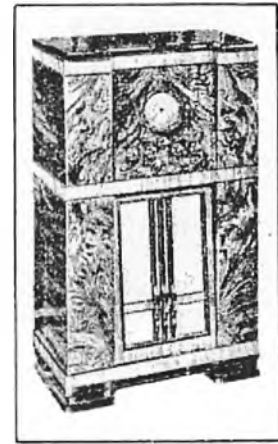
Calstan



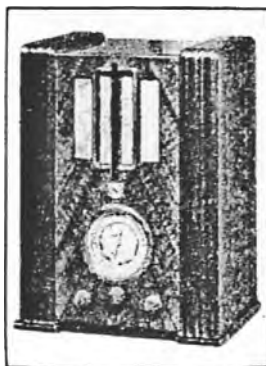
Sundel 536



Genalex 350, 365, 310



H.M.V. 719



Leknek 513, 514, 516



Airzone 554



Genalex 320



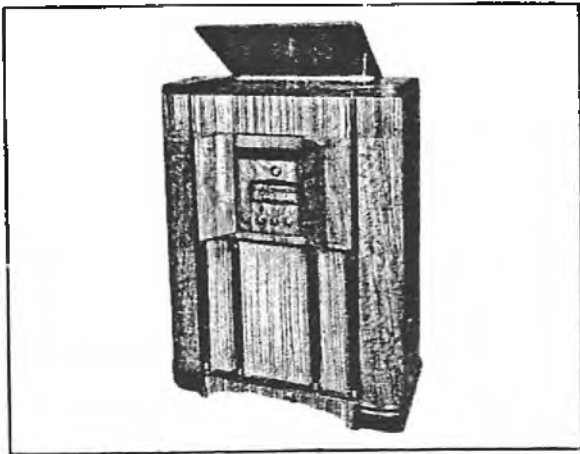
Radiulette 31

1936

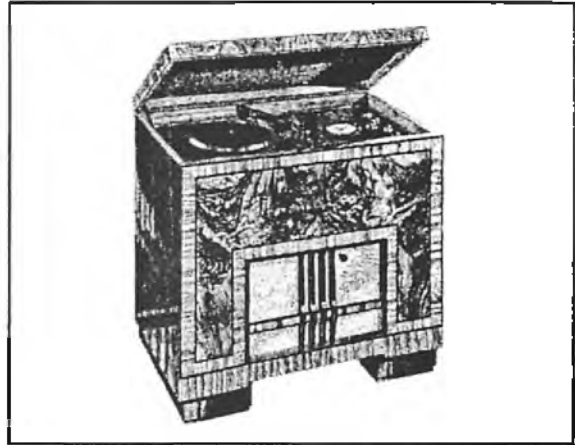
RADIO TRADE ANNUAL OF AUSTRALIA

1936

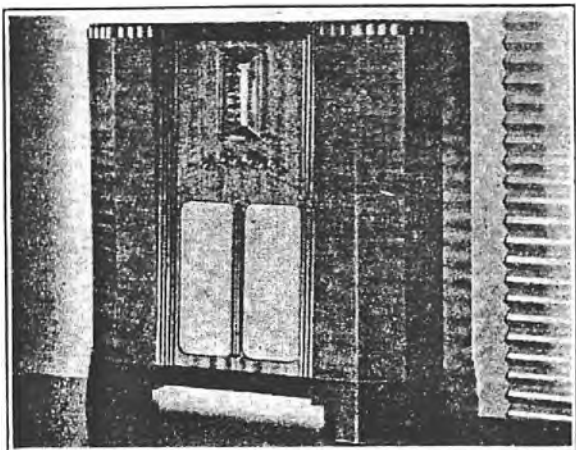
Many of the combination models shown here are either fitted or may be obtained with automatic record changers



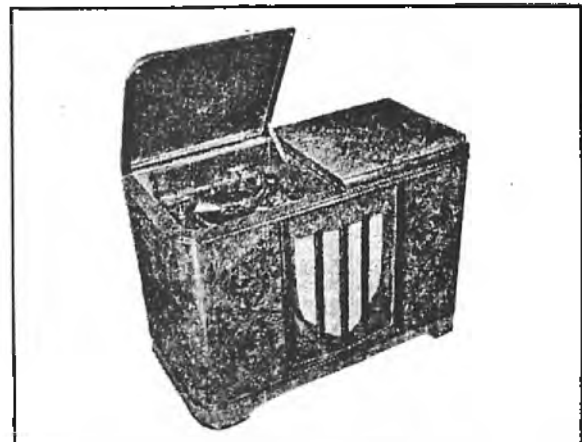
Radiola 302. Phono and world range combination



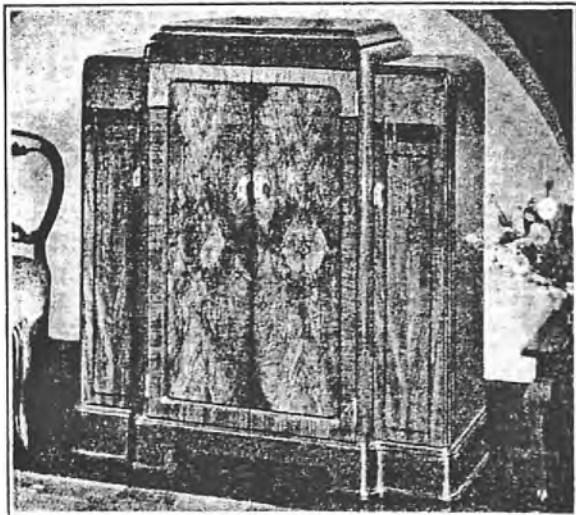
H.M.V. 720. Phono and All-Wave Combination



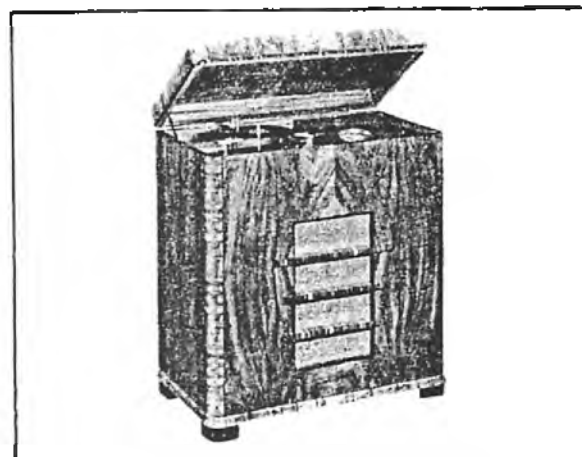
Scromberg-Carlson 536 B Radio only



Beiron Combination 94 CH



Krielder 10-valve Grand Combination with record compartments

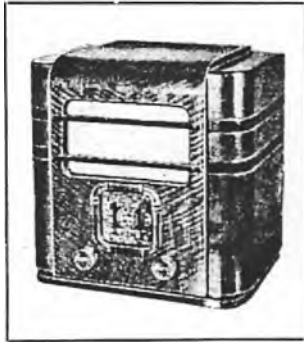


Genalex Combination with Auto Record Changer

1936

1936

RADIO TRADE ANNUAL OF AUSTRALIA



Radioplayer 6906



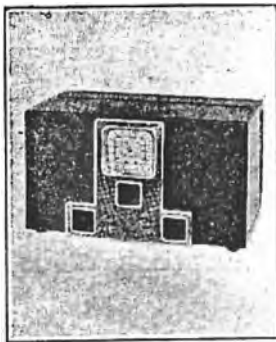
Stromberg-Carlson 55 B



Krisler 150



Radiolette 33, 35



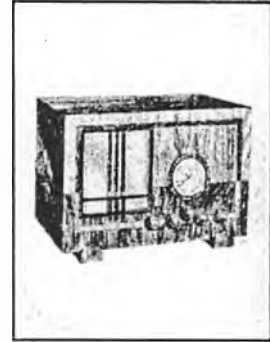
Mullard Master Unit



Lekmek Treasure Box



Beiton Buccaneer



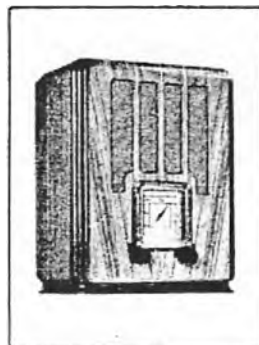
H.M.V. 710



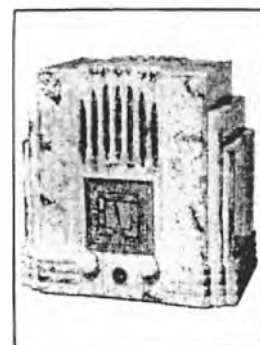
S.T.C. Mairiel



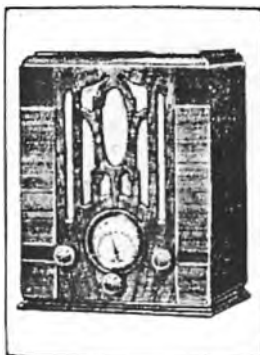
Astor Mickey Grand



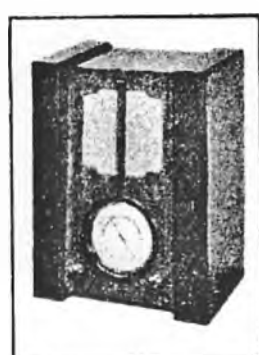
Bandmaster No. 6



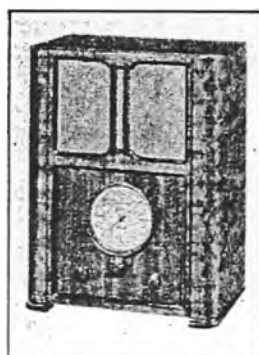
Radiolette 32



Breville Mantel



Tanna 320



Genalex 360, 370



Van Ruyten D30

Permanent-Magnet
Dynamic Types

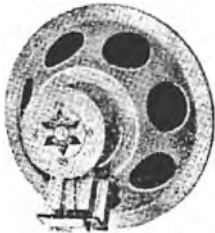
The Powerful
STAR SERIES



"01" STAR (8in.)
Equipped with "Amplion-Darwin" Magnet for Battery operated Receivers.



"05" STAR (10in.)
A high quality Speaker with the new "Amplion-Darwin" Core type Magnet.



"LS" STAR (10in.)
The most powerful permanent magnet dynamic Speaker made by Amplion, incorporates "Amplion-Darwin" ring type magnet.

AMPLION

Presents

AMPLION "M" TYPE (8in. Electro-Magnet)

The Amplion "M" Type Electro Dynamic Speaker is a miniature of the "Q" type and truly an Amplion. It employs the same type of new moulded Cone, which is vitally necessary, by reason of the high temperatures in which it is called to operate. The various parts are beautifully machined and of extreme accuracy, which is vital in the case of Speakers with such small tolerances. Ideally suited for use in all types of Midget Receivers and Automobile Radios.

AMPLION "Q" TYPE (8in. Electro-Magnet)

The Amplion "Q" type Electro Dynamic Speaker is now so well-known as to hardly call for further comment. The Amplion "Q," however, is an improvement on its prototype. The Transformer is heavier and is completely metal shielded. A terminal strip, with insulated metal cover, is fitted to the top, to which is fitted braided cord and Bakelite plug. The Voice Coil leads are now brought to a small terminal strip on the Cone Housing, which is likewise covered by an insulated metal strip. The Core Housing is rivetted to the pole-plate simplifying the operation of changing-over Field Coils, etc. The Cone, as previously, is a one-piece moulding, non-hygroscopic and more or less impervious to heat.

AMPLION "R" TYPE (10in. Electro-Magnet)

This is the latest Amplion release and by reason of its beautiful appearance, splendid frequency response, and tonal quality generally is known as the "Greater Range Series." Having an overall diameter of 10ins., it is fitted with a 10in. Cone. The Cone, with the exception of the dimension, is similar to that fitted in the "Q" type. For all high grade receivers, this is the only logical Speaker and is delightful for its all-round performance.

AMPLION "01" STAR, "05" STAR and "LS" STAR
(8in. and 10in. per Magnet)

The above types of Amplion Permanent Magnet Dynamic Speakers are designed for use in Battery Operated Receivers. By employing a Permanent Magnet, there is no current drain from the Battery. The "01" Star is an 8in. Speaker and the "05" Star and "LS" Star are 10in. Speakers. The Magnets vary in each type. All Magnets are exclusively "Amplion-Darwin," and are exclusive to Amplion. These extraordinarily efficient Magnets are employed by reason of their ability to retain magnetism, owing to the special processes and many heat treatments through which they pass.

PRICES:

Model	Remarks	Size of Cone	Price
ELECTRO-MAGNET DYNAMIC			
M	Standard Winding	8in.	£1 5 0
Q	Standard Winding	8in.	£1 15 0
Q	Non-Standard Winding	8in.	£1 18 6
R	Standard Winding	10in.	£2 15 0
R	Non-Standard Winding	10in.	£2 18 6
Duals	Comprise 2 "Q" Models	8in.	£4 0 0
Duals	Comprise 2 "R" Models	10in.	£5 10 0
PERMANENT-MAGNET DYNAMIC			
"01" STAR	Amplion-Darwin	8in.	£1 17 6
"05" STAR	Corr Type Magnet	10in.	£3 15 0
"LS" STAR	Large Ring Type Magnet	10in.	£5 10 0

PUBLIC ADDRESS TYPE

A 108 Unit only £14 0 0

PS.21 Complete (includes A 108 Unit) £20 0 0

Standard Winding includes the following coils (except the "M" type, which only includes 6 ohms, 1250 ohms, and 2500 ohms): 750, 1000, 1250, 1500, 2000 and 2500 ohms. Other Windings will be charged for at the higher rate, as shown in Price List. Also available fixed in Cabinets.

Electro-Magnet
Dynamic Types



"M" TYPE
A miniature Amplion for "Midget" and Auto Sets.



"Q" TYPE
For all Standard A.C. Receivers.



"R" TYPE
For all High Grade Sets.



"A 108" TYPE
For large Amplifiers, also large Public Address Apparatus.

DISTRIBUTORS IN ALL STATES

DESCRIPTIVE BULLETIN GLADLY FORWARDED

THE SIGN OF ENDURING QUALITY

ADVT. OF AMPLION (ASIA) LIMITED



70 CLARENCE STREET, SYDNEY

BRAND LINE RECEIVERS

THE following tabulated list includes the vast majority of brand lines available to the Australian radio market. The information contained herein should prove of material value to all sections of the industry. It is, we believe, the most complete tabulation ever produced in Australia. The various manufacturers concerned (who are regular advertisers in "Radio Retailer") have co-operated in the compilation of the details in order to make these data as informative as possible.

When analysing the contents of the various columns the following interpretations should be used:—
CABINET, either console (con.), mantel (man.), midget (mid.), Combination (comb.) automobile (car) . . . **POWER**, A.C. operated (●), Battery operated (+), AC/DC (=) . . . **COVERAGE**, Broadcast (B) Dual wave (D), All wave or triple wave (T) . . . **BAND PASS**, is band pass filter used, Yes (Y) or no (N) . . . **SPEAKER** diameter and resistance . . . **DIAL LAMP**, voltage or type given . . . **CONTROLS** number of . . . **TUNING** either single (S) or dual (D) . . . **DIAL** shape expressed in degrees when circular or semi-circular. Size given below. octagonal (Oct), oblong (O), square (S) . . . **SEN. CON.** is sensitivity control fitted, yes or no . . . **TUN. INDIC.** is tuning indicator fitted, yes or no . . . **PHONO Sw.** is phonograph or pick-up switching provided for . . . **LAMP Sw.** are means provided for switching off dial lamp on battery models . . .
 A, gives voltage, capacity and drain of A battery . . . B, gives B battery voltage . . . C, gives C battery voltage or (A) indicates automatic.

ASTOR

Model	Cabinet	Power	No. Valves	Coverage	Int. Freq.	VALVES USED	Band Pass	R.F. Stage	Speaker	Iron Cores	Dial Lamp	Controls	Tone Con.	Tuning	Dial	Sen. Con.	Tun. Indic.	Muting	Phono. Sw.	Lamp Sw.	A.V.C.	A	B	C	PRICE
77	Con.	+	5	B	456	1C6, 2/1C4, 1B5, 22A.	N	N	8" P.M.	Y	6	3	Y	S	4 1/2" 180°	N	N	N	N	Y	Y	6/100 1.1A	Vib	A	31/10/-
77DW	Con.	+	5	D	456	1C6, 2/1C4, 1B5, 22A.	N	N	8" P.M.	Y	6	3	Y	S	4 1/2" 180°	N	N	N	N	Y	Y	6/100 1.1A	Vib	A	36/15/-
Mickey Mouse	Mid.	●	4/5	B	456	6A7, 6D6, 6B7S, 41, 80.	N	N	5" 1350	—	4.5	2	N	S	180°	N	N	N	N	—	N	—	—	—	—
Mickey Grand	Man.	●	4/5	B	456	6A7, 6D6, 75, 42, 80.	N	N	6" 1350	—	4.5	2	N	S	180°	N	N	N	N	—	Y	—	—	—	—
220	Car	+	5/6	B	173	2/78, 6A7, 6B7S, 41, 84.	N	Y	6" 4	Y	6	2	Y†	S	**	N	N	N	N	—	Y	6V 6.5A	Vib	A	—
55DB	Con.	●	3/4	B	456	6A8, 6B7, 6F6, 5Z4.	N	N	7" 1900	Y	4.5	3	Y	S	4 1/2" 180°	Y	Y	N	N	N	N	—	—	—	15/15/-
66S	Con.	●	4/5	D	472.5	6A8, 6K7, 6Q7, 6F6, 5Z4.	N	N	7" 1900	Y	4.5	3	Y	S	4 1/2" Oct.	Y	N	N	N	N	N	—	—	—	23/15/-
88	Con.	=	4/5	B	472.5	CK1, CF2, CBC1, CL2, CY2, CL.	N	N	7" 1500	Y	4.5	3	Y	S	4 1/2" Oct.	Y	N	N	N	N	Y	—	—	—	25/4/-
190	Con.	●	6/7	D	456	3/6D6, 6A7, 75, 42, 80.	N	Y	7" 1550	Y	4.5	4	Y	S	4 1/2" Oct.	N	N	N	N	N	Y	—	—	—	34/13/-
30	Con.	+	5	B	456	2A7, 2/34, 19, 33.	N	N	8" P.M.	Y	—	4	Y	S	4 1/2" 180°	N	N	N	N	N	Y	6/100 1.25A	135 22.5	*23/10/-	

* Batteries extra.
 † Tone control on speaker.
 ** Special control heads available for all types of car

AIRMASTER

Model	Cabinet	Power	No. Valves	Coverage	Int. Freq.	VALVES USED	Band Pass	R.F. Stage	Speaker	Iron Cores	Dial Lamp	Controls	Tone Con.	Tuning	Dial	Sen. Con.	Tun. Indic.	Muting	Phono. Sw.	Lamp Sw.	A.Y.C.	A.	B.	C.	PRICE
D32	Con.	●	4/5	D	455	6A7, 6D6, 75, 42, 1867.	Y	N	10"	—	6	4	Y	D	360° 43"	N	N	N	N	—	Y	—	—	—	27/10/-
D36	Con.	●	5/6	D	455	6D6, 6A7, 6B7S, 75, 42, 1867.	Y	Y	12" 2000	—	6	5	Y	D	360° 71"	N	Y	Y	Y	—	Y	—	—	—	37/10/-
C36	Con.	●	4/5	B	158	6A7, 6B7S, 55, 42, 1867.	Y	N	12" 2000	—	6	5	Y	D	360° 71"	N	Y	Y	Y	—	Y	—	—	—	32/10/-
B33*	*	+	4	B	455	1C6, 1C4, 1B5, C243N.	Y	N	8" 2000 P.M.	—	2.5	3	N	S	360° 43"	N	N	N	N	Y	Y	2/100 0.5A	135	A	*

* This model when released will be available in both mantel and console cabinets. The dial used on Models D36 and C36 has 6E5 tuning indicator built-in.

AIRZONE

556	Con.	●	4/5	B	456	6A8, 6K7, 6J7, 6F6, 5Z4.	N	N	8"	Y	6.3	4	Y	S	O	Y	N	N	N	—	N	—	—	—	21/-/-
552A	Man.	●	4/5	B	456	6A7, 6D6, 6C6, 42, 80.	N	N	6"	—	6.3	4	Y	S	360° 8"x2" 5"	Y	N	N	N	—	N	—	—	—	17/12/6
553	Mid.	●	4/5	B	—	6F7, 6D6, 6C6, 41, 80.	N	N	5" 1500	N	6.3	2	N	S	360° 3"	N	N	N	N	—	N	—	—	—	14/14/-
554	Man.	●	4/5	B	—	6A8, 6K7, 6Q7, 6F6, 5Y3.	N	N	8" 2500	Y	6.3	2	N	S	360° 3"	N	N	N	N	—	Y	—	—	—	16/16/-
561	Con.	=	4/5	B	—	6F7, 6D6, 75, 43, 25Y5.	N	N	8"	—	6.3	3	Y	S	360° 5"	N	Y	N	N	—	N	—	—	—	26/19/6
567	Con.	●	4/5	D	—	6A8, 6K7, 6Q7, 6F6, 5Y3.	N	N	8"	Y	6.3	4	Y	S	O	N	Y	N	N	—	Y	—	—	—	28/15/-
582	Man.	●	4/5	D	456	6D6, 6A7, 6B7, 42, 80.	N	Y	6"	N	6.3	5	Y	S	360° 33" 31"	Y	N	N	N	—	Y	—	—	—	24/17/6
583	Con.	●	4/5	D	456	6D6, 6A7, 6B7, 42, 80.	N	Y	6"	N	6.3	5	Y	S	360° 31"	Y	N	N	N	—	Y	—	—	—	27/19/6
584	Con.	●	4/5	B	175	6D6, 6A7, 6B7S, 42, 80.	N	Y	8"	N	6.3	4	Y	S	360° 5"	Y	N	N	N	—	Y	—	—	—	23/17/6
635	Con.	=	5/6	B	175	6D6, 6A7, 6D6, 85, 43, 1V.	N	Y	10"	N	6.3	4	Y	S	180° 5"	Y	N	N	N	—	Y	—	—	—	31/15/-
672	Man.	●	5/6	D	456	6D6, 6A7, 6D6, 75, 42, 80.	N	Y	6"	N	6.3	5	Y	S	360° 5"	Y	N	N	N	—	Y	—	—	—	26/17/6
658	Con.	●	5/6	D	456	6D6, 6A7, 6D6, 75, 42, 80.	N	Y	8"	N	6.3	5	Y	S	360° 5"	Y	N	N	N	—	Y	—	—	—	31/-/-
660	Con.	●	5/6	D	456	6K7, 6A8, 6K7, 6Q7, 6F6, 5Z4.	N	Y	12"	Y	6.3	5	Y	D	360° 61"	Y	Y	N	Y	—	Y	—	—	—	39/18/-
563	Con.	+	5	B	175	1A4, 1C6, 1A4, 1B5, 22A.	N	N	8"	N	2	3	Y	S	360° 41"	N	N	N	N	Y	Y	2/120	135	4.5	28/19/6
671B	Con.	+	6	B	175	34, 1C6, 34, 25a, 30, 19.	N	Y	8" P.M.	N	2	4	Y	S	360° 5"	N	N	N	N	Y	Y	2/120	135	9	33/17/6
653	Con.	+	6	D	456	VP2, 1C6, VP2, 1B5, 30, 19.	N	Y	8" P.M.	N	2	5	Y	S	360° 6"	N	N	N	N	Y	Y	2/120	135	9	42/10/-

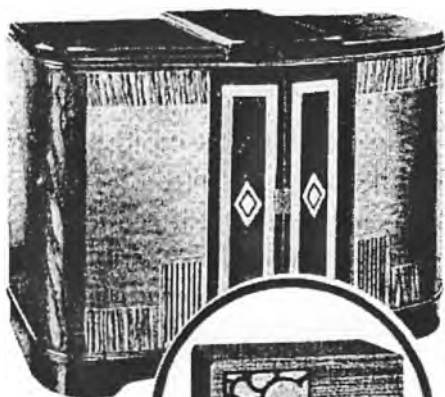
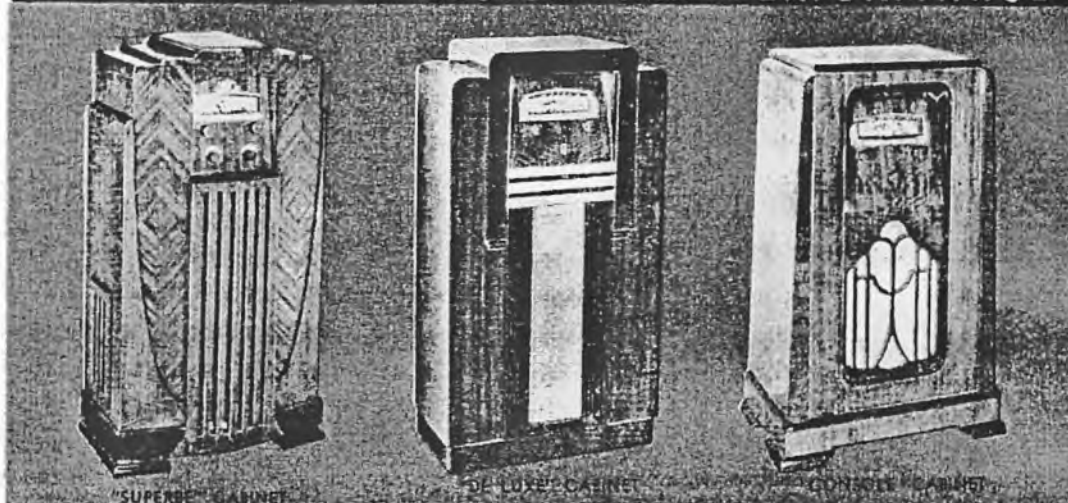
NOTE.—* Band spread needle pointer.

1936

ARISTOCRAT RADIO



PRE-EMINENT IN DESIGN AND PERFORMANCE



Above—
Radio-
Phonograph
Combination.

Aristocrat Radio for 1936 features a complete and comprehensive range of receivers . . . models for every purpose and for every purse.

Whatever type of receiver may be desired, whether it be A.C., A.C./D.C. or Battery-operated; Mantel, Console, or Radio-Phonograph combination; Broadcast or Dual-Wave . . . there is an "Aristocrat" that will give satisfaction—in appearance, operation and performance.

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S.W. Converter

At Left—
Mantel
Cabinet

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BANDMASTER

Model	Cabinet	Power	No. Valves	Coverage	Int. Freq.	VALVES USED	Band Pass	R.F. Stage	Speaker	Iron Cores	Dial Lamp	Controls	Tone Con.	Tuning	Dial	Sen. Con.	Tun. Indic.	Muting	Phone. Sw.	Lamp Sw.	A.V.C.	A.	B.	C.	PRICE
M656E	Man.	●	4/5	B	175	6D6, 6A7, 6B7, 42, 80.	N	Y 5"	1600	N	6.3	3	N	S	S 3"	Y	N	N	N	—	Y	—	—	—	15/15/-
D556E	Man.	●	4/5	D	460	6D6, 6A7, 6B7, 42, 80.	N	N 5"	1600	N	6.3	4	N	D	S 3 1/2"	Y	N	N	N	—	Y	—	—	—	19/19/-
M356E	Con.	●	4/5	B	175	6D6, 6A7, 6B7, 42, 80.	N	Y 8"	2000	N	6.3	4	Y	S	O	Y	N	N	N	—	Y	—	—	—	24/3/-
D356E	Con.	●	4/5	D	460	6A7, 6D6, 6B7, 42, 80.	N	N 8"	2000	N	6.3	5	Y	D	O 2 1/2"	Y	N	N	N	—	Y	—	—	—	27/6/-
M276E	Con.	●	6/7	B	175	6K7, 6A8, 6K7, 6H6, 6F5, 6F6, 80.	N	Y 10"	2000	N	6.3	4	Y	S	O 2 1/2"	Y	N	N	Y	—	Y	—	—	—	32/11/-
D276E	Con.	●	6/7	D	460	6K7, 6A8, 6K7, 6H6, 6F5, 6F6, 80.	N	Y 10"	2000	N	6.3	5	Y	D	O 2 1/2"	Y	N	N	Y	—	Y	—	—	—	36/15/-
D186E	Con.	●	7/8	D	460	6K7, 6A8, 6K7, 6H6, 6F5, 2-6F6, 80.	N	Y 10"	1000	N	6.3	5	Y	D	O 2 1/2"	Y	Y	N	Y	—	Y	—	—	—	44/2/-
M546B	Man.	+	4	B	460	1C6, 1C4, 1B5, 1D4.	N	N 5"	P.M.	N	2.5	4	Y	S	S 3"	N	N	N	N	Y	Y	2/100 0.54A	120	4.5	19/19/-
M346B	Con.	+	4	B	175	1C4, 1C6, 6B7, 1D4.	N	Y 8"	P.M.	N	6.3	4	Y	S	O 2 1/2"	N	N	N	N	Y	Y	6/100 0.54A	135	A	28/7/-
M256B	Con.	+	5	B	175	1C4, 1C6, 1C4, 1B5, 1D4.	N	Y 8"	P.M.	N	2.5	4	Y	S	O 2 1/2"	N	N	N	N	Y	Y	2/100 0.66A	135	4.5	30/9/-
D266B	Con.	+	6	D	460	1C4, 1C6, 2-1C4, 1B5, 1D4.	N	Y 8"	P.M.	N	2.5	5	Y	D	O 2 1/2"	N	N	N	N	Y	Y	2/120 0.78A	135	13.5	35/14/-

NOTE.—All models with the designation O are fitted with slide-rule type dials.
All models shown with dual-ratio tuning are equipped with automatic vernier tuning mechanisms.

BREVILLE

67	Con.	●	4/5	B	446	6C6, 6K7, 6C6, 6F6 & 80.	N	N 8"	2000	N	6	3	Y	S	360° 5"	N	N	N	N	—	N	—	—	—	A 19/19/- B 21/5/-
69	Con.	●	4/5	B	446	AK2, 6K7, E444N, 6F6 & 80.	N	N 10"	2000	N	6	3	Y	S	360° 5"	N	N	N	N	—	Y	—	—	—	A 23/5/- B 24/10/- C 25/10/-
76	Con.	●	4/5	D	446	AK2, 6K7, E444N, 6F6 & 80.	N	N 8"	2000	N	6	4	Y	S	360° 5"	N	N	N	N	—	N	—	—	—	A 23/5/- B 24/10/- C 25/10/-
70	Con.	●	4/5	D	446	AK2, 6K7, E444N, 6F6 & 80.	N	N 10"	2000	N	6	4	Y	S	360° 5"	N	N	N	N	—	Y	—	—	—	B 26/5/- C 27/5/- D 28/5/- E 36/5/-

Model	Cabinet	Power	No. Valves	Coverage	Int. Freq.	VALVES USED	Band Pass	R.F. Stage	Speaker	Iron Core	Dial Lamp	Controls	Tone Con.	Tuning	Dial	Sec. Con.	Tun. Indic.	Muting	Phone. Sw.	Lamp Sw.	A.V.C.	A.	B.	C.	PRICE
71	Con.	●	5/6	D	446	6K7, 6A8, 6K7, 75, 42 & 80.	N	Y 10"	Y	2000	6	4	Y	S	360° 5"	N	N	N	N	—	Y	—	—	—	C 31/15/- D 32/15/- E 40/15/- C 38/10/- D 39/10/- E 47/10/-
72*	Con.	●	6/7	D	446	6K7, 6A8, 6K7, 6B7, 79, 6F6 & 80.	N	Y 10"	Y	1000	6	4	Y	S	360° 5"	N	N	N	N	—	Y	—	—	—	A 24/10/- B 25/15/-
74	Con.	+	4	B	446	1C6, 1C4, 1B5, 1D4.	N	N 8"	Y	P.M.	2	3	N	S	360° 5"	N	N	N	N	Y	Y	2/100 0.74A	135	Auto	A 28/10/- B 29/15/- C 30/15/- D 31/15/- E 39/15/-
80	Con.	+	5	B	446	1C4, 1C6, 1C4, 1B5, 19.	N	Y 8"	Y	P.M.	2	3	N	S	360° 5"	N	N	N	N	Y	Y	2/100 0.88A	135	4.5	A 28/10/- B 29/15/- C 30/15/- D 31/15/- E 39/15/-
75	Con.	+	5	D	446	1C4, 1C6, 1C4, 1B5, 1D4.	N	Y 8"	Y	P.M.	2	4	Y	S	360° 5"	N	N	N	N	Y	Y	2/100 0.66A	135	4.5	B 32/5/- C 33/5/- D 34/5/- E 42/5/-
79	Con.	+	6	D	446	1C4, 1C6, 1C4, 1B5, B217, 19.	N	Y 8"	Y	P.M.	2	4	Y	S	360° 5"	N	N	N	N	Y	Y	2/100 0.78A	135	4.5	B 35/15/- C 36/15/- D 37/15/- E 45/15/- F 16/19/6
48	Mid.	●	4/5	B	446	6C6, 6D6, 6C6, 42 & 80.	N	N 6"	N	2000	6	3	Y	S	360° 5"	N	N	N	N	—	N	—	—	—	F 17/19/6
49	Mid.	≡	4/5	B	446	6C6, 6D6, 6C6, 43 & 25Y5.	N	N 6"	N	1250	6	3	Y	S	360° 5"	N	N	N	N	—	N	—	—	—	F 17/19/6

Last Col.: A, Richmond; B, York; C, Devon; D, New Beale; E, Edward; F, Clyde.
 * This model has variable selectivity, compensated tone control, push-pull output.
 All prices shown for Battery models are complete with accumulator, C battery and triple capacity B batteries.

BRITON

4MD	Man.	●	4/5	D	470	EK2, EF5, EBC3, EL3, EZ3.	N	N 6"	N		6	4	Y	S	5 3"	N	N	N	Y	—	Y	—	—	—	18/18/-
4AA	Con.	●	4/5	B	470	AF7, AF3, ABC1, AL2, 1561.	N	N 8"	N		6	3	Y	S	360° 5"	N	N	N	N	—	N	—	—	—	18/18/-
4AD	Con.	●	4/5	D	470	EK2, EF5, EBC3, EL3, EZ3.	N	N 8"	N		6	4	Y	S	360° 5"	N	Y	Y	Y	—	Y	—	—	—	25/4/-
6CDM	Con.	●	5/6	D	470	EK2, 6K7, 6H6, 6J7, 6F6, 1Y3.	Y	N 10"	N		6	4	Y	S	360° 5"	N	Y	Y	Y	—	Y	—	—	—	34/13/-
84	Con.	●	7/8	D	470	AK2, 2-AF3, ABC1, AC2, 2-E406N, 1561.	Y	N 10"	N		6	4	Y	S	360° 5"	N	Y	Y	Y	—	Y	—	—	—	47/5/-
94C	Comb.	●	7/8	D	470	AF3, AK2, 2-AF3 ABC1 AC2, 2-E406N, 1561.	Y	Y 10"	N		6	4	Y	S	360° 5"	N	Y	Y	Y	—	Y	—	—	—	68/5/-
94CS	Comb.	●	7/8	D	470	—	Y	Y 12"	N		6	4	Y	S	360° 5"	N	Y	Y	Y	—	Y	—	—	—	110/5/-
94CH*	Comb.	●	7/8	D	470	—	Y	Y †	N		6	4	Y	S	360° 5"	N	Y	Y	Y	—	Y	—	—	—	157/10/-
5B	Con.	+	5	B	178.5	2-1C4, KK2, 1B5, 1D4.	N	Y 8"	N	P.M.	2.5	3	N	S	360° 5"	N	N	N	N	Y	Y	2/100 0.74A	135	A	24/10/-
6B	Con.	+	6	B	178.5	2-1C4, KK2, 1B5, B217, B240.	N	Y 8"	N	P.M.	2.5	3	N	S	360° 5"	N	N	N	N	Y	Y	2/100 0.88A	135	4.5	28/10/-
12	Con.	≡	6	B	178.5	CK1, CF2, CBC1, CL2, C1, CY2.	Y	N 8"	N		4	3	Y	S	360° 5"	N	N	N	N	N	N	—	—	—	25/10/-

* Automatic record changer. Marconiphone pick-up.
 † High fidelity speaker.

Australian Radio History '45 to '49

CALSTAN

SS1	Con.	●	4/5	B	450	2-6C6, 6D6, 42, 80.	N	N	8"	Y	6.3	3	Y	S	360°	N	N	N	N	N	N	—	—	—	18/5/-		
SS1V	Con.	●	4/5	B	450	6C6, 6D6, 75, 42, 80.	N	N	8"	Y	6.3	3	Y	S	360°	N	*	N	N	N	Y	—	—	—	19/5/-		
SS1U	Con.	=	4/5	B	450	6C6, 6D6, 75, 43, 25Y†.	N	N	8"	Y	6.3	3	Y	S	360°	N	*	N	N	N	Y	—	—	—	19/5/-		
D5A	Con.	●	4/5	D	450	AK2, AF3, ABC1, AL2, 1561.	N	N	8"	N	—	4	4	Y	S	360°	Y	N	N	N	N	N	—	—	—	19/5/-	
D5AV	Con.	●	4/5	D	450	AK2, AF3, ABC1, AL2, 1561.	N	N	8"	N	—	4	4	Y	S	360°	Y	*	N	N	N	Y	—	—	—	24/10/-	
D5AVU	Con.	=	4/5	D	450	CK1, CF2, CBC1, CL2, CY2, C1.	N	N	8"	N	—	4	4	Y	S	360°	Y	*	N	N	N	Y	—	—	—	24/10/-	
D5M†	Con.	●	4/5	D	450	MG, 6A8, 6K7, 6B6, 6R6, 5Z4.	N	N	8"	Y	6.3	4	Y	S	360°	Y	*	N	N	N	Y	—	—	—	25/-/-		
D6A	Con.	●	5/6	D	450	6D6, 6A7, 6B7, 75, 42, 80.	N	Y	8"	Y	6.3	4	Y	S	360°	N	*	N	N	N	Y	—	—	—	32/10/-		
D6S	Con.	●	6/7	D	450	6D6, 6A7, 6B7, 75, 6C6, 42, 80.	N	Y	8"	Y	6.3	5	Y	S	360°	N	*	Y	N	N	Y	—	—	—	35/10/-		
D6B	Con.	+	6	D	450	2-KF2, 1C6, 1B5, B217, B240.	N	Y	8"	Y	—	2	5	Y	S	360°	N	N	N	N	N	Y	2/60 0.96A	135 4.5	—	—	33/10/-

NOTE.—SS1 and D6 models may be obtained with M.G. valve equipment.

* Tuning indicator (6E5) may be fitted at small extra cost.

† These models have band spread Edgelit dials.

Muting is provided in model D6S by means of special automatic noise suppression circuit.

GENALEX

BC310	Con.	+	5	D	470	EK1, 75, PM12M, 2-19.	N	N	8"	Y	6.3	4	Y	S	360°	N	N	N	N	N	Y	6 0.96A	135 A	—	—	—	35/10/-	
BC315	Car	+	5/6	B	—	6D6, 6A7, 6D6, 75, 42, 84.	N	Y	6"	N	—	2	Y	S	5	N	N	N	—	—	Y	—	G A	—	—	—	29/15/-	
BC320	Man.	●	4/5	B	470	EK1, 75, 42, 6D6, 80.	N	N	6"	N	6.3	2	N	S	360°	N	N	N	N	—	Y	—	—	—	—	—	16/16/-	
BC325	Con.	●	5/6	D	470	2-6D6, 42, 75, 6A7, 80.	N	Y	10"	Y	6.3	4	Y	S	360°	Y	N	N	N	—	Y	—	—	—	—	—	37/10/-	
BC330	Con.	=	6/7	D	470	2-CF2, CK1, CBC1, CL2, CY2, C1.	N	Y	10"	Y	—	4	Y	S	360°	N	N	N	N	—	Y	—	—	—	—	—	39/10/-	
BC335	Con.	+	6	D	405	2-1C4, 1C6, 1B5, 2-19.	N	Y	10"	Y	—	2	4	Y	S	360°	N	N	N	N	N	Y	2/150 0.9A	135 4.5	—	—	—	43/10/-
BC350**	Con.	●	4/5	B	470	EK1, 6D6, 75, 42, 80.	N	N	8"	Y	6.3	4	Y	S	360°	Y	N	N	N	—	Y	—	—	—	—	—	31/15/-	
BC360§§	Con.	●	4/5	B	470	EK1, 6D6, 75, 42, 80.	N	N	8"	Y	6.3	3	Y	S	360°	N	N	N	N	—	Y	—	—	—	—	—	21/17/6	
BC365†	Con.	●	4/5	D	470	6A7, 6D6, 75, 42, 80.	N	N	8"	Y	6.3	4	Y	S	360°	Y	N	N	N	—	Y	—	—	—	—	—	29/15/-	
BC370††	Con.	=	5/6	B	470	CK1, CF2, CBC1, CL2, CY2, C1.	N	N	8"	Y	—	3	Y	S	360°	N	N	N	N	—	Y	—	—	—	—	—	23/17/6	
BC375	Con.	+	4	B	470	1C6, C4, B5, D4.	N	N	8"	Y	—	2	3	Y	S	360°	N	N	N	N	N	Y	2/100 0.54A	135 4.5	—	—	—	98/10/-
BC380*	Comb.	●	7/8	D	470	2-6D6, 6A7, 75, 6A6, 2-42, 80.	N	Y	12"	Y	6.3	5	Y	S	360°	Y	Y	N	Y	—	Y	—	—	—	—	—	98/10/-	

NOTE.—All dial drives are of the counter-balanced band spread type, except those fitted to models BC315 and BC320.

§ Remote control automobile flex. cables either dash-board or steering column type.

* Any A.C., AC/DC or Battery chassis with either Automatic Record Changer (A.C. only), Electric Motor and Pickup or (in the case of Battery receivers)

Spring type motor with pickup, can be obtained in this cabinet. Price on application.

** This model is available in table type cabinet at 26/15/-.

§§ Available also in table type cabinet at 19/19/-.

† Available also in table type cabinet at 25/15/-.

†† Available also in table type cabinet at 21/17/6.

HIS MASTER'S VOICE

Model	Cabinet	Power	No. Valves	Coverage	Int. Freq.	VALVES USED	Band Pass	R.F. Stage	Speaker	Iron Core	Dial Lamp	Controls	Tone Con.	Tuning	Dial	Sen. Con.	Tun. Indic.	Muting	Phone. Sv.	Lamp Sv.	A.Y.C.	A.	B.	C.	PRICE
121	Con.	●	5/6	B	460	2-6D6, 6A7, 6B7, 42 & 80.	N	Y	6 1/2"	N	6.3	3	Y	S	360° 1270 80.	N	N	N	Y	—	Y	—	—	—	28/7/-
719	Con.	●	5/6	T	460	2-6D6, 6A7, 6B7, 42 & 80.	N	Y	6 1/2"	N	6.3	5	Y	D	360° 1270 80.	Y	Y	—	Y	—	Y	—	—	—	38/17/-
718	Man.	●	5/6	T	460	2-6D6, 6A7, 6B7, 42 & 80.	N	Y	6 1/2"	N	6.3	5	Y	D	360° 1270 80.	Y	Y	—	Y	—	Y	—	—	—	30/9/-
720	Com.	●	5/6	T	460	2-6D6, 6A7, 6B7, 42 & 80.	N	Y	6 1/2"	N	6.3	5	Y	D	360° 1270 80.	Y	Y	—	Y	—	Y	—	—	—	51/9/-

NOTE.—Models 718 and 719 have band spread dials. Wave bands are 175-560, 55-175 and 16.5-55 metres.

LEKMEK

406	Mid.	●	3/4	B	458	6A7, 6B7S, 6F6, 80.	N	N	5"	N	6.3	2	N	S	360°	N	N	N	N	—	N	—	—	—	11/11/-
513	Man.	●	4/5	B	458	AK2, 6K7, 6B7S, 42, 80.	N	N	8"	N	6.3	3	Y	S	360° 2500	N	N	N	N	—	Y	—	—	—	18/18/-
513C*	Con.	●	4/5	B	458	AK2, 6K7, 6B7S, 42, 80.	N	N	8"	N	6.3	3	Y	S	360° 2500	N	N	N	N	—	Y	—	—	—	19/19/-
514	Man.	●	4/5	D	458	AK2, 6K7, 6B7S, 42, 80.	N	N	8"	N	6.3	4	Y	S	360° 2500	N	N	N	N	—	Y	—	—	—	19/19/-
514C†	Con.	●	4/5	D	458	AK2, 6K7, 6B7S, 42, 80.	N	N	8"	N	6.3	4	Y	S	360° 2500	N	N	N	N	—	Y	—	—	—	24/3/-
516	Con.	+	5	B	458	KK2, 1C4, 1C4, 25S, C243N.	N	N	8"	N	2.5	4	Y	S	360° 2500	N	N	N	N	N	Y	2/100	135	9	30/19/-
518	Con.	+	5	D	458	KK2, 1C4, 1C4, 25S, C243N.	N	N	8"	N	2.5	5	Y	S	360° 2500	N	N	N	N	N	Y	2/100	135	9	32/11/-
614	Con.	+	6	B	458	1C4, KK2, 1C4, 1C4, 25S, C243N.	N	Y	10"	N	2.5	4	Y	S	360° 2500	N	N	N	N	N	Y	2/100	135	9	37/16/-
710**	Con.	●	6/7	D	458	AK2, 6K7, 75, 75, 42, 42, 80.	N	N	10"	N	6.3	5	Y	D	360° 750	Y	N	Y	N	N	Y	—	—	—	35/14/-

* Available also in Venus cabinet with 10" Speaker at 22 gns.

† Available also in Venus cabinet with 10" Speaker at 25 gns.

** Available in Special Arcturus cabinet and fitted with magic eye at 37 guineas.

KRIEGLER

170	Man.	●	4/5	D	458	6A8, 6K7, 6Q7, 6F6, & 5Y3.	N	N	8"	N	6.3	3	N	S	360° 5"	N	N	N	N	—	Y	—	—	—	17/17/-
150	Man.	●	4/5	D	458	6A7, 6D6, 75, 42, 80.	N	N	8"	N	6.3	3	N	S	360° 5"	N	N	N	N	—	Y	—	—	—	15/15/-
210*	Con.	●	4/5	D	175	6A7, 6D6, 75, 42, 80.	Y	N	8"	N	6.3	4	Y	S	360° 5"	N	N	Y	N	—	Y	—	—	—	19/19/-
220†	Con.	●	4/5	D	175	6A8, 6K7, 6Q7, 6F6G, 5Y3.	Y	N	8"	N	6.3	4	Y	S	360° 5"	N	N	Y	N	—	Y	—	—	—	26/10/-
240**	Con.	●	5/6	D	458	2-6K7, 6A8, 6Q7, 6F6G, 5Y3.	N	Y	8"	N	6.3	4	Y	S	360° 5"	N	N	Y	N	—	Y	—	—	—	30/10/-
260††	Con.	●	6/7	D	458	3-6K7, 6A8, 6Q7, 6F6G, 5Y3.	N	Y	8"	N	6.3	4	Y	S	360° 5"	N	N	Y	N	—	Y	—	—	—	33/15/-

(Continued on page 271)

KRIESLER—(Continued)—

Model	Cabinet	Power	No. Valves	Coverage	Int. Freq.	VALVES USED	Bond Pans	R.F. Stage	Speaker	Iron Cases	Dial Lamp	Controls	Tune Con.	Tuning	Dial	Sen. Con.	Tun. Indic.	Muting	Phone. Sw.	Lamp Sw.	A.V.C.	A	B	C	PRICE
280§	Con.	●	9/10	D	458	3-6K7, 6A8, 6Q7, 6F5, 2-6F6, 5Y3.	N	Y	10" N	6.3	4	Y	S	360° N	Y	Y	Y	N	—	Y	—	—	—	—	39/19/6
400§§	Man.	+	4	B	458	1C6, 1C4, 2-19.	N	N	8" N	2	3	N	S	360° N	N	N	N	N	Y	N	2/100	150	4.5	—	22/10/-
410‡	Con.	+	5	B	175	2-1C4, 1C6, 1B5, 1D4.	N	Y	8" N	2	4	Y	S	360° —	—	—	—	—	—	—	2/100	135	4.5	—	30/10/-
420‡‡	Con.	+	5	D	458	2-1C4, 1C6, 1B5, 1D4.	N	Y	8" N	2	4	Y	S	360° N	N	N	N	N	Y	Y	2/100	135	4.5	—	32/10/-
430||	Con.	+	7	D	458	4-1C4, 1C6, 1B5, 19.	N	Y	8" N	2	4	Y	S	360° N	N	N	N	N	Y	Y	2/100	135	1.5	—	37/10/-
440|||	Con.	=	4/5	B	175	6A7, 6D6, 75, 43, 25Y5.	Y	N	8" N	6.3	4	Y	S	360° N	N	N	N	N	—	Y	—	—	—	—	—
410	Con.	=	4/5	D	175	6A7, 6D6, 75, 43, 25Y5.	Y	N	8" N	6.3	4	Y	S	360° N	N	N	N	N	—	Y	—	—	—	—	—

* Available in cabinet type 44 at 22/10/-.
 † Available in cabinet type 44 at 28/15/-; type 55 at 29/15/-; and type 66 at 32/15/-.
 ‡ Available in cabinet type 44 at 32/15/-; type 55 at 33/19/-; and type 66 at 36/19/-.
 ‡‡ Available in cabinet type 44 at 36/-/-; type 55 at 37/5/-; and type 66 at 40/5/-.
 § Available in cabinet type 44 at 42/5/-; type 55 at 43/10/-; and type 66 at 46/10/-.
 §§ Available in cabinet type 33 at 25/10/-; type 44 at 27/15/-.
 ¶ Available in cabinet type 44 at 32/15/-; type 55 at 34/-/-; and type 66 at 37/-/-.
 ¶¶ Available in cabinet type 44 at 34/15/-; type 55 at 36/-/-; and type 66 at 39/-/-.
 ¶¶¶ Available in cabinet type 44 at 39/15/-; type 55 at 41/-/-; and type 66 at 44/-/-.
 ¶¶¶¶ Available in cabinet type 44 at 26/15/-; type 55 at 28/-/-.

MULLARD

Mark I.	*	+	7	B	450	VP2, SP2, 2-VP2, TDD2, PM2DX, PM2B.	N	Y	8" N	N	3	N	S	5 3/4"	Y	N	N	N	N	Y	6/120 0.48A	135†	Auto	—	28/10/-
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* This unit may be fitted to any type of cabinet or used without cabinet as a self-contained unit.
 † Battery reserve switch fitted to back of chassis.

NICHOLSON

A45	Con.	●	3/4	B	456	6A7, 6B7, AL3, 80.	N	N	8" N	6	—	—	S	O	N	N	N	N	N	—	N	—	—	—	—	17/17/-
Mozart																										
B56	Con.	●	4/5	B	456	6A8, 6K7, 6Q7, 6F6, 5Z4.	N	N	8" N	6	—	—	S	O	N	N	N	N	N	—	Y	—	—	—	—	22/1/-
Beethoven																										
B565	Con.	●	4/5	B	456	6A8, 6K7, 6Q7, 6F6, 5Z4.	N	N	8" N	6	—	—	S	O	N	N	N	N	N	—	Y	—	—	—	—	24/3/-
Schubert																										
CD566	Con.	●	4/5	D	456	6A8, 6K7, 6Q7, 6F6, 5Z4.	N	N	8" N	6	—	—	S	O	Y	N	N	N	N	—	Y	—	—	—	—	25/4/-
Liszt																										
CDS56	Con.	●	4/5	D	456	6A8, 6K7, 6Q7, 6F6, 5Z4.	N	N	8" N	6	—	—	S	O	Y	N	N	N	N	—	Y	—	—	—	—	28/7/-
Bach																										
D65	Con.	●	5/6	D	456	6A8, 6K7, 6Q7, 6J7, 6P6, 5Z4.	N	Y	8" N	6	—	—	S	O	Y	N	N	N	N	—	Y	—	—	—	—	34/13/-
Chopin																										
DS656	Con.	●	5/6	D	456	6A8, 6K7, 6F6, 6J7, 6Q7, 5Z4.	N	Y	8" N	6.3	4	Y	S	O	Y	N	N	N	N	—	Y	—	—	—	—	38/17/-
Strauss																										

PHILCO

Model	Cabinet	Power	No. Valves	Coverage	Inf. Freq.	VALVES USED	Band Pass	R.F. Stage	Speaker	Iron Cores	Dial Lamp	Controls	Tone Cont.	Tuning	Dial	Son. Con.	Tun. Indic.	Muting	Phono. Sw.	Lamp Sw.	A.V.C.	A.	B.	C.	PRICE
654D	Con.	●	4/5	B	—	—	Y	N	10"	N	6.3	3	Y	S	360°	N	Y	N	N	—	Y	—	—	—	30/9/-
67U	Con.	≡	4/5	B	—	—	N	N	8"	N	—	3	Y	S	360°	N	N	N	N	—	Y	—	—	—	30/9/-
653	Con.	●	4/5	B	—	—	N	N	8"	N	6.3	3	Y	S	360°	N	N	N	N	—	Y	—	—	—	26/5/-
654	Con.	●	4/5	B	—	—	Y	N	8"	N	6.3	3	Y	S	360°	N	N	N	N	—	Y	—	—	—	28/7/-
651	Man.	●	4/5	B	—	—	N	N	6"	N	6.3	2	N	S	360°	N	N	N	N	—	N	—	—	—	17/17/-
652	Con.	●	4/5	B	—	—	N	N	8"	N	6.3	3	Y	S	360°	N	N	N	N	—	N	—	—	—	22/1/-
64B	Con.	+	4	B	—	—	N	N	8"	N	2	3	Y	S	360°	N	N	N	N	Y	N	2	135	—	28/7/-
68B	Con.	+	8	T	—	—	N	Y	10" P.M.	N	2	4	Y	D	360°	Y	N	N	N	Y	Y	2	180	A	54/12/-
66X	Con.	+	6	D	—	—	N	N	10" P.M.	N	2	4	Y	D	360°	N	N	N	N	Y	Y	2	135	—	44/2/-
66B	Con.	+	6	B	—	—	N	Y	8" P.M.	N	2	4	Y	S	360°	N	N	N	N	Y	Y	2	135	—	38/17/-
688	Con.	●	7/8	D	—	—	N	Y	12" P.M.	N	6.3	4	Y	D	360°	Y	Y	N	N	—	Y	—	—	—	50/8/-
667	Con.	●	5/6	D	—	—	N	Y	10"	N	6.3	4	Y	D	360°	Y	Y	N	N	—	Y	—	—	—	39/18/-
656	Con.	●	4/5	D	—	—	N	Y	10"	N	6.3	4	Y	D	360°	Y	Y	N	N	—	Y	—	—	—	32/11/-
655	Con.	●	4/5	D	—	—	N	N	8"	N	6.3	4	Y	D	360°	Y	N	N	N	—	Y	—	—	—	31/10/-
609*	Con.	●	9/10	T	—	—	N	Y	12"	N	6.3	4	Y	D	360° †	Y	Y	N	N	—	Y	—	—	—	68/5/-

NOTE.—In triple wave models the coverage is complete from 18 megacycles to 530 k.c. (16—560 m.). Dual wave models 16-53 and 190-560 m.
 * This model has variable selectivity, also two-in-one high fidelity speaker.
 † Special type dial with shadowgraph tuning.

RADIOLA

31/32	Man.*	●	4/5	B	175	6D6, 6A7, 6B7, 42, 80.	N	Y	5" 1600	N	6.3	3	N	S	5 3"	Y	N	N	N	—	Y	—	—	—	15/15/-
33	Man.†	●	4/5	D	460	6D6, 6A7, 6B7, 42, 80.	N	N	5" 1600	N	6.3	4	N	D	5 3 1/2"	Y	N	N	N	—	Y	—	—	—	19/19/-
195	Con.	●	4/5	B	175	6D6, 6A7, 6B7, 42, 80.	N	Y	8" 2000	N	6.3	4	Y	S	0 7 1/2" 2 1/2"	Y	N	N	N	—	Y	—	—	—	24/3/-
248	Con.	●	4/5	D	460	6A7, 6D6, 6B7, 42, 80.	N	N	8" 2000	N	6.3	1	Y	D	0 7 1/2" 2 1/2"	Y	N	N	N	—	Y	—	—	—	27/6/-

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Model	Cabinet	Power	No. Valves	Coverage	Int. Freq.	VALVES USED	Band Pass	R.F. Stage	Speaker	Iron Cores	Dial Lamp	Controls	Tone Con.	Tuning	Dial	Sen. Con.	Tun. Indic.	Muting	Phone. Sw.	Lamp Sw.	A.V.C.	A	B	C	PRICE
RADIOLA—(Continued)—																									
158	Con.	●	6/7	B	175	6K7, 6A8, 6K7, 6H6, 6F5, 6F6, 80.	N	Y 10 ^o	N	6.3	4	Y	S	O	Y	N	N	Y	—	Y	—	—	—	—	32/11/-
249	Con.	●	6/7	D	460	6K7, 6A8, 6K7, 6H6, 6F5, 6F6, 80.	N	Y 10 ^o	N	6.3	5	Y	D	O	Y	N	N	Y	—	Y	—	—	—	—	36/15/-
251	Con.	●	7/8	D	460	6K7, 6A8, 6K7, 6H6, 6F5, 2-6F6, 80.	N	Y 10 ^o	N	6.3	5	Y	D	O	Y	Y	N	Y	—	Y	—	—	—	—	44/2/-
35	Man.†	+	4	B	460	1C6, 1C4, 1B5, 1D4.	N	N 5 ^o	N	2.5	4	Y	S	S	N	N	N	N	Y	Y	2/100	120	4.5	—	19/19/-
156	Con.	+	4	B	175	1C4, 1C6, 6B7, 1D4.	N	Y 8 ^o	N	6.3	4	Y	S	O	N	N	N	N	Y	Y	6/100	135	A	—	28/7/-
177	Con.	+	5	B	175	1C4, 1C6, 1C4, 1B5, 1D4.	N	Y 8 ^o	N	2.5	4	Y	S	O	N	N	N	N	Y	Y	2/100	135	4.5	—	30/9/-
250	Con.	+	6	D	460	1C4, 1C6, 2-1C4, 1B5, 1D4.	N	Y 8 ^o	N	2.5	5	Y	D	O	N	N	N	N	Y	Y	2/120	135	13.5	—	35/14/-

* Moulded Radelec cabinets. Model 31 in black, Model 32 in ivory. All models designated O are fitted with straight line tuning slide rule type dials.
 † Moulded Radelec cabinet, black finish relieved with green fret and base. All models shown with dual ratio tuning are equipped with automatic vernier tuning mechanisms.

RADIOPLAYER

6506	Man	●	4/5	B	462	AK2, AF3, ABC1, AL2, EZ3.	N	N 5 ^o	Y	4.5	2	N	S	S	N	N	N	N	—	Y	—	—	—	—	15/15/-
6507	Con.	●	4/5	B	462	do.	N	N 8 ^o	Y	4.5	2	N	S	S	N	N	N	N	—	Y	—	—	—	—	19/19/-
6608	Con.	●	5/6	D	462	AK2, AF3, AB2, AC2, AL2, EZ3.	N	N 8 ^o	Y	6811	3	Y	S	S	N	Y	N	Y	—	Y	—	—	—	—	28/7/-
6709	Con.	●	6/7	D	462	2-AF3, AK2, AB2, AC2, AL2, EZ3.	N	Y 10 ^o	Y	6811	3	Y	S	S	N	Y	N	Y	—	Y	—	—	—	—	35/14/-

SANDEL

5G36	Man.	●	4/5	B	460	6C6, 6D6, 6C6, 42, 80.	N	N 8 ^o	N	6.3	3	Y	S	360 ^o	Y	N	N	N	—	N*	—	—	—	—	**14/14/-
5M36	Man.	●	4/5	B	460	6J7, 6K7, 6J7, 6F6, 5Z4.	N	N 8 ^o	N	6.3	3	Y	S	360 ^o	Y	N	N	N	—	N*	—	—	—	—	†18/18/-
6G36	Con.	●	5/6	B	460	6D6, 6A7, 6D6, 75, 42, 80.	N	Y 8 ^o	N	6.3	3	Y	S	360 ^o	N	N	N	N	—	Y	—	—	—	—	††22/10/-
5DW36	Con.	●	4/5	D	460	6A7, 6D6, 75, 42, 80.	N	N 8 ^o	N	6.3	4	Y	S	360 ^o	N	N	N	N	—	Y	—	—	—	—	§19/19/-
6DW36	Con.	●	5/6	D	460	6D6, 6A7, 6D6, 75, 42, 80.	N	Y 8 ^o	N	6.3	4	Y	S	360 ^o	N	N	N	N	—	Y	—	—	—	—	§§27/10/-
636B	Con.	+	6	B	460	1C4, 1C6, 1C4, 1B5S, 1C4, 1D4.	N	Y 8 ^o	N	2.5	4	Y	S	360 ^o	N	N	N	N	Y	Y	2/100	135	9	—	§§27/10/-
736B	Con.	+	7	B	460	1C4, 1C6, 1C4, 1B5S, 30, 2-1D4.	N	Y 10 ^o	N	2.5	4	Y	S	360 ^o	N	N	N	N	Y	Y	2/100	139	9	—	§§29/15/-

Model	Cabinet	Power	No. Valves	Coverage	Int. Freq.	VALVES USED	Band Pass	R.F. Stage	Speaker	Iron Core	Dial Lamp	Controls	Tone Con.	Tuning	Dial	Sen. Con.	Tun. Indic.	Muting	Phone. Sw.	Lamp Sw.	A.V.C.	A	B	C	PRICE
636BDW	Con.	+	6	D	460	1C4, 1C6, 1C4, 1B5S, 1C4, 1D4.	N	Y	8" P.M.	N	6.3	1	Y	S	350°	N	N	N	N	Y	Y	2/100	135	9	£\$34/10/-
736BDW	Con.	+	7	D	460	1C4, 1C6, 1C4, 1B5S, 30, 2-1D4.	N	Y	10" 2000 P.M.	N	2.5	1	Y	S	350°	N	N	N	N	Y	Y	2/100	135	9	£\$37/10/-

NOTE.—All Battery receivers also A.C. dual-wave models are available with Edgelit dials at same price. A.C. Broadcast models fitted with Edgelit dial at 21/- extra.

* These models are fitted with A.V.C. if desired.

** In York console; also available in Milton or Lytton at 16/16/- or Chaucer console at 17/17/-.

† In Milton or Lytton consoles; also available in Chaucer console at 19/19/-.

‡ Same price in either Milton, Lytton or Chaucer consoles.

§ In Milton or Lytton consoles; also available in Chaucer console at 21/10/-.

§§ In Milton or Lytton consoles; also available in Chaucer console at 20/- extra.

STROMBERG-CARLSON

496	Man.	●	3/4	B	465	6C6, 6A7, AL3, 80.	N	N	7" N		6	2	N	S	S	N	N	N	N	—	N	—	—	—	14 gns.
55B	Man.	=	4/5	B	465	CBC1, C1, CY2, CL2, CF1, CK1.	N	N	8" N		240	4	Y	S	S	Y	N	N	N	—	Y	—	—	—	18 gns.
566	Con.	=	4/5	B	465	CBC1, C1, CY2, CL2, CF1, CK2.	N	N	8" N		240	4	Y	S	O	Y	N	N	N	—	Y	—	—	—	24 gns.
556	Con.	●	4/5	B	250	6A7, 6F7, 6B7, AL3, 80.	N	Y	8" N		6	3	Y	S	O	N	N	N	N	—	Y	—	—	—	27 gns.
536	Con.	●	4/5	D	250	6A7, 6F7, 6B7, AL3, 80.	N	Y	8" N		6	4	Y	D	O	N	N	N	Y	—	Y	—	—	—	31 gns.
736	Con.	●	6/7	D	392	6D6, 6A7, 6B7, 79, 80, 2-42.	N	Y	8" N		6	4	Y	D	O	N	Y	N	Y	—	Y	—	—	—	39 gns.
836	Con.	=	7/8	D	392	CL, CY2, CB1, 2-CF2, 2-CL2, CK1, CF1.	N	Y	8" N		240	4	Y	D	O	N	Y	N	Y	—	Y	—	—	—	43 gns.
466	Con.	+	4	B	465	KP1, KK2, 25S, C243N.	N	N	8" N		2	3	N	S	O	N	N	N	N	Y	Y	2/100	135	A	25 gns.
506	Con.	+	5	B	175	KK2, 25S, C243N, 2-1C4.	N	Y	8" N		2	3	N	S	O	N	N	N	N	Y	Y	2/100	135	A	29 gns.
666	Con.	+	6	D	392	1C6, 25S, C243N, 3-1C4.	N	Y	8" N		2	4	N	D	O	N	N	N	N	Y	Y	2/100	135	A	37 gns.
888	Con.	+	8	D	392	25S, KK2, 2-30, 4-1C4.	N	Y	8" N		2	4	N	D	O	N	N	N	N	Y	Y	2/100	135	A	45 gns.

S. T. C.

514	Man.	●	4/5	B	450	6A7, 6D6, 6C6, 42, 80.	N	N	8" N		6.3	—	N	S	§	N	N	N	N	—	N	—	—	—	16/16/-
511	Con.	●	4/5	B	450	6A7, 6D6, 6C6, 42, 80.	N	N	8" N		6.3	—	N	S	§	N	N	N	N	—	N	—	—	—	19/19/-
580	Con.	●	4/5	B	450	6A8, 6K7, 6J7, 6F6, 5Y3.	N	N	8" N		6.3	—	Y	S	§	Y	N	N	N	—	N	—	—	—	24/3/-
530	Con.	●	4/5	D	450	6A8, 6K7, 6Q7, 6F6, 5Y3.	N	N	8" Y		6.3	—	Y	D	§	Y	N	N	N	—	Y	—	—	—	29/8/-
577D	Con.	=	4/5	B	450	2-6C6, 6D6, 43, 12Z3.	N	Y	8" N		6.3	—	N	S	§	N	N	N	N	—	N	—	—	—	26/10/-
613	Con.	●	5/6	B	175	2-6K7, 6A8, 6Q7, 6F6, 5Y3.	N	Y	8" Y		6.3	—	Y	S	§	N	Y	N	N	—	Y	—	—	—	30/9/-
623	Con.	●	5/6	D	450	2-6K7, 6A8, 6Q7, 6F6, 5Y3.	N	Y	10" Y		6.3	—	Y	D	§	Y	Y	N	N	—	Y	—	—	—	35/14/-
452B	Con.	+	4	B	450	1C6, 30, 33, 34.	N	N	8" N		6.3	—	N	S	§	N	N	N	N	Y	N	6/100	135	A	23/10/-
510B	Con.	+	5	B	175	2-1C4, 1C6, 1B5/25S, 1D4.	N	Y	8" P.M.		2	—	N	S	§	N	N	N	N	Y	Y	2/90	135	A	29/8/-

Model	Cabinet	Power	No. Valves	Coverage	Int. Freq.	VALVES USED	Band Pass	R.F. Stage	Speaker	Iron Cores	Dial Lamp	Controls	Tone Con.	Tuning	Dial	Sen. Con.	Tun. Indic.	Muting	Phone. Sw.	Lamp Sw.	A.V.C.	A.	B.	C.	PRICE
520B	Con.	+	5	D	470	2-1C4, 1C6, 1B5/2F5, 1D4.	N	Y	8" P.M.	Y	2	—	N	D	5	Y	N	N	N	Y	Y	2/90 0.6A	135	A	34/13/-
677B	Con.	+	6	B	450	19, 6A7, 2-34, 2-30.	N	Y	8" P.M.	N	6	—	N	S	5	N	N	N	N	Y	Y	6/140 0.55A	135	9	38/15/-
780B	Con.	+	7	D	470	3-1C4, 1C6, 1B5/2F5, 30, 19.	N	Y	8" P.M.	Y	2	—	N	D	5	Y	N	N	N	Y	Y	2/140 0.9A	135	9	40/19/-

§ Special ovaloid spotlight tuning dial.

TASMA

305	Con.	●	4/5	B	175	EK1, 6D6, 75, 42, 80.	Y	N	8" Y	6.3	3	Y	S	360° 5"	N	N	N	N	—	Y	—	—	—	—	25/19/6
310*	Con.	+	5	D	470	EK1, 75, PM12M, 2-19.	N	N	8" Y P.M.	6.3	4	Y	S	360° 5"	N	N	N	N	N	Y	Y	6 0.96A	135	A	35/10/-
315	Car	+	5/6	B	—	6D6, 6A7, 6D6, 75, 42, 84.	N	Y	6" N 6	—	2	Y	§	§	N	N	N	—	—	Y	—	G	A	29/15/-	
320	Man.	●	4/5	B	470	EK1, 75, 42, 6D6, 80.	N	N	6" N	6.3	2	N	S	360° 5"	N	N	N	N	—	Y	—	—	—	—	16/16/-
325	Con.	●	5/6	D	470	2-6D6, 42, 75, 6A7, 80.	N	Y	10" Y 1650	6.3	4	Y	S	360° 5"	Y	N	N	N	—	Y	—	—	—	—	37/10/-
330	Con.	=	6/7	D	470	2-CF2, CK1, CBC1, CL2, CY2, Cl.	N	Y	10" Y 1650	—	4	Y	S	360° 5"	N	N	N	N	—	Y	—	—	—	—	39/10/-
335	Con.	+	6	D	405	2-1C4, 1C6, 1B5, 2-19.	N	Y	10" Y	2	4	Y	S	360° 5"	N	N	N	N	N	Y	Y	2/150 0.9A	135	4.5	43/10/-
350	Con.	●	4/5	B	470	EK1, 6D6, 75, 42, 80.	N	N	8" Y	6.3	4	Y	S	360° 5"	Y	N	N	N	—	Y	—	—	—	—	31/15/-
360	Con.	●	4/5	B	470	EK1, 6D6, 75, 42, 80.	N	N	8" Y	6.3	3	Y	S	360° 5"	N	N	N	N	—	Y	—	—	—	—	21/17/6
365	Con.	●	4/5	D	470	6A7, 6D6, 75, 42, 80.	N	N	8" Y	6.3	4	Y	S	360° 5"	Y	N	N	N	—	Y	—	—	—	—	29/15/-
370	Con.	=	5/6	B	470	CK1, CF2, CBC1, CL2, CY2, Cl.	N	N	8" Y	—	3	Y	S	360° 5"	N	N	N	N	—	Y	—	—	—	—	23/17/6
375	Con.	+	4	B	470	1C6, C4, B5, D4.	N	N	8" Y P.M.	2	3	Y	S	360° 5"	N	N	N	N	N	Y	Y	2/100 0.54A	135	4.5	27/10/-

NOTE.—All dial drives are of the counter-balanced band spread type, except those fitted to models 315 and 320.

* This model available in Gilbert console at 33/19/6.

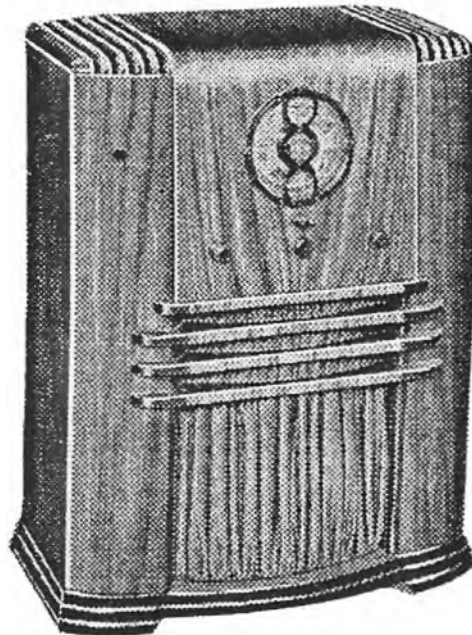
§ Remote control automobile flex. cables.

VAN RUYTEN

D30	Man.	=	5/6	B	175	CK1, CB1, CF2, CF1, CL2, CY2, Cl.	Y	N	8" — 1500	4	3	Y	S	33" Oct.	N	N	N	N	—	Y	—	—	—	—	22/19/6	
D31	Con.	+	6	B	175	2/34, 1C6, 1B5, 30, 19.	N	Y	8" — P.M.	6	4	Y	S	41" 360°	N	N	N	N	Y	Y	Y	6/100 1.25A	Vib	A	38/15/-	
D33	Con.	+	4	B	175	1A6, 1C4, 1B5, 1D4.	Y	N	8" — P.M.	2	3	N	S	4" Oct.	N	N	N	N	N	Y	Y	2/100 0.55A	135	A	23/15/6	
D34	Con.	+	5	B	175	2/1C4, 1C6, 1B5, 1D4.	N	Y	8" — P.M.	2	3	N	S	4" Oct.	N	N	N	N	Y	Y	Y	2/100 0.66A	135	A	29/10/-	
D35	Con.	●	4/5	B	456	6A7, 6D6, 75, 42, 80.	N	N	8" — 1500	6	3	Y	S	4" Oct.	N	N	N	N	—	Y	—	—	—	—	19/19/-	
D36	Man.	●	3/4	B	456	6A7, 6F7, 42, 80.	N	N	8" — 1500	6	3	Y	S	31" Oct.	N	N	N	N	—	N	—	—	—	—	—	14/14/-

1939

Glorious Console Grand World Receiver



featuring

- Overseas and Interstate Reception of highest quality.
- Seven Tuned Circuits.
- Full Automatic Volume Control.
- Automatic Tone Compensation.
- High Fidelity Reception. A musical frequency range 32% greater than that of normal radio set.
- Nerve Box, exclusive design that isolates the selected station from interference.
- Magnified Tuning simplifies station selection.
- Massive Lowboy Cabinet (Australian prize winner).

MODEL 560—For A.C. Mains. Six Valve Dual Wave Superhet, illustrated above.

Price **30 gns. s**

MODEL 560.—A.C./D.C. operation. Seven Valve, including special Barretter for D.C. voltage fluctuations.

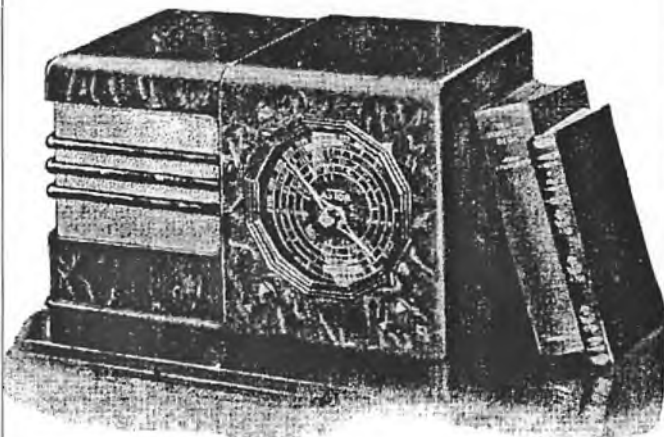
Price **30 gns. s**

MODEL 770—6-volt Vibrator Operated, for homes without electric supply. Extremely powerful and amazingly economical. 5-Valve Superhet.

Price complete with Special Accumulator **35 gns. s**

VERY EASY TERMS ARRANGED.

FOR FARM USE ONLY

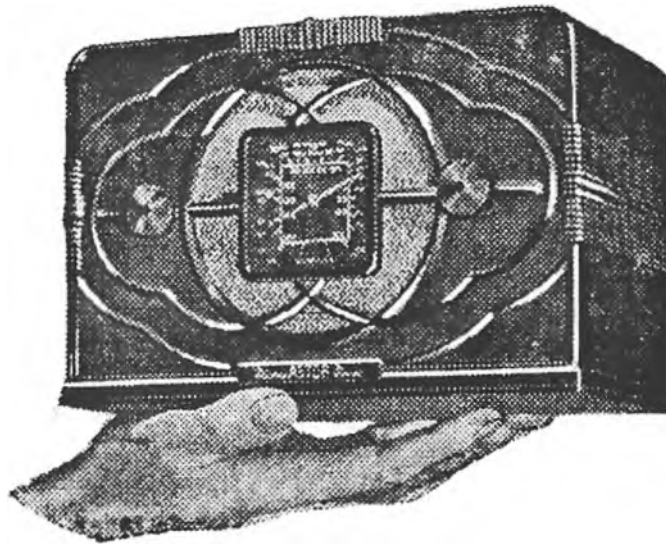


Model 500 5-Valve Superhet (Broadcast) Mantel Set, using the new 1.4 volt Valves in a powerful economy receiver. Gives 7-valve performance, yet operates entirely from Dry Cells. Price, complete with metal battery pack **18 gns. s**

VERY EASY TERMS ARRANGED.

1939

FOR FARM OR TOWN The World's Favourite



ASTOR Mickey Mouse

A.C. ELECTRIC MODEL, 5 Valve Superhet. A midget with actual dimensions of 6in. high, 8½in. long, 5in. deep; yet with performance comparable with 6-valve full sized radios. Inter-state reception guaranteed. Available in walnut or black, or in ivory white 10/6 extra

£12/19/6 s

NEW BATTERY MODEL, exploiting amazing 1.4 volt economy Valves. Operates entirely from dry cells. 4-valve Superhet with guaranteed inter-state reception. Housed in midget cabinet as above. Complete with compact metal battery box. Price Available in ivory white, 12/6 extra.

15 gns. s

ASTOR NEW MODEL CAR RADIOS ACCLAIMED!

Astor maintains undisputed leadership in the Car Radio field by these new releases.

ASTOR PRESTO-TUNED 2-UNIT MODEL.

Model 6195 6 to 8-volt for American Cars.
Model 12395 12 to 16-volt for Continental Cars.

Automatic tuning introduced for the first time into Car Radio. This new Astor model will tune any one station in your State or district accurately to the highest pitch of perfect reception, simply by pressing a button marked with the station call-sign. Other features are of course, powerful sound. A guaranteed trouble-free operation employing dual and triple purpose valves. Controls and set built into one unit as illustrated. Can be installed in any type of car with ease. Price complete with 6in. underdash speaker

18 Gns.

Plus Tax



ASTOR Six De Luxe 2-Unit Model

FOR LONG-DISTANCE RECEPTION
Model 6196 for American Cars.
Model 12396 for Continental Cars.
Model 6196F for Ford Cars.

Introducing high fidelity reproduction with **PUSH-PULL OUTPUT.** Powerful six valve chassis with six times greater sensitivity than previous models. It employs the **LATEST METAL VALVES.** This new model is built into an amazingly compact unit of unique **AERO-DYNAMIC DESIGN.** This will fit under the dashboard in any make of car. Price complete with large 6in. underdash speaker and universal tuning circuit

£26/10/-

Plus Tax

Also ASTOR Standard Six

Popular 2-unit Model, to suit American and Continental cars. Models 630, 1238, 614F. Features of this series include: The Acousticator, Noise Interference Reducer, Double Synchronizing, Quick-acting delayed A.V.C. Price with 6in. underdash or hooded 6in. speaker

23 Gns.

Plus Tax

Note.—ASTOR Car Radios quoted. Aerial and Installation EXTRA. See price list for details.

£2/10/- Deposit will place Any Astor Car Radio in your car!

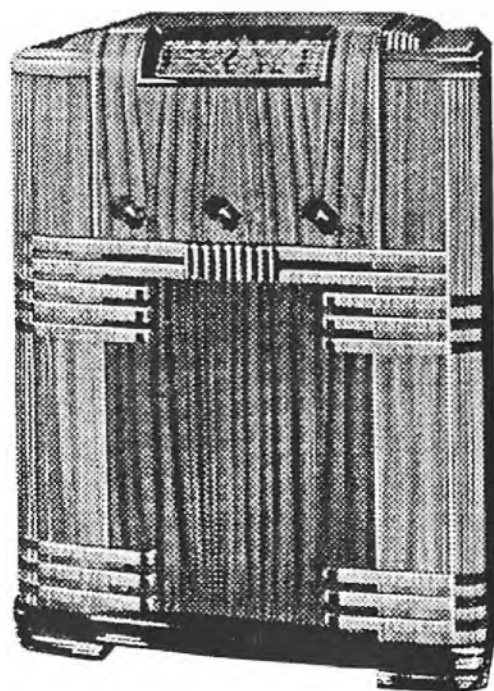


43

1939

DE LUXE TONE MASTER---MODEL 900 ASTOR'S LATEST RELEASE---Push Pull

Console

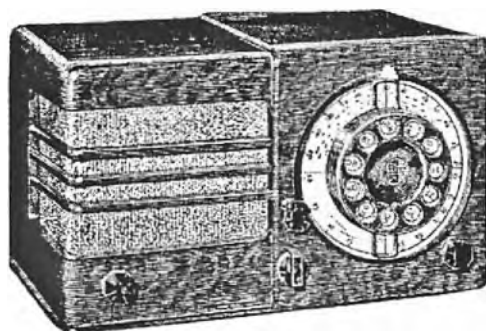


Designed to give high fidelity reproduction of Australian stations with auditorium volume. The Model 900 Superhet incorporates push-pull output with automatic tone compensation. It employs a 10in. dynamic speaker and is housed in an acoustically perfect and beautifully proportioned cabinet of figured walnut. Introducing new magnified straight-line tuning.

PRICE

20 gns. s

OR VERY EASY
TERMS



This exclusive Astor feature is introduced in the
**New ALADDIN Dual Wave
Mantel Radios**
(illustrated above).

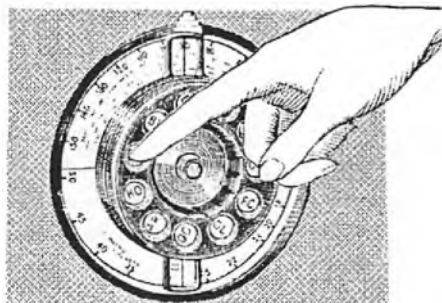
Extremely compact in moulded bakelite cabinet of appealing modern design. As portable as a "Midget," yet with the tone and volume of a full-sized console, the ASTOR ALADDIN features:

- Whole world reception with efficiency and ease.
- Two speed manual tuning, in addition to "Presto" automatic station selection.
- Full automatic volume control.
- Four position tone selector.
- Iron-cored coupling system.
- Specially designed Rola speaker.

In Three Models to suit all requirements.
For Town or Country on A.C. Mains supply:--
ALADDIN MODEL CF (A.C. operated) 17 Gns. s
For homes on D.C. Mains supply:--ALADDIN
MODEL CD (D.C. operated) 19 Gns. s
For home without Electric supply:--ALADDIN
MODEL FH (6 volt vibrator operated), complete with
special 120 amp. accumulator 25/10/- s

Sensational New ASTOR models with PRESTO Tuning

The most amazing tuning device ever developed. Gives accurate automatic tuning for any one of eleven favorite stations BY ONE SIMPLE MOVEMENT. Just place your finger in the required call-sign aperture, rotate the dial, and it locks on the centre of the wave band of the station you wish to hear.



PRESTO Tuning is also
introduced in New
ASTOR CONSOLES

MODEL 350P (illustrated on right). Embodied in this set are all the technical features enumerated above, together with high fidelity reception on a musical frequency range 32% greater than that of the normal receiver. A.C. operated 23 Gns. s
MODEL 470P, similar to above, but designed for country homes, 6-volt vibrator operated. Price complete with 120 amp. accumulator 10 Gns. s



Illustrating Cabinet of Models
550 P and 470P. In beautiful
Walnut veneer with contrasting
chromium bars across speaker
grille.

ANY ASTOR RECEIVER CAN BE PURCHASED ON VERY EASY TERMS.

1947



HEALING GOLDEN VOICE RADIO . . . is Radio's sweetest name. A pioneer of earliest days, it has ever been to the fore in introducing latest Australian and overseas developments. Each model released sets a new and higher standard of reception . . . and generous advertising and thousands of satisfied users have built a public demand that progressive radio distributors cannot afford to overlook.

*Sell GOLDEN-VOICE . . . the
Gilt - edged Distributorship*

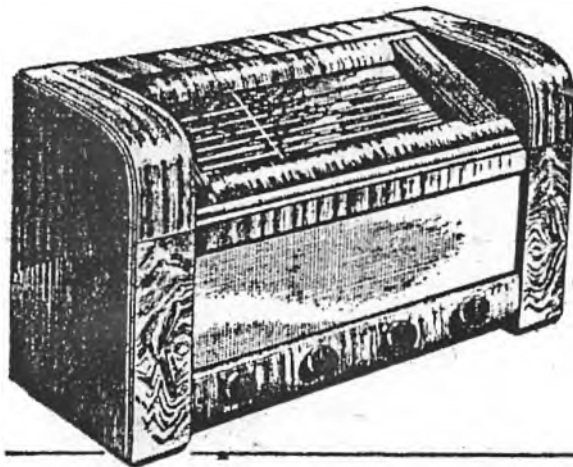
A. G. HEALING LTD.

167-173 Franklin St.
MELBOURNE

159 Pirie St.
ADELAIDE

162-170 Goulburn St.
SYDNEY

1948



Why you should buy
H.M.V.

You choose a radio for one purpose only—to give you faithful reproduction of your chosen programmes. BEHIND every "H.M.V." is more than 50 years' experience in the science of sound reproduction. IN every "H.M.V." is every *worthwhile* feature of modern radio design. ON every "H.M.V." is the famous trademark—your guarantee of the high standards of tone, quality, craftsmanship and technical excellence which ensure reliability in operation. These are the reasons why you should buy "H.M.V."

*Illustrated is Model 888, 5-Valve Dual Wave
A.C. Table Model Receiver, 35 guineas (or by
hire purchase).*

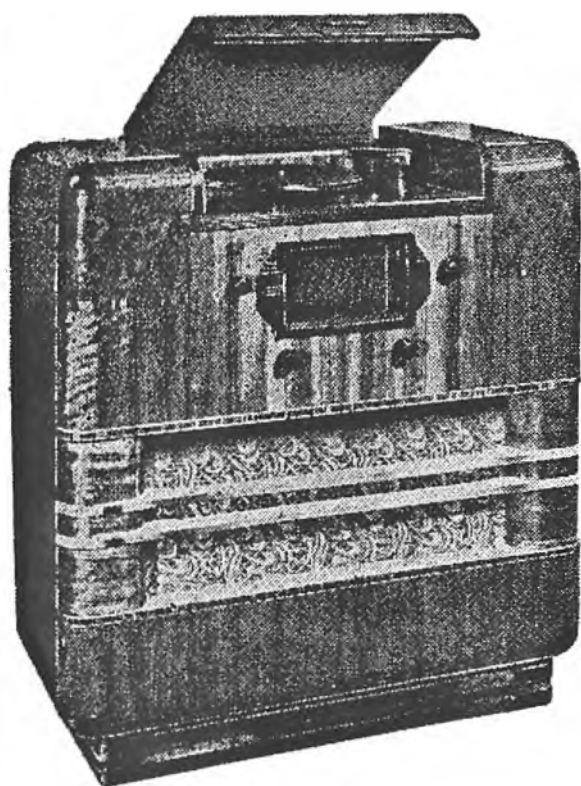
"His Master's Voice"
TRUE-TO-LIFE RADIO

THE GRAMOPHONE COMPANY LTD. (Inc. in England), HOMEBUSSE, N.E.W.

1948



**Why
Over 50,000
Queenslanders
have chosen
MUSIC MASTERS RADIO**



Manufactured right here in Queensland by Queensland technicians, Music Masters Radio is built for Queensland conditions and is **GUARANTEED FOR 3 YEARS**. Our "direct from factory to you" sales policy ensures a highest quality radio at a much lower price than other radios of similar quality. A wide range of 52 models is available, including the 5-valve dual-wave Mendelssohn Radiogram (illustrated)—a combination which gives clear world-wide reception plus favourite selections from your own record library.

MUSIC MASTERS RADIO

209 QUEEN STREET Thru to EDWARD STREET, BRISBANE. Phone B 3481

Factory: Stanley Street, South Brisbane

1948

You've *heard* about it!
read about it!
here it is!



All-electric for town and city. Vibrator powered for country home, caravan, week-ender or boat.

KRIESLER *Sealed* RADIO

- SHOCKPROOF
- BEAUTY BACK & FRONT
- TAMPERPROOF
- DUST & DIRTPROOF

FACTORY SEALED FOR YOUR PROTECTION

NOW AVAILABLE for immediate delivery

BATTERY VIBRATOR MODEL £28/7/-

(Complete with 6-volt Battery)

ELECTRIC MODEL Walnut Cabinet £18/13/4

ELECTRIC MODEL Cream Cabinet £19/14/-

PACKED FREE OF CHARGE AND FREE ON RAIL
A DEPOSIT MUST ACCOMPANY ALL C.O.D. ORDERS

PHONE: NEWCASTLE 83465.

TELEGRAMS: "STANRADIO", NEWCASTLE

NEW STANDARD RADIO

102 HUNTER ST., NEWCASTLE

1948

Queensland Radio Stations

NEW FREQUENCIES as from 1st SEPTEMBER, 1948

The stations marked "X" will broadcast on new frequencies from 1st September. Some southern stations will also use new channels.

If you experience any difficulty your receiver may need the services of a competent mechanic. We shall be glad to give prompt and efficient technical services at reasonable charges.

Perhaps you have been considering the purchase of a new Radio—this is a good opportunity to see the new 1948 **RADIOLAS** at Chandlers, who will gladly arrange a trade-in of your old set, and easy terms if you wish.

Call	Location		K'cycles	Meters
4QL	Longreach	X	540	555
4QR	Brisbane	X	590	508
4QN	Townsville		630	476
4AT	Atherton		680	441
4KQ	Brisbane	X	690	435
4TO	Townsville		780	385
4QG	Brisbane	X	790	380
4GR	Toowoomba		860	349
4WK	Warwick		880	341
4QB	Pialba	X	910	330
4VL	Charleville		920	326
4RE	Rockhampton	X	940	319
4AY	Ayr	X	960	313
4CA	Cairns	X	1010	297
4MB	Maryborough	X	1010	297
4RO	Rockhampton		1080	278
4LG	Longreach		1100	273
4BC	Brisbane		1120	268
4AK	Oakey		1220	246
4BK	Brisbane		1290	233
4BU	Bundaberg		1330	226
4GY	Gympie		1350	222
4MK	Mackay	X	1380	217
4BH	Brisbane	X	1390	216
4IP	Ipswich		1440	208
4ZR	Roma		1490	201

CHANDLERS PTY. LTD.

43 ADELAIDE STREET, BRISBANE

Queensland's Leading Radio and Electrical Store,

and at BUNDABERG, CAIRNS, MACKAY, ROCKHAMPTON,

TOOWOOMBA, TOWNSVILLE AND WARWICK

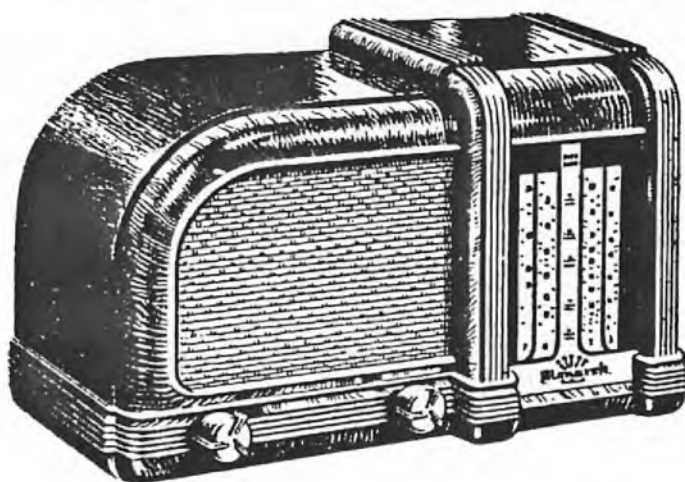
QUEENSLAND DISTRIBUTORS of the

AWA RADIOLA

Australia's Finest Broadcast Receiver

1949

DESIGN FOR SALES



MONARCH 5-VALVE MANTEL MODEL

Monarch means certain sales. Each Monarch model is a superb radio specifically designed and built to add to your list of satisfied customers. Display the full Monarch range prominently — you'll find it pays. The attractive cabinet illustrated, houses either a 4-valve AC reflex radio, a 5-valve AC dual wave radio, or a 5-valve dual wave radio entirely dry-battery operated with inbuilt batteries.

Monarch

THE KING  OF RADIO

ECLIPSE RADIO PTY. LTD.

11-21 Sturt Street, South Melbourne

DIVISION OF ELECTRONIC INDUSTRIES LIMITED

EC/443

1949

What KRIESLER Did 10 Years Ago Proves

KRIESLER

STAYS NEW THE LONGEST!

* MAMMOTH DIAL

* MAGIC EYE

* TONE EXPANDER
* PROJECTOGRAPHIC TUNING

* WORLD RANGE

* TELL THE TIME IN 13 DIFFERENT PARTS OF THE WORLD

* SYNCHROMATIC INDICATOR

* TURRET TOP

ALL THESE WERE EXCLUSIVE KRIESLER FEATURES 10 YEARS & MORE AGO...

AND NOW...

Sealed RADIO IN 2 SENSATIONAL MODELS!

THE REVOLUTIONARY

TRIPLE-THROAT

Sealed Table Model...

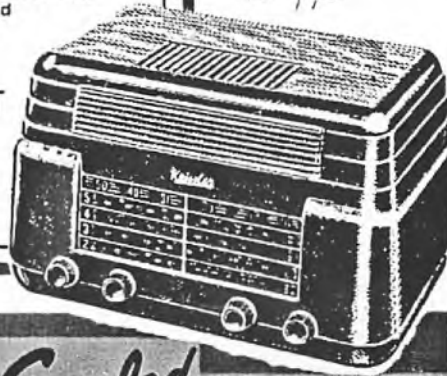
offering glorious triple-throat tone, World Range reception at local volume, full size cabinet with big console dial, and beautyback and front...

The amazing Sealed

MIDGET

More sold than any other make. 360° Sound Radiation, Beauty Back and Front, World Range.

Kriesler "years-ahead" design leadership ensures high re-sale value and quick movement on trade-in Krieslers — and, of course, they're traded in on NEW Krieslers... once a Kriesler owner, ALWAYS a Kriesler owner!

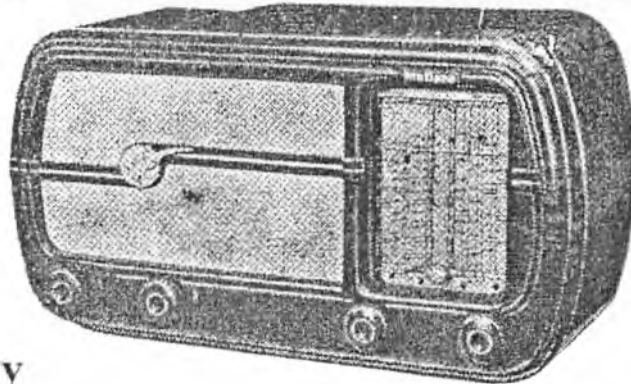


KRIESLER Sealed RADIO

AGAIN... THE RADIO OF THE FUTURE!

1949

Two more Outstanding Successes!

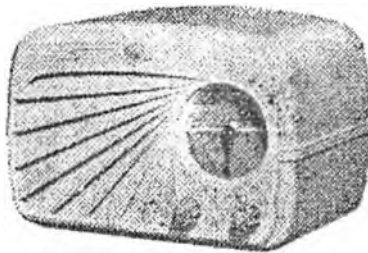


by

Model 651

Mullard

Power . . . beauty . . . performance . . . these are the features for fuller Radio enjoyment incorporated in the latest Mullard models. Fast sellers at any time, the latest Mantels are in increasing demand. Let Mullard popularity be your guide to bigger and better sales . . . make enquiries now from—



Model 600

VICTORIAN & TASMANIAN DISTRIBUTORS

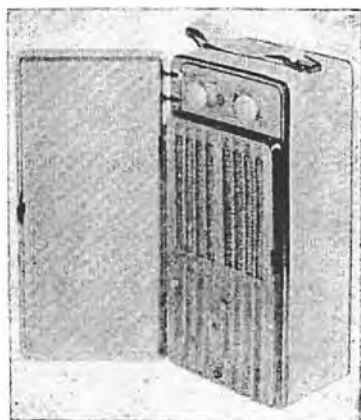
HOWARD ELECTRICAL & RADIO PTY. LTD.

VERE STREET, RICHMOND, E.I., VIC.

1949

PERSONAL PORTABLES ON PARADE

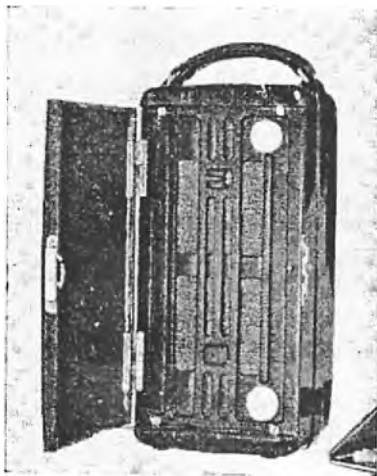
ASTOR
Radio Corporation Pty Ltd.
MODEL: KQ



Features: 4V, B/C; 3" speaker; loop aerial built into lid; uses two DR2 and one 467 batteries; lid action operates on/off switch. Aeroplane-cloth covered metal case, finished in black or cream; plastic shoulder strap; dimensions: 8½" x 4" x 3½"; weight (incl. btys): 4½ lbs.

Retail Price: £21/19/6 (incl. btys).

★
AWA RADIOLA
Amalgamated Wireless (A/asia) Ltd.
MODEL: 450P.



Features: 4V, B/C; 3½" speaker; aerial built into lid; on/off switch controlled by spring-loaded lid; uses two 950 and one 467 batteries. Moulded plastic case, in Ivory, walnut, burgundy or black; leather suitcase-type carrying

handle; detachable plastic shoulder strap. Dimensions: 8½" x 4½" x 4½"; weight (incl. btys): 5 lbs.

Retail Price: £19/19/0 (incl. btys). Ivory, 10/- extra. (Slightly higher in WA.)

★
BREVILLE
Breville Radio Pty Ltd.
MODEL: 801.



Features: 5V, B/C; untuned RF stage; 3½" speaker; aerial built into braided carrying sling; uses two 950 and one 467 batteries; on/off switch operated by protective roller shutter. Moulded plastic case, in mahogany color; dimensions: 6" x 4½" x 4½"; weight (incl. btys): 4 lbs; speaker mounted face uppermost when set in carrying position; chassis attached to top of case, with remainder of casing removable in downward direction by releasing screws in base.

Retail Price: £21/10/0 (NSW & Vic.); £21/15/0 (SA, Tas., Sth Qld); £21/19/6 (WA & NQ).

★
GENALEX
British General Electric Co.
Pty. Ltd.
MODEL: BC1199.

Features: 4V, B/C; 3" speaker; aerial



built into lid; movement of door operates on/off switch; uses two 950 and one 467 batteries. Metal case brocade finish in cream and black; plastic carrying handle and shoulder strap; plastic catch on lid; back removable by a sliding catch; overall dimensions: 6½" x 4½" x 3½"; weight (incl. btys): 4½ lbs.

Retail Price: £20.17/6 (incl. btys). Slightly higher in NQ and WA.

★
HEALING
A. G. Healing Ltd.
MODEL: 404B.



Features: 4V, B/C; 3" speaker; aerial built into lid; on/off switch controlled by spring-loaded lid, snap catch on side; recessed control knobs; uses one 950 and one 467 batteries; straight-line dial, calibrated in kc/s. Plastic case, with plastic carrying handle; ivory color; dimensions: 8½" x 4½" x 2½"; weight (incl. btys): 3 lbs 15 ozs. Hinged rear of case and the bty mounting arrangements provide for easy bty replacement.

Retail Price: £19.19.0 (incl. btys).

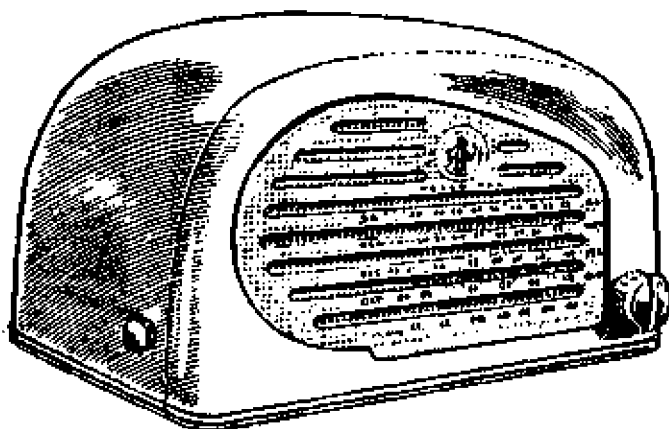
★
HMV
The Gramophone Co. Ltd.
MODEL: P17BX.



Features: English-made, 4V, B/C; 3" speaker; loop aerial built into lid; uses one 467 and one 950 batteries;

1949

Best Seller '49



The new Peter Pan 4-valve mantel is your best seller for 1949. It has the same Peter Pan, high-standard performance and an entirely new design. Display it prominently — it will be the centre of interest. Your clients know it's Peter Pan for Perfect Performance.



ECLIPSE RADIO PTY. LTD.
11-21 Sturt Street, South Melbourne
DIVISION OF ELECTRONIC INDUSTRIES LIMITED

EC/6443

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Complete List
of
**RADIOLA
RECEIVERS**

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1925-1938
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Amalgamated  Wireless
(Australasia) Ltd

COMPLETE LIST RADIOLA RECEIVERS 1925-1938

YEAR	MODEL	CABINET	CIRCUIT	I.F. FREQU.	VALVES	DETAILS	LOUDSPEAKER
1925	4	Table	T.R.F.	—	4-UV199	4V., Battery-Operated	Magnetic
"	C25	Table	Superhet.	50 K.C.	6-UV199	6V., Battery-Operated	Magnetic
"	"Sheraton" C25	Console	Superhet.	50 K.C.	6-UV199	6V., Battery-Operated	Magnetic
"	"Super Sports" C25	Portable	Superhet.	50 K.C.	6-UV199	6V., Battery-Operated	Magnetic
1926	C26	Table	Superhet.	50 K.C.	6-UX199	6V., Battery-Operated	Magnetic
"	C26	Console	Superhet.	50 K.C.	6-UX199	6V., Battery-Operated	Magnetic
"	4A/C28	Table	T.R.F.	—	4-UX199	4V., Battery-Operated	Magnetic
"	5A/C29	Table	T.R.F.	—	3-UX199, 2-P410	5V., Battery-Operated	Magnetic
"	3A	Table	T.R.F.	—	3-UX199	3V., Battery-Operated	Magnetic
1927	C33	Portable	Superhet.	50 K.C.	6-UX199	6V., Battery-Operated	Magnetic
"	"Standard" C38	Table	Superhet.	50 K.C.	4-UX199, 1-L410, 1-P410	6V., Battery-Operated	Magnetic
"	"Senior" C39	Table	Superhet.	50 K.C.	4-UX199, 1-L410, 1-P410	6V., Battery-Operated	Magnetic
"	"Super Eight" C40	Console	Superhet.	50 K.C.	6-UX199, 2-P410	8V., Battery-Operated	Magnetic
"	4C/C42	Table	T.R.F.	—	2-UX199, 2-P410	4V., Battery-Operated	Magnetic
"	4C/C47	Portable	T.R.F. (Browning Drake)	—	2-L210, 2-P210	4V., Battery-Operated	Magnetic
1928	"Straight Six" C48	Table	T.R.F.	—	5-L410, 1-P410	6V., Battery-Operated	Magnetic
"	"Straight Six" C49	Table	T.R.F.	—	4-26, 1-27, 1-71A, 1-80	6V., A.C. Operated	Magnetic
"	"Screened Six" C50	Console	T.R.F.	—	5-L410, 1-P410	6V., Battery-Operated	Magnetic
"	"Screened Six" C51	Console	T.R.F.	—	4-26, 1-27, 1-71A, 1-80	6V., A.C. Operated	Magnetic
1929	"Electric 3" C53	Table	T.R.F.	—	1-27, 1-26, 1-112A, 1-80	3V., A.C. Operated	Magnetic
"	"Batt. Six" C54	Table	T.R.F.	—	5-L410, 1-P410	6V., Battery-Operated	Magnetic
"	"Batt. Six" C54	Console	T.R.F.	—	5-L410, 1-P410	6V., Battery-Operated	Magnetic
"	"Electric 7" C55	Table	T.R.F.	—	5-26, 1-27, 1-71A, 1-80	7V., A.C. Operated	Magnetic

A.W.A. Radiola Receivers 1925 - 1938

Illustration Radio History 'As it Happened'

COMPLETE LIST RADIOLA RECEIVERS 1925-1938

YEAR	MODEL	CABINET	CIRCUIT	I.F. FREQU.	VALVES	DETAILS	LOUDSPEAKER
1929	"Electric 7" C55	Console	T.R.F.	—	5-26, 1-27, 1-71A, 1-80	7V., A.C. Operated	Magnetic
"	"Duoforte" C56	Radiogram	T.R.F.	--	5-26, 1-27, 2-71A, 1-80	8V., Phono-Radio, A.C. Operated, P.P. Output	E.M. 500 ohms
"	"Batt. 7" C57	Table	T.R.F.	—	6-L410, 1-P410	7V., Battery-Operated	Magnetic
"	"Batt. 7" C57	Console	T.R.F.	—	6-L410, 1-P410	7V., Battery-Operated	Magnetic
"	"Duoforte" C58	Radiogram	T.R.F.	—	6-26, 1-27, 2-45, 1-80	9V., Phono-Radio, A.C. Operated, P.P. Output	Magnavox Type 405
1930	40/C62	Table	T.R.F.	—	2-24, 1-27, 1-71A, 1-80	4V., A.C. Operated	Magnetic
"	40/C62A	Console	T.R.F.	—	2-24, 1-47, 1-71A, 1-80	4V., A.C. Operated	Magnetic
"	50/C63	Table	T.R.F.	—	5-L410, 1-P410	6V., Battery-Operated	Magnetic
"	50/C63A	Table	T.R.F.	—	5-L410, 1-P410	6V., Battery-Operated	Magnetic
"	70/C64	Table	T.R.F.	—	5-27, 1-71A, 1-80	6V., A.C. Operated	Magnetic
"	70/C64A	Table	T.R.F.	—	5-27, 1-71A, 1-80	6V., A.C. Operated	Magnetic
"	80/C65	Table	T.R.F.	—	3-22, 2-L410, 1-P410	6V., Battery-Operated	Magnetic
"	80/C65A	Table	T.R.F.	—	3-22, 2-L410, 1-P410	6V., Battery-Operated	Magnetic
"	90/C66	Table	T.R.F.	—	4-24, 1-27, 1-45, 1-80	6V., A.C. Operated	E.M. 7500 ohms
"	90/C66A	Console	T.R.F.	—	4-24, 1-27, 1-45, 1-80	6V., A.C. Operated	E.M. 7500 ohms
"	"Duoforte" 40/C67	Radiogram	T.R.F.	—	2-24, 1-27, 1-45, 1-80	4V., Phono-Radio, A.C. Operated	E.M. 7500 ohms
"	"Duoforte" 90/C68	Radiogram	T.R.F.	—	4-24, 2-27, 2-45, 1-80*	8V., Phono-Radio, A.C. Operated, Push-Pull Output	E.M. 7500 ohms
"	45/C73	Console	T.R.F.	—	3-24, 1-45, 1-80	4V., A.C. Operated	E.M. 7500 ohms
"	"Duoforte" 45/C74	Radiogram	T.R.F.	—	3-24, 1-45, 1-80	4V., Phono-Radio, A.C. Operated	E.M. 7500 ohms
"	34/C76	Mantel	T.R.F.	—	2-24, 1-MHL4, 1-80	3V., A.C. Operated	Magnetic
1931	34E/C77	Console	T.R.F.	—	2-24, 1-45 or 47, 1-80	3V., A.C. Operated	E.M. 2500 ohms
"	45B/C78	Table	T.R.F.	—	3-32, 1-P215	4V., Battery-Operated	Magnetic
"	45E/C79	Console	T.R.F.	—	3-24, 1-45, 1-80	4V., A.C. Operated	E.M. 7500 ohms
"	80B/C82	Table	T.R.F.	—	3-32, 2-L210, 1-P215	6V., Battery-Operated	Magnetic
"	80B/C282A	Console	T.R.F.	—	3-32, 2-L210, 1-P215	6V., Battery-Operated	Magnetic
"	"Duoforte" 45E	Radiogram	T.R.F.	—	3-24, 1-45, 1-80	4V., Phono-Radio, A.C. Operated	E.M. 7500 ohms
"	"Duoforte" 90E/C81	Radiogram	T.R.F.	—	4-24, 1-27, 2-45, 1-80	7V., Phono-Radio, A.C. Operated	E.M. 7500 ohms
1932	"Junior" C87	Console	T.R.F.	—	1-35, 1-24, 1-47, 1-80	3V., A.C. Operated	E.M. 2000 ohms
"	"Radiolette" C87	Mantel	T.R.F.	--	1-35, 1-24, 1-47, 1-80	3V., A.C. Operated	E.M. 2000 ohms

* In late models 2-80 valves were used.

COMPLETE LIST RADIOLA RECEIVERS 1925-1938

YEAR	MODEL	CABINET	CIRCUIT	I.F. FREQ.	VALVES	DETAILS	LOUDSPEAKER
1932	"Disolux" 556/C87	Radiogram	T.R.F.	—	3-35, 1-24, 1-47, 1-80	5V., Phono-Radio, A.C. Operated	E.M. 2000 ohms
"	55E/C87	Console	T.R.F.	—	3-35, 1-24, 1-47, 1-80	5V., A.C. Operated	E.M. 2000 ohms
"	46E/C92	Console	T.R.F.	—	2-35, 1-24, 1-47, 1-80	4V., A.C. Operated	E.M. 2000 ohms
"	55C/C94	Console	T.R.F.	—	3-39, 1-36, 2-38	6V., D.C. Operated with parallel output	E.M. 4500 ohms
"	55B/C90	Console	T.R.F.	—	3-32, 4-30	7V., Battery-Operated, Push-Pull output	P.M.
1933	110/C104	Mantel	Superhet.	175 K.C.	2-57, 1-58, 1-59, 1-80	4V., A.C. Operated	E.M. 2000 ohms
"	120/C105	Console	Superhet.	175 K.C.	2-57, 1-58, 1-59, 1-80	4V., A.C. Operated	E.M. 2000 ohms
"	130/C106	Console	Superhet.	175 K.C.	3-58, 1-56, 1-55, 1-59, 1-80	6V., A.C. Operated	E.M. 2000 ohms
"	120B/C107	Console	Superhet.	175 K.C.	2-34, 1-32, 3-30	6V., Battery-Operated, Push-Pull output	P.M.
"	130B/C108	Console	Superhet.	175 K.C.	2-34, 2-32, 4-30	8V., Battery-Operated, Push-Pull output	P.M.
"	130DC/C116	Console	Superhet.	175 K.C.	2-78, 1-6A7, 1-77, 1-43	5V., D.C. Operated	E.M. 135 ohms
"	137/C120	Console	Superhet.	175 K.C.	2-58, 1-2A7, 1-2B7, 2-2A5, 1-80	6V., A.C. Operated, Push-Pull output	E.M. 850 ohms
"	136/C132	Console	Superhet.	175 K.C.	2-78, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 2000 ohms
1934					From this year onwards the rectifier is classed as a valve.		
"	"Radiolettes" 24, 34 & 44	Mantel	Superhet.	175 K.C.	1-78, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	24 & 34 E.M. 1000 ohms 44 E.M. 2000 ohms
"	"Radiolettes" 54 & 57	Mantel	Superhet.	175 K.C.	1-78, 1-6A7, 1-6B7, 1-43, 1-12Z3	5V., Universal A.C.-D.C.	E.M. 1000 ohms
"	"Radiolettes" 64 & 67	Mantel	Superhet.	175 K.C.	1-78, 1-6A7, 1-6B7, 1-38	4V., Battery-Operated	P.M.
"	"Radiolettes" 27 & 47	Mantel	Superhet.	175 K.C.	1-78, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	27 E.M. 1000 ohms 47 E.M. 2000 ohms
"	74	Console	Superhet.	175 K.C.	1-78, 1-6A7, 1-6B7, 1-42	4V., Automobile Receiver, vibrator powered	E.M. 100 ohms
"	138	Console	Superhet.	175 K.C.	2-34, 1-1A6, 2-30, 1-19	6V., Battery-Operated, Class "B" output	P.M.
"	139	Console	Superhet.	175 K.C.	2-78, 1-6A7, 1-6B7, 1-42, 1-80	6V., A.C. Operated	E.M. 2000 ohms
"	140	Console	Superhet.	175 K.C.	2-78, 1-6A7, 1-6B7, 1-42, 1-53, 1-80	7V., A.C. Operated, Class "B" output	E.M. 850 ohms
"	740	Console	Superhet.	460 K.C.	3-6D6, 1-6A7, 1-6B7, 1-42, 1-80	7V., A.C. Operated, Three Band	E.M. 2000 ohms
"	141	Console	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 2000 ohms
"	"Radiolettes" 28 & 68	Mantel	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 1600 ohms
"	142	Console	Superhet.	175 K.C.	2-6D6, 1-6A7, 1-6B7, 1-42, 1-80	6V., A.C. Operated	E.M. 2000 ohms

A. W. A. Radiola Receivers 1925 - 1938

Illustrations of Radiola receivers "As they appeared"

COMPLETE LIST RADIOLA RECEIVERS 1925-1938

YEAR	MODEL	CABINET	CIRCUIT	I.F. FREQU.	VALVES	DETAILS	LOUDSPEAKER
1934	143	Console	Superhet.	175 K.C.	2-34, 1-1A6, 2-30, 1-19	6V., Battery-Operated, Class "B" output	P.M.
"	144	Console	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-43, 1-12Z1	5V., Universal A.C.-D.C.	E.M. 2000 ohms
"	145	Console	Superhet.	175 K.C.	2-34, 1-1A6, 1-6B7, 1-38	5V., Battery-Operated	P.M.
"	301	Console	Superhet.	460 K.C.	3-6D6, 1-6A7, 1-6B7, 3-42, 1-80	9V., Phono-Radio, A.C. Operated, Three Band, Push-Pull Output	E.M. 2000 ohms
"	"Radiolette" 69	Mantel	Superhet.	175 K.C.	1-34, 1-1A6, 1-6B7, 1-38	4V., Battery-Operated	P.M.
1935	"Radiolettes" 29 & 71	Mantel	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 1600 ohms
"	"Radiolette" 70	Mantel	Superhet.	175 K.C.	1-34, 1-1A6, 1-6B7, 1-38	4V., Battery-Operated	P.M.
"	146	Mantel	Superhet.	175 K.C.	1-1A6, 1-34, 1-32, 1-33	4V., Battery-Operated	P.M.
"	147	Console	Superhet.	175 K.C.	2-34, 1-1A6, 1-6B7, 1-38	5V., Battery-Operated	P.M.
"	148	Console	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-43	4V., Universal A.C.-D.C.	E.M. 2000 ohms
"	72	Console	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-43	4V., D.C. Operated	E.M. 2000 ohms
"	151	Console	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 2000 ohms
"	241	Console	Superhet.	460 K.C.	2-6D6, 1-6A7, 1-42, 1-6B7, 1-80	6V., A.C. Operated, Three Band	E.M. 2000 ohms
"	242	Console	Superhet.	460 K.C.	3-6D6, 1-6A7, 1-6B7, 1-42, 1-80	7V., A.C. Operated, Three Band	E.M. 2000 ohms
"	243	Console	Superhet.	460 K.C.	1-6A7, 2-34, 1-6B7, 1-38	5V., Battery-Operated, Three Band	P.M.
"	152	Console	Superhet.	175 K.C.	2-34, 1-1A6, 1-30, 1-32, 1-33	6V., Battery-Operated	P.M.
"	153	Metal	Superhet.	175 K.C.	2-6D6, 1-6A7, 1-75, 1-76, 1-79	6V., Automobile Receiver, Class "B" output, motor-generator powered	E.M. 10 ohms
"	75	Console	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 2000 ohms
"	76	Console	Superhet.	175 K.C.	1-34, 1-1A6, 1-6B7, 1-38	4V., Battery Operated	P.M.
"	77	Console	Superhet.	175 K.C.	1-1A6, 1-34, 1-32, 1-33	4V., Battery Operated	P.M.
"	244	Mantel	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-42, 1-80	5V., A.C. Operated, Two Band	E.M. 2000 ohms
"	245	Console	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-42, 1-80	5V., A.C. Operated, Two Band	E.M. 2000 ohms
"	154	Console	Superhet.	175 K.C.	2-34, 1-1A6, 1-30, 1-32, 1-33	6V., Battery-Operated	P.M.
"	246	Console	Superhet.	460 K.C.	1-1C6, 2-34, 1-30, 1-32, 1-33	6V., Battery-Operated, Two Band	P.M.
"	247	Console	Superhet.	460 K.C.	3-34, 1-1C6, 1-30, 1-32, 1-33	7V., Battery-Operated, Three Band	P.M.
"	301A	Console	Superhet.	460 K.C.	3-6D6, 1-6A7, 1-6B7, 1-42, 1-80	8V., A.C. Operated, Three Band	E.M. 850 ohms
"	"Radiolette" 30	Mantel	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 1600 ohms
1936	"Radiolette" 31	Mantel	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 1600 ohms
"	"Radiolette" 32	Mantel	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 1600 ohms

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YEAR	MODEL	CABINET	CIRCUIT	I.F. FREQU.	VALVES	DETAILS	LOUDSPEAKER
1936	"Radiolette" 33	Mantel	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-42, 1-80	5V., A.C. Operated, Two Band	E.M. 1600 ohms
..	"Radiolette" 35	Mantel	Superhet.	175 K.C.	1-1C6, 1-1C4, 1-1B5, 1-1D4	4V., Battery-Operated	P.M.
..	"Radiolette" 36	Mantel	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-43	4V., D.C. Operated	E.M. 1000 ohms
..	155	Console	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 2000 ohms
..	156	Console	Superhet.	175 K.C.	1-1C4, 1-1C6, 1-6B7, 1-1D4	4V., Battery-Operated	P.M.
..	157	Console	Superhet.	175 K.C.	2-1C4, 1-1C6, 1-1B5, 1-1D4	5V., Battery-Operated	P.M.
..	158	Console	Superhet.	175 K.C.	2-6K7, 1-6A8, 1-6H6, 1-6F5, 1-6F6, 1-80	7V., A.C. Operated, Metal Valves	E.M. 2000 ohms
..	159	Console	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-43, 1-12Z3	5V., Universal A.C.-D.C.	E.M. 2000 ohms
..	248	Console	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-42, 1-80	5V., A.C. Operated, Two Band	E.M. 2000 ohms
..	249	Console	Superhet.	460 K.C.	2-6K7, 1-6A8, 1-6H6, 1-6F5, 1-6F6, 1-80	7V., A.C. Operated, Two Band, Metal Valves	E.M. 2000 ohms
..	250	Console	Superhet.	460 K.C.	3-1C4, 1-1C6, 1-1B5, 1-1D4	6V., Battery-Operated, Two Band	P.M.
..	251	Console	Superhet.	460 K.C.	2-6K7, 1-6A8, 1-6H6, 1-6F5, 2-6F6, 1-6E5, 1-80	8V., A.C. Operated, Two Band, Metal Valves, Tuning Indicator	E.M. 1000 ohms
..	252	Console	Superhet.	460 K.C.	2-6D6, 1-6A7, 1-6B7, 1-43	5V., D.C. Operated, Two Band	E.M. 4500 ohms
..	253	Console	Superhet.	460 K.C.	3-1C4, 1-1C6, 1-1B5, 1-30, 1-19	7V., Battery-Operated, Two Band, Class "B" Output	P.M.
..	254	Console	Superhet.	460 K.C.	2-6D6, 1-6A7, 1-6B7, 1-43	5V., 32 volt D.C. Operated, Two Band, Motor-Generator powered	E.M. 200 ohms
1937	"Radiolette" 37	Mantel	Superhet.	175 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 1600 ohms
..	"Radiolette" 38	Mantel	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-42, 1-80	5V., A.C. Operated, Two Band	E.M. 1600 ohms
..	"Radiolette" 39	Mantel	Superhet.	460 K.C.	1-1C6, 1-1C4, 1-1K6, 1-1D4	4V., Battery-Operated	P.M.
..	"Radiolette" 42B	Console	Superhet.	460 K.C.	1-1C6, 1-1C4, 1-1K6, 1-1D4	4V., Battery-Operated	P.M.
..	"Radiolette" 40	Mantel	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-43	4V., D.C. Operated, Two Band	E.M. 1000 ohms
..	"Radiolette" 43	Console	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-43	4V., D.C. Operated, Two Band	E.M. 1000 ohms
..	"Radiolette" 42V	Console	Superhet.	460 K.C.	1-1C6, 1-1C4, 1-1K6, 1-1D4	4V., Vibrator Operated	P.M.
..	160	Console	Superhet.	460 K.C.	1-6D6, 1-6A7, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 2000 ohms

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YEAR	MODEL	CABINET	CIRCUIT	I.I. FREQU.	VALVES	DETAILS	LOUDSPEAKER
1937	161	Console	Superhet.	460 K.C.	2-1C4, 1-1C6, 1-1K6, 1-1D4	5V., Vibrator-Battery Operated (convertible)	P.M.
..	255	Console	Superhet.	460 K.C.	2-6D6, 1-6A7, 1-6B7, 1-42, 1-80	6V., A.C. Operated, Two Band	E.M. 2000 ohms
..	256	Console	Superhet.	460 K.C.	2-6D6, 1-6A7, 1-6B7, 1-42, 1-80, 1-6G5	6V., A.C. Operated, Three Band, Tuning Indicator	E.M. 2000 ohms
..	257	Console	Superhet.	460 K.C.	2-6K7, 2-6L7, 2-6H6, 1-6J7, 1-6L6, 1-80, 1-6G5	9V., A.C. Operated, Three Band, Tuning Indicator, Muting System	E.M. 650 ohms
..	258	Console	Superhet.	460 K.C.	2-6D6, 1-6A7, 1-6B7, 1-43, 1-6G5	5V., D.C. Operated, Three Band, Tuning Indicator	E.M. 4500 ohms
..	259	Console	Superhet.	460 K.C.	2-1C4, 1-1C6, 1-1K6, 1-1D4	5V., Vibrator-Battery Operated (Convertible), Two Band	P.M.
..	260	Console	Superhet.	460 K.C.	3-1C4, 1-1C6, 1-1K6, 1-1K4, 1-19	7V., Vibrator-Battery Operated (Convertible), Three Band, Class "B" Output	P.M.
..	261	Console	Superhet.	460 K.C.	2-6D6, 1-6A7, 1-6B7, 1-43, 1-6G5	5V., 32 Volt D.C. Vibrator Operated, Three Band	E.M. 200 ohms
..	262	Console	Superhet.	460 K.C.	2-6K7, 2-6L7, 2-6H6, 2-6L6, 1-6N7, 1-6J7, 1-5Z3, 1-6G5	11V., A.C. Operated, Three Band, Muting System, Tuning Indicator, Push-Pull Output	E.M. 500 ohms
..	401	Metal	Superhet.	175 K.C.	2-6K7, 1-6A8, 1-6Q7, 1-6F6, 1-6X5	6V., Automobile Receiver, Vibrator Operated, Internal Loudspeaker, 6 or 12 volt	E.M. 5 ohms (6V), E.M. 20 ohms (12V)
..	402	Metal	Superhet.	175 K.C.	2-6K7, 1-6A8, 1-6Q7, 1-6F6, 1-6X5	6V., Automobile Receiver, Vibrator Operated, External Loudspeaker, 6 or 12 volt	E.M. 5 ohms (6V), E.M. 20 ohms (12V)
..	403	Metal	Superhet.	175 K.C.	2-6K7, 1-6A8, 1-6Q7, 1-6F6, 1-6X5	6V., Automobile Receiver, Vibrator Operated, External Loudspeaker, 12 volt	E.M. 20 ohms
1938	48	Mantel	Superhet.	460 K.C.	1-6A7, 1-6B7, 1-42, 1-80	4V., A.C. Operated	E.M. 1600 ohms
..	49	Mantel	Superhet.	460 K.C.	1-1C6, 1-1D5G, 1-1K6, 1-1D4	4V., Battery-Operated	P.M.
..	164	Console	Superhet.	460 K.C.	1-1C6, 1-1D5G, 1-1K6, 1-1D4	4V., Vibrator-Battery Operated (Convertible)	P.M.
..	50	Mantel	Superhet.	460 K.C.	1-1C6, 2-1D5G, 1-1K6, 1-1D4	5V., Battery-Operated, Two Band	P.M.
..	165	Console	Superhet.	460 K.C.	1-1C6, 2-1D5G, 1-1K6, 1-1D4	5V., Vibrator-Battery Operated (Convertible), Two Band	P.M.
..	51	Mantel	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-42, 1-80	5V., A.C. Operated	E.M. 1600 ohms
..	162	Console	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-42, 1-80, 1-6U5	5V., A.C. Operated, Tuning Indicator	E.M. 1600 ohms
..	52	Mantel	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-42, 1-80, 1-6U5	5V., A.C. Operated, Two Band	E.M. 1600 ohms

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YEAR	MODEL	CABINET	CIRCUIT	I.F. FREQU.	VALVES	DETAILS	LOUDSPEAKER
1938	163	Console	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-42, 1-80, 1-6U5	5V., A.C. Operated, Two Band, Tuning Indicator	E.M. 1600 ohms
..	53	Mantle	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-43, 1-302 Barretter	4V., D.C. Operated, Two Band	E.M. 1000 ohms
..	166	Console	Superhet.	460 K.C.	1-6A7, 1-6D6, 1-6B7, 1-43, 1-302 Barretter	4V., D.C. Operated, Two Band, Tuning Indicator	E.M. 4500 ohms
..	167	Console	Superhet.	460 K.C.	1-6U7G, 1-6A8G, 1-6G8G, 1-6F6G, 1-5Y3G, 1-6U5	5V., A.C. Operated, Tuning Indicator	E.M. 1580 ohms
..	263	Console	Superhet.	460 K.C.	1-6U7G, 1-6A8G, 1-6G8G, 1-6F6G, 1-5Y3G, 1-6U5	5V., A.C. Operated, Two Band, Tuning Indicator	E.M. 1580 ohms
..	264	Console	Superhet.	460 K.C.	2-6K7, 3-6J7, 1-6L7, 1-6H6, 1-6V6G, 1-5Z3, 1-6U5	9V., A.C. Operated, Three Band, Automatically Motor Tuned, Metal Valves, A.F.C. Tuning Indicator	E.M. 1000 ohms
..	265	Console	Superhet.	460 K.C.	2-1D5G, 1-1C7G, 1-1F7G, 1-1E5G, 1-1J6G	6V., Vibrator-Battery Operated (Convertible), Two Band, Class "B" output.	P.M.
..	266	Console	Superhet.	460 K.C.	2-6U7G, 1-6A8G, 1-6H6G, 1-6J7G, 1-6V6G, 1-5Y3G, 1-6U5	7V., A.C. Operated, Three Band, Tuning Indicator	E.M. 1300 ohms
..	267	Console	Superhet.	460 K.C.	3-1D5G, 1-1C7G, 1-1F7G, 1-1E5G, 1-1J6G	7V., Vibrator-Battery Operated (Convertible), Three Band	P.M.
..	268	Console	Superhet.	460 K.C.	2-6U7G, 1-6A8G, 1-6G8G, 1-43, 1-302 Barretter, 1-6U5	5V., D.C. Operated, Three Band, Tuning Indicator	E.M. 4500 ohms
..	304	Radiogram	Superhet.	460 K.C.	1-6U7G, 1-6A8G, 1-6G8G, 1-6F6G, 1-5Y3G, 1-6U5	5V., Phono-Radio, A.C. Operated, Tuning Indicator	E.M. 1580 ohms
..	305	Radiogram	Superhet.	460 K.C.	1-6U7G, 1-6A8G, 1-6G8G, 1-6F6G, 1-5Y3G, 1-6U5	5V., Phono-Radio, A.C. Operated, Two Band, Tuning Indicator	E.M. 1580 ohms
..	306	Radiogram	Superhet.	460 K.C.	2-6U7G, 1-6A8G, 1-6H6G, 1-6J7G, 1-6V6G, 1-5Y3G, 1-6U5	7V., Phono-Radio, A.C. Operated, Three Band, Tuning Indicator	E.M. 1300 ohms
..	307	Radiogram	Superhet.	460 K.C.	2-6K7, 3-6J7, 1-6L7, 1-6H6, 1-6V6G, 1-5Z3, 1-6U5	9V., Automatic Record Changing Phono-Radio, A.C. Operated, Metal Valves, A.F.C. Tuning Indicator	E.M. 1000 ohms
..	308	Radiogram	Superhet.	460 K.C.	2-1D5G, 1-1C7G, 1-1F7G, 1-1E5G, 1-1J6G	6V., Phono-Radio Vibrator-Battery Operated (Convertible), Two Band, Class "B" output	P.M.
..	48G	Mantel	Superhet.	460 K.C.	1-6A8G, 1-6G8G, 1-6F6G, 1-5Y3G	4V., A.C. Operated	E.M. 1600 ohms

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YEAR	MODEL	CABINET	CIRCUIT	I.F. FRE- QUENCY	VALVES	DETAILS	LOUDSPEAKER
1938	49G	Mantel	Superhet.	460 K.C.	1-1C7G, 1-1D5G, 1-1K7G, 1-1L5G	4V., Battery-Operated	P.M.
"	49GV	Mantel	Superhet.	460 K.C.	1-1C7G, 1-1D5G, 1-1K7G, 1-1L5G	4V., Vibrator-Operated	P.M.
"	50G	Mantel	Superhet.	460 K.C.	1-1C7G, 2-1D5G, 1-1K7G, 1-1L5G	5V., Battery-Operated, Two Band	P.M.
"	50GV	Mantel	Superhet.	460 K.C.	1-1C7G, 2-1D5G, 1-1K7G, 1-1L5G	5V., Vibrator-Operated	P.M.
"	51G	Mantel	Superhet.	460 K.C.	1-6A8G, 1-6U7G, 1-6G8G, 1-6F6G, 1-5Y3G	5V., A.C. Operated	E.M. 1600 ohms
"	52G	Mantel	Superhet.	460 K.C.	1-6A8G, 1-6U7G, 1-6G8G, 1-6F6G, 1-5Y3G	5V., A.C. Operated, Two Band	E.M. 1600 ohms
"	53G	Mantel	Superhet.	460 K.C.	1-6A8G, 1-6U7G, 1-6G8G, 1-43, 1-302 Barretter	4V., D.C. Operated, Two Band	E.M. 1000 ohms
"	170	Console	Superhet.	460 K.C.	1-6K8G, 1-6U7G, 1-6G8G, 1-6F6G, 1-5Y3G, 1-6U5	5V., A.C. Operated, Tuning Indicator	E.M. 1580 ohms
"	171	Console	Superhet.	460 K.C.	1-6K8G, 1-6U7G, 1-6G8G, 1-6F6G, 1-5Y3G, 1-6U5	5V., A.C. Operated, Automatically tuned, Tuning Indicator	E.M. 1580 ohms
"	172	Console	Superhet.	460 K.C.	1-6A8G, 1-6U7G, 1-6G8G, 1-6F6G, 1-5Y3G, 1-6U5	5V., A.C. Operated, Two Band, Tuning Indicator	E.M. 1580 ohms
"	173	Console	Superhet.	460 K.C.	1-6K8G, 1-6U7G, 1-6G8G, 1-6F6G, 1-5Y3G, 1-6U5	5V., A.C. Operated, Two Band, Automatically Tuned, Tuning Indicator.	E.M. 1580 ohms
"	174	Console	Superhet.	460 K.C.	1-1C7G, 1-1D5G, 1-1K7G, 1-1L5G	4V., Vibrator-Battery Operated (Convertible)	P.M.
"	175	Console	Superhet.	460 K.C.	1-1C7G, 2-1D5G, 1-1K7G, 1-1L5G	5V., Vibrator-Battery Operated (Convertible), Two Band	P.M.
"	176	Console	Superhet.	460 K.C.	1-6K8G, 1-6U7G, 1-6G8G, 1-43, 1-302 Barretter	4V., D.C. Operated, Two Band, Tuning Indicator	E.M. 4500 ohms

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