

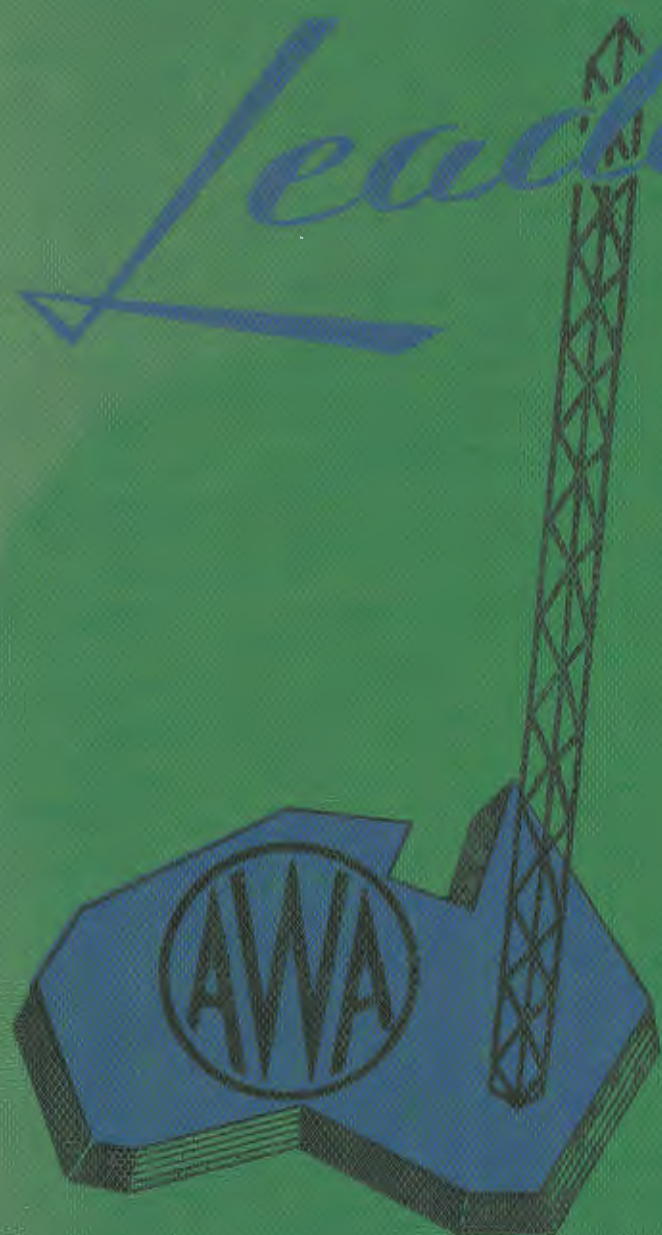
RADIO TRADE ANNUAL OF AUSTRALIA

1935

Leaders

OF THE AUSTRALIAN WIRELESS INDUSTRY

Beam Wireless
Beam Picturegram
Wireless Telephony
Broadcasting
Coastal Radio
Marine Wireless
Pacific Islands Radio
World-wide Communication
Wireless Research
Radio Manufacture
The Fisk Radiola



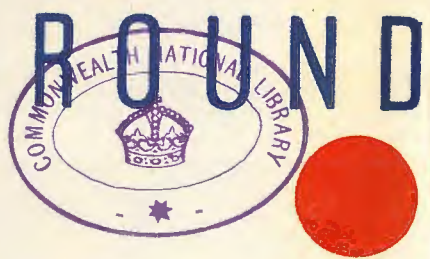
**AMALGAMATED WIRELESS
(AUSTRALASIA) LIMITED**

AUSTRALIA'S NATIONAL WIRELESS ORGANISATION

621-384
R32



THEY



TECHNICAL DATA

Complete technical data on all the new Mullard Valves is available on request. It is the aim of Mullard to help you take full advantage of the new selling features the new series offers. Write to the Technical Dept., Mullard Radio Co. (Aust.) Ltd., 35 Clarence St., Sydney. G.P.O. Box No. 2118 L. Telegrams & Cables: "Mulvalve" Sydney. Telephone: BW 1278.

Mullard

Advertisement of MULLARD RADIO CO. (AUST.) LTD., 35 Clarence Street, Sydney, N.S.W.

THREW A GIRDLE THE GLOBE

They looked across the vastnesses of space – saw an industry in Embryo – seized the strands of possibility – linked them and launched a radio construction which the world acclaimed a Master Valve.

Mullard have been pioneers since radio began. Mullard are still explorers in an ever widening field.

For 1935 Mullard produced a new high efficiency series of battery valves more than matching the performance of improved coils and I.F. transformers.

But Mullard market every type.

2V. (Battery) English.	2V. (Battery) American.
4V. A.C. English.	2½V. A.C., American.
A.C./D.C. 200M.A., English.	6.3 A.C./D.C., American.
In American, English and Continental Bases.	

Radio is racing to meet the future – Mullard scientists still lead.

THE • MASTER • VALVE

Victorian Distributors: Homecrafts Pty. Ltd., 211 Swanston St., Melbourne, C.I.

FIRST

with

Pentode Speakers

When pentodes first appeared back in 1931, Rola produced the first specially designed pentode speaker.

Midgets

When manufacturers concentrated on midget sets, Rola was first into the field with a speaker to fill the bill.

Sealed Transformers

Rola was first to solve the humidity problem by producing an entirely sealed transformer.

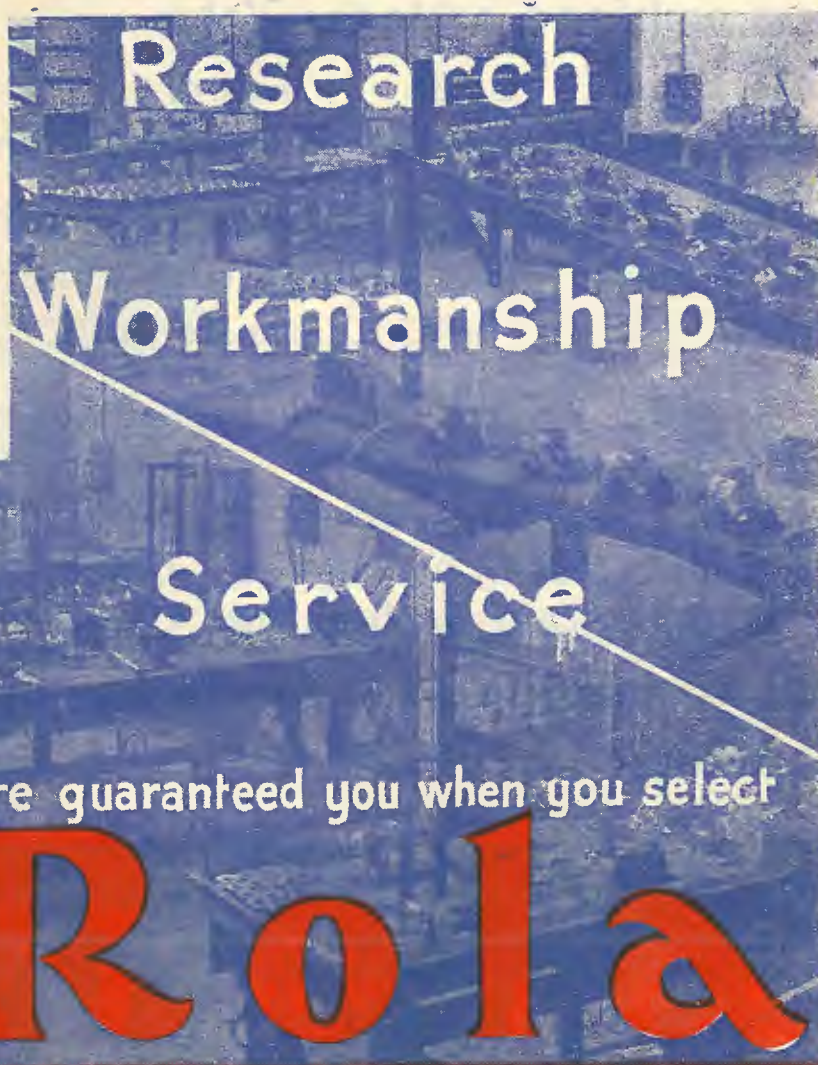
Dustproofing

Rola's latest triumph . . . an entirely dust-proof speaker, radically different in construction from all other types of make-shift dust-proof speakers.

Rola

justifies its claim to be

**MANUFACTURERS
OF THE WORLD'S
FINEST SOUND
: REPRODUCERS :**



are guaranteed you when you select

Rola

Stock, recommend and sell Australia's most dependable battery. Diamonds are your guarantee of 100% customer satisfaction.

**PUT
DIAMONDS
ON YOUR
SHELVES**



**AND
PROFITS
IN YOUR
TILL**

DIAMOND

**Radio and Torch
Batteries**

Manufactured by
WIDDIS DIAMOND DRY CELLS PTY. LTD.
Dalgety Rd., Millers Point, Sydney
Hawke St., West Melbourne



TRUMP CARDS

The proposition which Stromberg - Carlson offer is so attractive that they are winning the co-operation of the best dealer in every district. Some of the advantages of this franchise are mentioned above. There are others that will be detailed in confidence. If you are the dealer who can make most use of these "trump - cards" in YOUR territory write now for the complete information.



— cards that assure big winnings for their holders

Here are some of the money-making advantages enjoyed by Stromberg-Carlson dealers—"trump-cards" that will make you a winner in your district. When you "tie-up" with Stromberg-Carlson you secure . . .



A range of receivers that covers every type of radio buyer. You are not limited to any one class.



Bigger, quicker profits and no price-cutting worries.



Every prospect in your territory for yourself (only one dealer to be appointed in each district).



Prestige—a share of the respect attached to Stromberg-Carlson's name.



Unlimited supplies of folders, show-cards, posters, window-displays and other selling helps.



The benefit of Stromberg-Carlson's powerful, widespread advertising campaign.



Financial assistance in any advertising you think necessary in your local papers.



New developments ahead of all competitors. (You're always first with the latest).



Sets that need only the minimum of after-sale service.



Assistance, guidance and advice from every branch of the entire Stromberg-Carlson organisation.

Stromberg-Carlson deal their dealers

There are still a few districts needing Stromberg-Carlson representation—yours may be on the list. Write at once for the full details and give yourself the chance to cash-in on the advantages enjoyed by Authorised Stromberg-Carlson Dealers.

Stromberg-Carlson

STROMBERG-CARLSON (A/SIA) LTD., 72 WILLIAM STREET, SYDNEY

I'M A PROSPEROUS RADIO DEALER SINCE I TOOK ON THE *Precedent* FRANCHISE

LOOK about you . . . compare this shop with the one I had six months ago and you'll get some idea of how my profits soared after taking a Precedent franchise.

YOU know what a bugbear Summer can be to the radio dealer—Precedent filled the breach this year with an Australian-made Refrigerator and Fan. That meant no delays with supplies; no risk of future shortage of parts and a better all-round service to clients. I'll build a still bigger business in the coming months with Precedent RADIO; for I can bank on Precedent features to more than compete with anything on the market. Take a friendly tip and write for details of the Precedent franchise yourself.



Sydney Office :

FIRTH BROS. (N.S.W.) PTY. LTD.
Rippon House
154-156 Clarence Street,
Sydney

Precedent

SELL PRECEDENT FOR PREFERENCE
FIRTH BROS. PTY. LTD.
149-163 Little Lonsdale Street, Melbourne

S.A. Distributor :
D. HARRIS & CO.
140 Rundle Street
Adelaide, S.A.

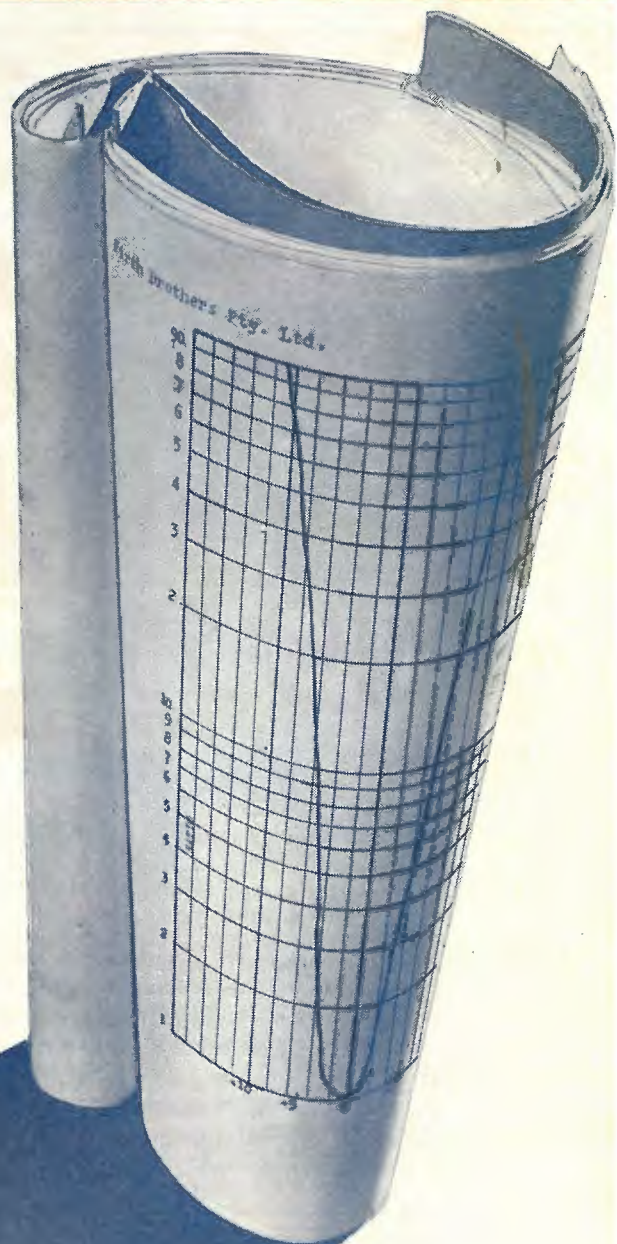
Inside Information

about PRECEDENT and MONITOR QUALITY COMPONENTS & SPEAKERS

HERE'S a catalogue you need for all-the-year-round reference. Crammed full of vital, useful, inside information and technical data, it's the "Who's Who" of Quality Components and Parts.

Years of patient research and actual user performance range behind each of the listed articles. Only the finest components are used in their manufacture. Modern production methods definitely assure you of buying any of our products at the lowest possible price.

GET THIS FREE INSIDE INFORMATION BY WRITING DIRECT TO OUR NEAREST OFFICE FOR THE CATALOGUE SHOWN.



FIRTH BROS. Pty. Ltd.

149-163 LITTLE LONSDALE STREET, MELBOURNE

Sydney Office:

FIRTH BROS. (N.S.W.) PTY. LTD.
Rippon House, 154-156 Clarence Street, Sydney.

S.A. Distributor:

D. HARRIS & CO.
140 Rundle Street, Adelaide, S.A.



ADELAIDE

MELBOURNE

SYDNEY

Gruelling

OVERLAND TEST

demonstrates amazing qualities of...

1935 GOLDEN VOICE



TESTS under actual working conditions 'way back of the beyond usually bring up a radio's weak spots . . . but Healing 1935 Radio passed a sensational overland test of 4,000 miles with "Excellent" written on every page.

Its "golden voice" reverberated through bush-land, over desert sands and on the mountain tops. The most difficult spots for reception were visited, and far-away stations came in with a clarity that local people had hitherto believed impossible.

Healing "Golden Voiced" Radio demonstrates a new standard of Power, Ease of Tuning and Tone to country and suburban Australia, and in consequence there are indications everywhere of a record season ahead. Radio agents are positively enthusiastic.

The Healing is a radio of quality parts, made by a firm that puts performance and tone above every other consideration. A Healing "Golden Voiced" Radio agency repays you, not only by greater and more profitable sales, but in dropping service costs to a minimum.

The dealer proposition for 1935 is better even than the generous proposition of 1934! The advertising programme is wider and the display materials are more attractive. Why not send TO-DAY for full particulars of the Healing Sales Plan—there is no obligation.

Manufacturers and Distributors:
A. G. HEALING LTD.
 Sydney, Melbourne and Adelaide



HEALING *Golden Voiced* RADIO

THE BEST RADIO TO SELL — BECAUSE IT IS STILL THE BEST TO BUY



...from little acorns grow



THREE years ago Thom & Smith Ltd. planted three acorns simultaneously — the acorn of BETTER RADIO; the acorn of genuine CO-OPERATION WITH DEALERS and the acorn of PUBLIC GOODWILL.

The acorns have grown powerful oaks—firmly rooted — sturdy — and STILL GROWING.

Tasma to-day predominates in the radio field—and will continue to do so. This is no empty claim, but a definite and logical FACT.

Tasma set out to build receivers which could have no serious competitors; sets which would stand up to any test and any comparison. Every candid radio dealer will admit that they have succeeded. They set out to create a range of receivers which could meet every grade of demand. Again they succeeded! Tasma is loyal to its dealers. The Tasma Dealer enjoys an exclusive territorial franchise, a Hire-Purchase arrangement which is

smooth-running and free from annoying delays and a co-operation which is, in every sense, PRACTICAL and complete. He deals DIRECT with the manufacturers: no intermediaries absorb any proportion of the reward won by active sales effort. The Tasma Dealer is in real partnership with the factory.

Tasma has made money and Tasma dealers have made money. That money has been made not on a sudden wave of popularity, or by a whimsical fluctuation in public taste, but by the sound and progressive method of selling high quality receivers at attractive prices through dealers who appreciate a really tangible form of co-operation.

It is highly probable that you would like full details of the Tasma proposition to dealers. Your letter of enquiry will receive immediate and considerate attention.

THOM & SMITH LIMITED
55 Dowling Street
East Sydney

Tasma
DETAIL-BUILT
RADIO

Melbourne Representative:
R. J. BRYCE
London Stores Building
Elizabeth Street

ARISTOCRAT

Radio

Aristocrat Radio is "thoroughbred" . . . in manufacture . . . operation . . . appearance . . . performance. All modern developments in Radio are incorporated in Aristocrat 1935 Receivers. The new Aristocrat velvet system ensures simplicity and ease of operation. Aristocrat Radio is presented in cabinets of unexcelled beauty, in keeping with outstanding performance.

You may select any model from the complete range of Aristocrat Receivers and be assured of full satisfaction.

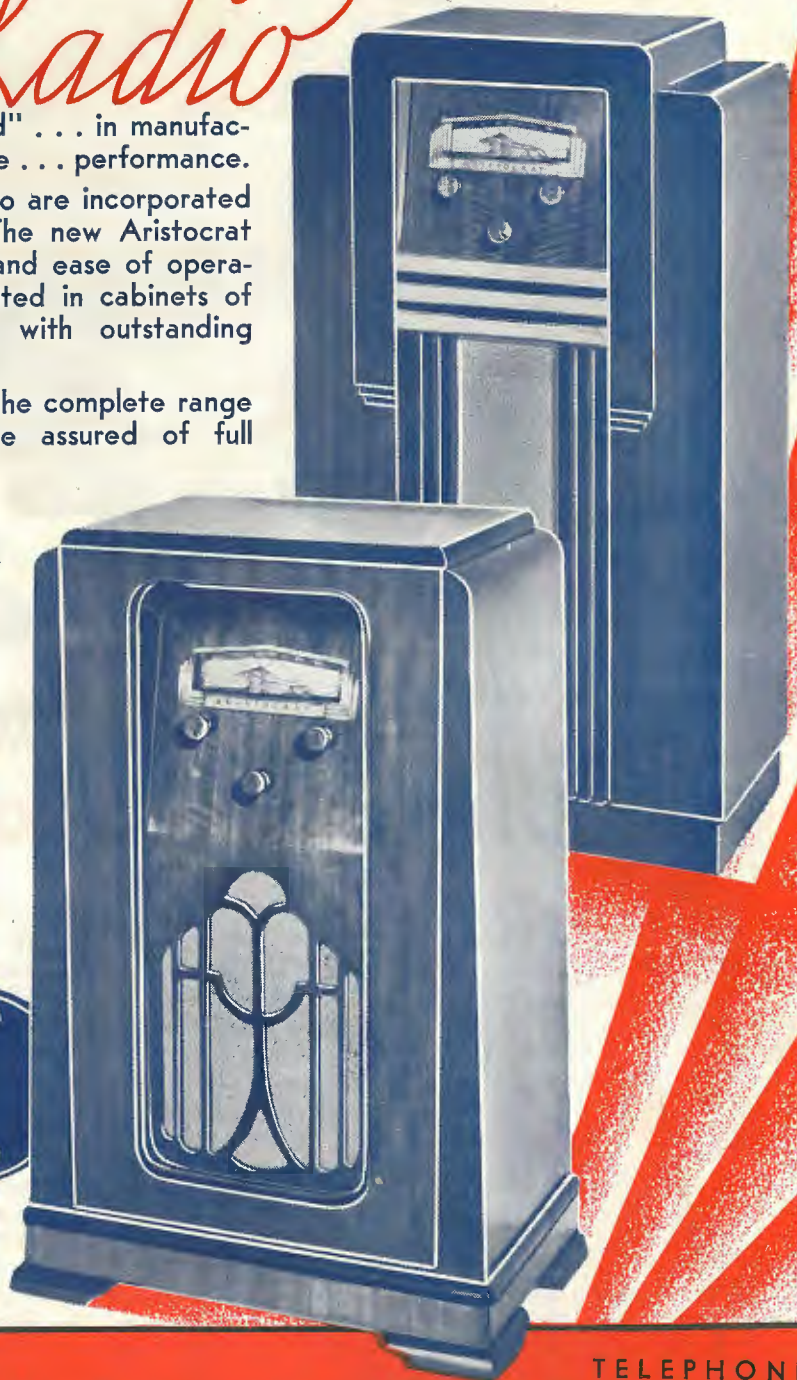
DISTRIBUTORS:

ELECTRICAL SERVICE CO.
Newcastle

TRACKSON BROS. PTY. LIMITED
Brisbane

CARLYLE & COMPANY
Perth

MCCANN BROTHERS
Hobart



**ELECTRICAL SPECIALTY
MANUFACTURING CO. LTD.**
17 GLEBE STREET, GLEBE, SYDNEY

TELEPHONES:
MW 2608 - MW 2609

TELEGRAPHIC
ADDRESS
"ESSEMCO"

Dealers are invited to write in for full particulars of our direct distribution and dealer franchise.

1934

Calendar for 1934 showing months JANUARY to JUNE with days of the week (SMTWTFSS) and dates.

Calendar for 1934 showing months JULY to DECEMBER with days of the week (SMTWTFSS) and dates.

1935

Calendar for 1935 showing months JANUARY to JUNE with days of the week (SMTWTFSS) and dates.

Calendar for 1935 showing months JULY to DECEMBER with days of the week (SMTWTFSS) and dates.

1936

Calendar for 1936 showing months JANUARY to JUNE with days of the week (SMTWTFSS) and dates.

Calendar for 1936 showing months JULY to DECEMBER with days of the week (SMTWTFSS) and dates.

... The ...
**RADIO TRADE
 ANNUAL**
 OF AUSTRALIA
 ●
THIRD EDITION
1935

PRICE, 5/-
 POST FREE IN AUSTRALIA
 OVERSEAS PRICE, 7/6

●
 Whilst every care has been exercised in the compilation of this Annual, the publishers cannot accept any responsibility for any errors or omissions.

●
PUBLISHERS

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 Head Office: 15 Castlereagh Street, Sydney.
 'Phone B 7188 (3 lines); G.P.O. Box 3765

Branch Office: 422 Little Collins Street, Melbourne.
 'Phone CI.2805; G.P.O. Box 1774

Also Publishers of . . .

"RADIO & ELECTRICAL MERCHANT" (the weekly trade journal circulating throughout Australia.)

"RADIO REVIEW" (technical monthly incorporating the Proceedings of the Institution of Radio Engineers of Australia.)

"BROADCASTING BUSINESS" (the weekly trade publication covering the activities of Commercial Broadcasting in Australia.)

Preface . . .

IN presenting this third edition of the Radio Trade Annual of Australia, we record our appreciation of the multitude of congratulations and commendations offered in respect to our previous edition last year. Every effort is made to include in this Annual all the data that is required by manufacturers, wholesalers and retailers on the trading side, also data required by broadcasting stations and broadcast advertisers, etc. That this Radio Trade Annual has filled a very important need, and been of great service to the radio industry and broadcasting interests, is unquestionable.

But our task does not end here. We accept the responsibility of placing in the hands of all concerned, information essential to the more successful conduct of their business. The carrying out of this calls for the fullest co-operation of all sections of radio and broadcasting, and to that end we extend an invitation to all our readers to let us have any suggestion for improvement by way of alteration, deletion or addition.

The extraordinary development of both the radio manufacturing industry and commercial broadcasting, plus the improvement in the National Broadcasting Service, is strikingly illustrated in the growth of listeners' licences, which, at the end of 1934, stood at 681,634 as compared to 518,628 at 31/12/33.

Statistics and data are incorporated in this 1935 Edition which, if carefully considered, will form a basis for future plans by all sections of the radio and broadcasting industries. As time goes on, we believe additional information will become available, and therefore will be included herein.

To all who have assisted in the supplying of information included in this 1935 Edition, we extend our thanks.

O. F. MINGAY,
 Editor.

(Table of Contents and Index will be found on the last pages of this Annual).

The

TELA-VERTA

Range



MODEL 644 (illustrated above)

A 6 valve A.C. Dual Wave Receiver using the **Philips Super series valves** including the famous **Octode A.K.I.** Incorporates A.V.C. Pre-selector, one stage radio frequency on Short Wave and Broad-Cast Bands; the latest type dual action dial; "Cola-code," band change incorporating coloured lights, sensitivity of .5 microvolt and excellent selectivity. Housed in specially selected console cabinet.

COMPRISING some 30 odd models — 5 & 6 Valve A.C. Dual Wavers; 5 & 6 Valve Battery Dual Wavers; 4 & 5 Valve Midget Super Hets; 5, 6 & 7 Valve Console Super Hets; 5 & 6 Valve Battery Super Hets; A.C. and Battery Short Wave Converters—the "Tela-Verta" range is so complete that dealers can supply any customers' requirements without the slightest sales resistance. Prices are attractive. Discounts are liberal. Workmanship is guaranteed.



MODEL 425 (illustrated above)

5 Valve Midget A.C. Super Het, in superior highly polished cabinet. Has excellent tone and selectivity. Uses 2-57, 58, 2A5 and 80 valves, 6in. speaker, square dial with positive non slipping action, tuning and volume controls. Interstate reception guaranteed on this easy seller.



MODEL 544 (illustrated above)

5 Valve A.C. Dual Wave Receiver using the **Philips Super Series Valves** —A.K.I Octode, A.F.2, I.F. at 450 k.c.; 446 diode-det-amp; 463 penthode, 1867 rec. Incorporates A.V.C.; latest type smooth action dial, wave change switch, volume and tone controls. Only the best of components are used including an 8in. speaker. Housed in very fine console cabinet.

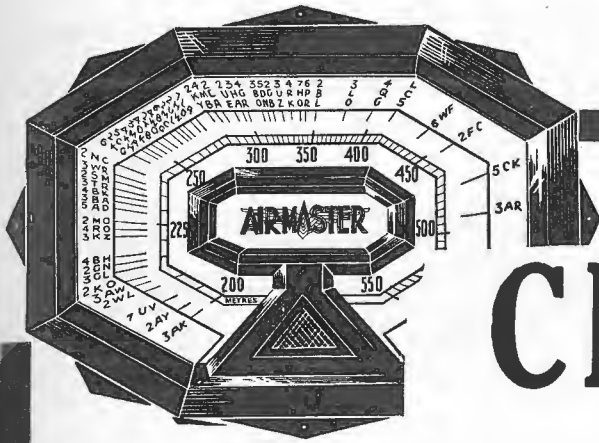
SEND FOR PARTICULARS OF COMPLETE RANGE AND TERRITORIES AVAILABLE.

TELA-VERTA

D.W. RADIO, 210 WILLOUGHBY ROAD, CROW'S NEST, N.S.W. — X 5010, X 5019

Trade Discount Ready Reckoner

Amount	DISCOUNT RATE %.									Amount	DISCOUNT RATE %.					
	2½	3½	3¾	5	6	7½	10	12½	15		17½	20	25	27½	33½	
£100	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£100	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
90	2 10 0	3 6 8	3 15 0	5 0 0	6 0 0	7 10 0	10 0 0	12 10 0	15 0 0	17 10 0	20 0 0	25 0 0	27 10 0	33 6 8	33 6 8	33 6 8
80	2 5 0	3 0 0	3 7 6	4 10 0	5 8 0	6 15 0	9 0 0	11 5 0	13 10 0	15 15 0	18 0 0	22 10 0	24 15 0	30 0 0	30 0 0	30 0 0
70	2 0 0	2 13 4	3 0 0	4 0 0	4 16 0	6 0 0	8 0 0	10 0 0	12 0 0	14 0 0	16 0 0	20 0 0	22 0 0	26 13 4	26 13 4	26 13 4
60	1 15 0	2 6 8	2 12 6	3 10 0	4 4 0	5 5 0	7 0 0	8 15 0	10 10 0	12 5 0	14 0 0	17 10 0	19 5 0	23 6 8	23 6 8	23 6 8
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40	1 5 0	1 13 4	1 17 6	2 10 0	3 0 0	3 15 0	5 0 0	6 5 0	7 10 0	8 15 0	10 0 0	12 10 0	13 15 0	16 13 4	16 13 4	16 13 4
30	1 0 0	1 6 8	1 10 0	2 0 0	2 8 0	3 0 0	4 0 0	5 0 0	6 0 0	7 0 0	8 0 0	10 0 0	11 0 0	13 6 8	13 6 8	13 6 8
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10	10 0	13 4	15 0	1 0 0	1 4 0	1 10 0	2 0 0	2 10 0	3 0 0	3 10 0	4 0 0	5 0 0	5 10 0	6 13 4	6 13 4	6 13 4
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8	4 6	6 0	6 9	9 0	10 10	13 6	1 18 0	1 26 0	1 17 0	1 26 0	2 0 0	2 5 0	2 9 6	3 0 0	3 0 0	3 0 0
7	4 0	5 4	6 0	8 0	9 7	12 0	1 16 0	1 0 0	1 16 0	1 8 0	1 12 0	1 15 0	1 18 0	2 13 4	2 13 4	2 13 4
6	3 6	4 8	5 3	7 0	8 5	10 6	1 14 0	1 7 6	1 15 0	1 10 0	1 8 0	1 14 0	1 18 0	2 6 8	2 6 8	2 6 8
5	3 0	4 0	4 6	6 0	7 3	9 0	1 12 0	1 5 0	1 12 0	1 6 0	1 4 0	1 10 0	1 13 0	2 0 0	2 0 0	2 0 0
4	2 6	3 4	3 9	5 0	6 0	7 6	1 10 0	1 2 6	1 10 0	1 4 0	1 2 0	1 5 0	1 7 6	1 13 4	1 13 4	1 13 4
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19/-	6 6	8 8	9 9	11 0	11 3	1 6	2 0	2 6	3 0	3 6	4 0	5 0	5 6	6 8	6 8	6 8
18/-	5 5	7 7	8 8	10 11	1 1	1 5	1 11	1 5	2 10	2 8	3 4	4 9	5 3	6 4	6 4	6 4
17/-	5 5	7 7	8 8	10 11	1 1	1 4	1 10	1 4	2 8	2 8	3 2	3 7	4 6	5 8	5 8	5 8
16/-	5 5	6 6	7 7	10 11	1 1	1 3	1 7	1 2	2 7	2 7	3 0	3 5	4 3	5 0	5 0	5 0
15/-	5 5	6 6	7 7	10 11	1 1	1 2	1 6	1 1	2 5	2 5	2 10	3 2	4 0	4 5	4 5	4 5
14/-	4 4	6 6	6 6	8 9	10 10	1 1	1 5	1 9	2 3	2 3	2 8	3 0	3 9	4 2	4 2	4 2
13/-	4 4	5 5	6 6	8 9	9 9	1 1	1 4	1 8	2 1	2 1	2 5	3 3	3 6	4 4	4 4	4 4
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11/-	3 3	4 4	5 5	7 7	8 8	10 10	1 2	1 6	1 10	1 10	1 8	2 2	2 9	3 4	3 4	3 4
10/-	3 3	4 4	5 5	6 6	7 7	8 8	1 1	1 5	1 9	1 9	1 6	2 0	2 6	3 3	3 3	3 3
9/-	3 3	4 4	5 5	6 6	7 7	8 8	1 1	1 4	1 8	1 8	1 4	1 10	1 6	2 2	2 2	2 2
8/-	2 2	3 3	4 4	5 5	6 6	7 7	1 1	1 3	1 7	1 7	1 4	1 7	1 6	2 2	2 2	2 2
7/-	2 2	3 3	4 4	5 5	6 6	7 7	1 1	1 2	1 6	1 6	1 3	1 10	1 6	2 2	2 2	2 2
6/-	2 2	3 3	4 4	5 5	6 6	7 7	1 1	1 1	1 5	1 5	1 2	1 7	1 5	2 2	2 2	2 2
5/-	2 2	3 3	4 4	5 5	6 6	7 7	1 1	1 1	1 4	1 4	1 1	1 6	1 4	2 2	2 2	2 2
4/-	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 3	1 3	1 0	1 3	1 1	1 8	1 8	1 8
3/-	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 2	1 2	0 9	1 1	1 1	1 5	1 5	1 5
2/-	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 8	1 0	1 0	1 4	1 4	1 4
1/-	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 7	0 9	1 0	1 1	1 1	1 1
11d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 6	0 8	0 9	1 0	1 0	1 0
10d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 5	0 7	0 8	0 9	1 0	1 0
9d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 4	0 6	0 7	0 8	0 9	1 0
8d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 3	0 5	0 6	0 7	0 8	0 9
7d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 2	0 4	0 5	0 6	0 7	0 8
6d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 1	0 3	0 4	0 5	0 6	0 7
5d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 1	0 2	0 3	0 4	0 5	0 6
4d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 1	0 2	0 3	0 4	0 5	0 6
3d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 1	0 2	0 3	0 4	0 5	0 6
2d.	1 1	2 2	3 3	4 4	5 5	6 6	1 1	1 1	1 1	1 1	0 1	0 2	0 3	0 4	0 5	0 6



A NEW CHAPTER

in Radio Manufacturing

was written when

AIR-MASTER

introduced

THE NEW 35 SERIES

and presented for the first time

Circuit using the Octode and indirectly heated rectifier.

Image suppression circuit which eliminates double tuning responses and whistles.

Horizontal chassis with sloping dial.

Flat topped I.F. curve giving good treble response.

Rola K7—the improved fidelity 10in. speaker.

AD35.

Beretter voltage regulator.

Low power consumption (up to 60 watts).

Full 3 watts output.

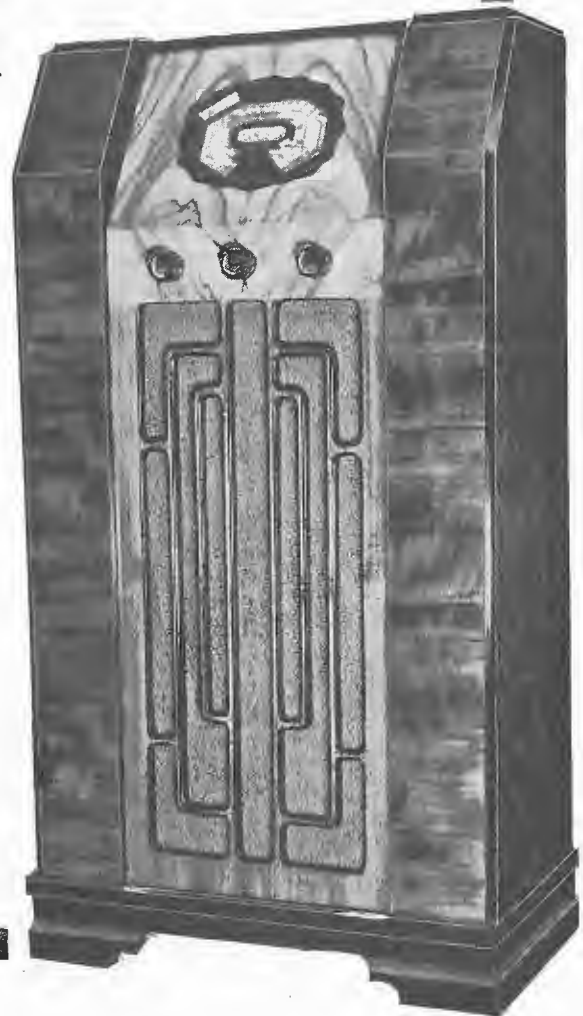
B35.

Syncrolite dial which automatically illuminates scale of wavelengths when tuning.

Delayed A.V.C. on battery sets.

Rola dust-proof speakers.

Because the new Air-Masters are genuinely outstanding they will build big business for selected dealers.



AIR-MASTER

TARGAN ELECTRIC CO. PTY. LTD., Brunswick Road, Brunswick, Vic.

A Review of the Australian Radio Industry During 1934

A SUCCESSFUL TRADING YEAR

THE year 1934 was the most successful trading period ever experienced by radio manufacturers, distributors and retailers throughout Australia. This is realistically appreciated by the actual official figures which show that during 1934 over 228,000 new broadcast listeners' licences were taken by the public throughout the Commonwealth, as compared to 162,644 during 1933.

After allowing for cancellations of over 60,000, the nett gain during the year 1934 in licences was 163,000, as compared to about 99,500 in 1933.

From the beginning of the year under review until about October, the trade was hard put to supply the demand.

Those figures do not include or allow for replacement sets bought to replace out of date 1928-1931 sets, and of these it is estimated that at the very least 72,000 were replaced with 1934 models, making a grand total of at least 300,000. At an average retail price of £25 the total of £7,500,000 retail turnover without service and parts, was passed through the radio industry.

The drastic tapering off during November and December last year points to the tremendous national importance of the Cricket Test Matches played in England between the Australian and English teams from May to August. During those four months (May, June, July, August) 111,079 new licences were issued, averaging 27,770 per month compared to the remaining 8 months, when 116,934 new licences were issued, averaging 14,617 per month. Another interesting comparison might be cited for those same 4 months during 1933—when there was no cricket—only 63,349 new licences were issued, averaging 15,587 per month.

The exceptional public demand of 1934 encouraged many new factories to open up and the problem was not only to supply the required broadcast receivers, but to obtain the skilled staff necessary to produce efficient sets. That problem is one that one day must be faced.

Australian Broadcasting Commission

THE Annual Report of the Australian Broadcasting Commission, as published in this Annual, shows that revenue for the year ending 30th June, 1934 was £325,731, as compared to £250,618 for the period ending June 1933, an increase in gross revenue of £75,113. Expenditure for 1934 was £292,737 as compared to £231,290 for 1933, an increase in expenses of £61,447.

Every effort is apparently being made by the Postmaster-General's Department—which controls broadcasting in Australia—to improve the transmission of existing National Stations, and, added to the several new stations which are now in course of erection, the result

should be a much improved National service to broadcast listeners. Several of these new stations are planned to radiate much higher power than has hitherto been enjoyed. Not only is the power being increased, but also the fidelity of reproduction has received much attention.

Early this year, 1935, the P.M.G.'s Department announced a re-shuffle of wave-lengths of existing and projected stations, details of which are published in this Annual.

Radio Patents

THE year of 1934 opened with considerable controversy going on between groups of radio manufacturers and the owners of radio patents, all of which was brought about by the Commonwealth Government terminating during 1933 an agreement with Amalgamated Wireless (A/sia) Ltd. Manufacturers were obliged to make their own arrangements to handle the patent position. After considerable negotiation, all manufacturers signed a licence (details of which are published herein) with the Australian Radio Technical Services & Patents Ltd. (A.R.T.S. & P.) which company ultimately included Amalgamated Wireless (A/sia) Ltd., Standard Telephones & Cables (A/sia) Ltd., Philips Lamps A/sia Ltd., and Neutrodyne (Hazel-tine) Pty. Ltd.

After this complete licence was concluded, certain radio manufacturers decided to re-form the trade organisation known as Radio Interests Ltd., which was formed in 1933 to investigate the whole patent position and negotiate an arrangement for its members. The re-form movement temporarily failed, but the action resulted in the dissolution of Radio Interests Ltd., and its ultimate winding up by liquidation.

The re-form party then formed Australian Radio Manufacturers Patents Association Ltd., and has restricted its membership to bona fide radio manufacturers.

The patent licence agreement with A.R.T.S. & P. Ltd., expires on December 31st, 1938.

The Commercial Broadcasting "B" Stations were also obliged to make their own arrangements with transmitting patent holders and many have done so.

Existing patent licences do not include valves, loud speakers or television apparatus. It is anticipated that the introduction of television—probably in 1936—will again bring up the patent controversy in that field.

In order to give readers an opportunity of appreciating the activity in the radio and television patent field, a very exhaustive analysis of all patents filed during 1934 is published in this Annual.

(Continued on Page 18)

Australian WIRELESS PROGRESS

- 1913 Incorporation of Amalgamated Wireless (A'sia) Ltd. Wireless installed on ships of Australasian Mercantile Marine.
- 1914 Upon outbreak of war, supplied immediately many complete wireless stations and trained men to erect and operate them for Australian Expeditionary Forces.
- 1918 First direct wireless messages received in Australia from England by Mr. Fisk.
- 1920 First public demonstration of Wireless Broadcasting given by Mr. Fisk at the Royal Society of N.S.W., Sydney.
- 1922 The administration and operation of the whole of the Australian Coastal Radio, Papuan and New Guinea stations—29 in all—taken over by A.W.A.
- 1923 First daily newspaper, "Wireless News," published on board a British ship in the Pacific was carried out by A.W.A.
- 1924 Wireless Telephone Communication between England and Australia established.
- 1927 Opening of Beam Wireless Service to Great Britain and the Continent of Europe.
A.W.A. Transmitted first Empire broadcast programme and first world-wide broadcast programme.
- 1928 Beam Wireless Service between Australia and North and South America opened.
A.W.A. re-organised the Fijian Wireless Service for the Colonial Office and now operates the stations for them.
- 1930 Opening of the A.W.A. Trans-Ocean Wireless Telephone Service between Australia and Great Britain, the Continent of Europe, and North and South America.
A.W.A. Wireless Telephony Service between New Zealand and Australia opened.
- 1931 A.W.A. experimental short-wave World-wide Broadcasting Service inaugurated.
Australia's largest Radio-Electric Works established by A.W.A. at Ashfield, Sydney.
- 1933 Establishment of valve manufacturing by A.W.A.
- 1934 Beam Wireless Picturegram Service between Australia and England and North America inaugurated.

AMALGAMATED WIRELESS (A/SIA) LTD.
AUSTRALIA'S NATIONAL WIRELESS ORGANISATION



REVIEW OF THE AUSTRALIAN RADIO INDUSTRY—(Continued from Page 16)

Commercial "B" Stations

THE effectiveness of the Commercial (B) Stations throughout Australia is worthy of mention. Their popularity can best be gauged by the increasing "advertising time" that is being sold; the increase of actual broadcast time on the air by almost every station; general excellence and merit of their programmes; their increase of staff and announcers, and the increase of country stations. Altogether the prosperity enjoyed by all commercial stations is significant of the public acceptance of these non-subsidised stations, whose only source of income is the sale to advertisers of **time on-the-air**.

The Australian system of broadcasting, including the National (A) stations (controlled by the Federal Government) on the one hand, and the Commercial (B) stations on the other, still remains probably the most efficient system in the world. This is not to be taken as an endorsement of the policy of Federal Government control of programmes.

All-Wave Year

Receiving set design swung to "All-Wave" models and every manufacturer included in his range several receivers—both all-electric and battery—covering the short wave band to receive the overseas short wave broadcasts, whilst still covering the 200-550 metre broadcast band.

These receivers, while named in most cases "All Wave" were not truly all wave, as the majority only covered 20-80 metres in two positions and the broadcast band 200-550 metres. Towards the end of 1934 there was a trend towards "Dual Wave" which was a more faithful description of the set, and in the early part of this year 1935, the fashion has been decidedly dual wave.

The entertainment value of short wave broadcasts is becoming more apparent every week. The Christmas Empire broadcast by His Majesty The King was a marvellous success. The Empire broadcasts conducted daily by the B.B.C. have a pronounced entertainment value. The various Continental stations are fast becoming acceptable as possessing quite an entertainment factor.

Development of short wave broadcast transmissions not only overseas but in Australia, particularly by the A.W.A. stations 2ME and 3ME, and also the P.M.G.'s station 3LR, is fast progressing. There is a growing school of thought that the short wave broadcasts will prove effective against "static," particularly for country areas, but against that is the huge area within at least 100 or more miles of a short wave station which is really ineffective.

Use of short wave high powered broadcast stations by various countries to put their propaganda into certain foreign stations is proving most efficient and effective. This International coverage is something to be reckoned with.

Overseas reception, while of a fair standard, is destined to become more popular, and it is anticipated that 1935 will witness greater public interest in the many

excellent stations that are receivable under good conditions.

Automobile Radio

Also experienced larger sales during late 1934 and early 1935. Several prominent set manufacturers were very successful in this field, while others—in fact several of the leaders—did not bother. Auto radio calls for specialisation to be profitable.

Battery Sets

A noticeable trend was the improvement in the performance of battery sets for the country; greater thought being given to this subject than for many years. The untouched yet available market in the country for battery sets is surely an objective worth going after.

Valve Trend

The outstanding development during the past year was undoubtedly the Octode type of frequency changer. The simple addition of a suppressor grid to a pentagrid type frequency converter has thus removed many of the difficulties associated with dual or all-wave superheterodynes. In general, the valve designer has concentrated on multi-electrode valves for various purposes, culminating in a special output valve incorporating a driver stage, although this type of valve is not yet available in Australia.

Certain valves have also been developed particularly for use in universal AC/DC receivers, the series-operated heaters being rated from 13 to 24 volts as required.

Many of the troubles previously associated with series heaters in AC/DC sets, due to line surges or variation, have now been removed by the introduction of the iron-hydrogen type of barretter valve.

Several comparatively recent valves have been redesigned during the last twelve months, in some cases to overcome difficulties associated with short-wave reception, in others to improve characteristics or to remove certain deficiencies as revealed by service reports.

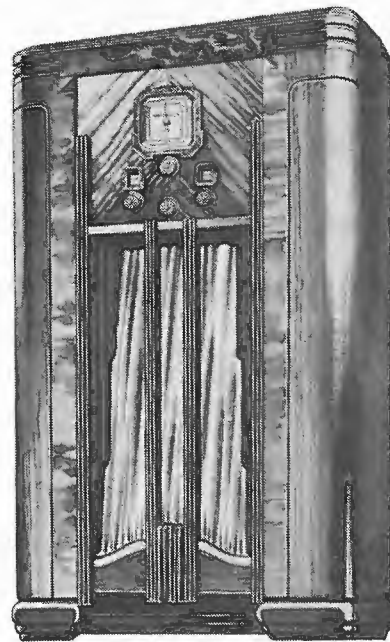
More attention has been paid to valves for battery operation, resulting in the production, for battery service, of equivalents of many popular A.C. types.

A number of twin valves for class "B" operation, to give maximum power output with minimum battery consumption, have also been developed.

Apart from these types, however, valves for A.C. operation fall roughly into three classes: (1) for 2.5 volt operation; (2) for 6.3 operation; and (3) for 4 volt operation. Valves of the first type are rapidly falling into disuse in favour of types (2) or (3), which represent standard American types and English or Continental types respectively.

With the interest aroused in high-fidelity reproduction, there has been a general reversion to push-pull triodes in the output stages of high quality receivers. Associated with this is the production of the 83V, a high vacuum rectifier having the same characteristics as the mercury-vapour 83, and which is capable of giving twice the current obtained from a type 80.

4 4 4 Steps to Better Radio Trading!



DEALERS' PROTECTION. Definite territory allocation and rigid dealer protection. All radio business emanating from each territory, irrespective of its source, direct, indirect, or even sold through our City sales organisation, will be credited to the particular territory where the customer is residing at the time of the purchase. This co-operation must assist the dealer to increase sales volume.

FACTORY TO DEALER DIRECT. Every Gulbransen, carefully tested before despatch, is an exact replica in every minute detail of the master laboratory model and it is this standardisation and precision building which must create confidence in the efficiency and tone quality of each set. No second or third handling. Each Gulbransen comes to you DIRECT.

PRICE MAINTENANCE. No dealer will be permitted to cut prices under any circumstances. Rigid adherence to this policy will protect every dealer, must create customer confidence and establish a standard of fair business dealing, which will be reflected in increased output. N.S.W. agents have the advantage of all hire purchase sales being carried by the Company direct.

MANUFACTURING AND RETAILING. Twenty years of retail selling are behind every Gulbransen manufactured at our factory. This enables us to anticipate the Agent's viewpoint and solve his retailing difficulties and service problems by co-operation and co-ordination of retailing facilities. A few country territories are still available. Exclusive interstate distribution is also available to live organisations. Particulars of franchise will be posted on request.

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Second Annual Report of The Australian Broadcasting Commission

YEAR ENDING 30th JUNE, 1934

Furnished to THE MINISTER for presentation to both HOUSES of the PARLIAMENT in accordance with the provisions of Section Thirty-two of the Australian Broadcasting Commission Act of 1932.

MEMBERS OF THE COMMISSION:

W. J. Cleary (Chairman), Herbert Brookes (Vice Chairman), R. B. Orchard (Commissioner), R. S. Wallace (Commissioner), Elizabeth M. R. Couchman (Commissioner).



MAJOR
W. T. CONDER
General Manager
Australian Broad-
casting Commission

DURING the period of twelve months from the 1st July, 1933, to 30th June, 1934, the Australian Broadcasting Commission has continued, under the authority of the Australian Broadcasting Commission Act of 1932, to provide and to render programmes from the twelve A Class National Broadcasting Stations in Australia. The preceding year had seen an increase of 99,532 in the number of licence-holders in Australia—an increase not previously equalled since the inauguration of broadcasting in 1924—and it is with pleasure that the Commission is able to report that the increase for the twelve months just concluded has exceeded even that figure and has reached the unprecedented total of 129,682 (an advance of 30,150 over the record established in the Commission's first year). A pleasing feature of this increase has been the fact that it has been so uniformly distributed that every State has improved upon last year's figures and that, with the single exception of Victoria, the increase in each separate State has been the greatest ever recorded there. In Victoria the improvement is the third highest ever recorded.

This advance in the number of licence-holders throughout Australia is most gratifying. In the period under review there has been no alteration in the number or power of transmitting stations, so that the transmission coverage has remained the same as it was during the preceding year.

Staff.

The Commission mentioned, in its first report, that it had taken over, practically without alteration, the Staff engaged for similar work by the organisation previously controlling A Class Stations, a policy adopted to avoid both disorganisation of the service and hardship to the individual employees. The fact that there was already in existence an organisation capable, in general, of carrying out the necessary work was, for many reasons, a distinct advantage to the newly-appointed Commission, but, none the less, has not allowed quite the freedom which the Commission would have had if it had created the whole organisation de novo; during the last twelve months some small alterations have been made, and further minor adjustments may be necessary from time to time in the future. At the present moment it is only necessary to report that considerable extensions in the scope of the programmes and improvements in their quality have been brought about without a proportionate increase in the number of employees, which has remained practically the same as at the Commission's inception.

Personnel of Commission

It is with regret that the Commission records the resignation, as from the conclusion of the period herein reviewed, of its first Chairman, Mr. Charles Lloyd Jones, who, after two years of most valuable service, found himself no longer able to devote the necessary time to this work. Mr. W. J. Cleary has been appointed Chairman in his place.

One of the members of the Commission, Mr. Claude Couchman, has been absent on leave for the latter portion of the

year, and has visited America, England and the Continent, where she has been enabled to study a number of aspects of broadcasting in those countries, and has also had the honour of representing Australia at both the Congress of the International Council of Women at Paris and The Assembly of the League of Nations at Geneva.

Stations

The Commission has continued to supply programmes for the twelve A Class Stations in Australia, namely:—

Station	Carrier Power in the Aerial (Kilowatts)	Operating Frequency (Kilocycles)	Wavelength* (Metres)
2CO—Corowa	7.5 K.W.	560 K.C.	535 metres
7ZL—Hobart	1 "	580 "	516 "
3AR—Melbourne	4.5 "	610 "	491 "
5CK—Crystal Brook	7.5 "	635 "	472 "
2FC—Sydney	2.5 "	665 "	450 "
6WF—Perth	3.5 "	690 "	435 "
5CL—Adelaide	2 "	730 "	411 "
4QG—Brisbane	2.5 "	760 "	395 "
3LO—Melbourne	3.5 "	800 "	375 "
2BL—Sydney	3 "	855 "	351 "
4RK—Rockhampton	2 "	910 "	329 "
2NC—Newcastle	2 "	1245 "	241 "

* Approximately.

Of the above Stations 2FC, 2BL, 3LO, 3AR, 4QG, 5CL, 6WF, and 7ZL have supplied regular full-time programmes, with the exception of occasional relays. Station 2NC has supplied an increasing amount of its own programme-time by means of local concerts, news services and sporting descriptions, while the remaining three have depended mainly upon relays from other stations, but have all supplied individual programmes for a portion of their transmitting time.

Throughout the year the total transmitting time of the 12 National Stations has been 51,446 hours 12 minutes, an average of 4,287 hours 11 minutes per station or 11 hours 40 minutes (approximately) per station per day. Of the above-mentioned total period, 19,066 hours 49 minutes were occupied in relays taken from other stations in the network, so that the actual period for which separate programme-items had to be found during the year was 32,379 hours 23 minutes. The Commission therefore provided, during the twelve months under review, separate programme-items aggregating on an average approximately 88 2-3 hours in every day.

It will readily be recognised that the preparation and rendition of so large a number of programme-items has thrown a considerable burden upon the resources of the Commission and the ingenuity of its officers. The difficulty of the task, when compared with that of similar organisations in other parts of the world, has been further increased by a number

A.B.C. ANNUAL REPORT—(Continued)

of other factors associated with the specific characteristics of Australia; this country is still largely undeveloped, artistically as in other ways, and is separated by some twelve thousand miles from England and the Continent, upon which it must still depend for much of the material which is essential to a proper broadcasting service. In addition to that, the climatic, social and economic conditions, and with them the interests of the people, vary greatly in the different States, and all of these things must necessarily react upon the Commission's work. These matters have received close attention, and much of value has been learned concerning them. The results of investigations have been embodied in the programmes from time to time, and it is believed that definite improvements have resulted.

Licences

(a) In Australia:

Reference has previously been made to the increase in licences held in Australia during the year just concluded. The increase in the actual number of broadcast listeners' licences issued to the public since the creation of the Commission two years before has, at 30th June, 1934, reached the remarkable figure of 229,214, an increase of more than 78 per cent. over the total compiled in the previous eight years—an increase which has been evenly distributed over town and country and over every State, which showed itself immediately and which has been maintained progressively.

The proportion of cancellations has still remained gratifyingly low, while extensive new business has been transacted. The proportion of licence holders to the whole population has increased since June 30th, 1932, from 5.67 per cent. to 9 per cent., and this latter figure, while extremely satisfactory as an indication of the progress which has been made, is still more pleasing in that it shows wide scope still for further expansion, an expansion which will be greatly facilitated by the seven new National Stations which are soon to be made available at different country centres throughout Australia.

Of the various States, Victoria has still the highest proportion of licences to population, its percentage being 11.36. The lowest proportion is still to be found in Queensland, but such marked improvement has been recorded there since the commencement of 1934 that there is good reason to hope that the gap between it and other States will soon be bridged.

(b) In Comparison With Other Countries:

Since the previous report was compiled the activities of L'Union Internationale de Radiodiffusion have made it possible to obtain much fuller and more recent information concerning listener-statistics from other countries, and reasonably accurate figures from every other nation in which there is a broadcasting system are now available. In view of this, it is particularly pleasing to observe that Australia had, at the 31st December, 1933, retained its position as the sixth nation in the world in respect of proportion of listeners to population, and it is not unlikely that the remarkable increase which has occurred here since that date has raised our position to fifth. Austria, which previously was above Australia, has fallen back somewhat, but the Netherlands, whose figures were not available last year, were slightly ahead of Australia in December last. Australia is still second in the Empire, and first of the Dominions.

In the following comparative table the number of licences in force (or in countries where there is no licence system the number of receiving sets in operation, whether actual or estimated) is set out, together with the dates at which the returns were made. For purposes of comparison the Australian figures are shown as at 30th June, 1934, and also as at the various dates marked against other countries.

Country	Date to which Figures Refer.	Licences	Latest Population Return	Percent. of Licences to Population
Denmark	30/6/34	534,782	3,550,651	15.06
1United States of America	31/12/33	18,925,000	127,900,000	14.79
Great Britain	30/6/34	6,373,594	44,790,485	14.23
Sweden	30/6/34	707,565	6,162,446	11.48
Netherlands .	30/6/34	858,843	8,127,549	10.56
Australia	{ 31/12/33 31/1/34 30/6/34	{ 518,592 527,003 599,159	{ 6,641,689 6,641,689 6,656,912	{ 7.81 7.93 9.
Germany	30/6/34	5,359,480	65,306,130	8.2
Switzerland	30/6/34	323,302	4,080,720	7.92
Cuba	31/12/33	300,000	3,962,344	7.57
Austria	30/6/34	506,038	6,732,395	7.51
New Zealand	31/12/33	113,053	1,539,782	7.34
Iceland	31/12/33	8,030	109,500	7.2
Canada	31/1/34	681,089	10,353,778	6.57
Danzig	30/6/34	22,680	407,517	5.56
Belgium	30/6/34	534,939	8,159,185	6.55
Norway	30/6/34	145,536	2,847,000	5.11
Mexico	31/12/34	80,000	16,552,722	4.83
Czecho-Slovakia	30/6/34	621,124	14,726,158	4.21
France	30/6/34	1,587,247	41,427,000	3.83
Hungary	30/6/34	334,478	8,734,206	3.82
Argentina	31/12/33	450,000	12,000,000	3.75
Union of Sth. Africa	31/12/33	67,160	1,828,175	3.67
Finland	31/12/33	121,014	3,697,505	3.28
Latvia	30/6/34	55,239	1,935,000	2.85
Japan	31/5/34	1,760,345	93,533,716	1.88
Irish Free State	30/6/34	52,453	2,971,992	1.76
2U.S.S.R. (Rus- sia)	31/12/33	2,385,000	167,143,000	1.47
Newfoundland	31/12/33	3,500	263,033	1.33

Poland (.97), Italy (.86), 2 Spain (.77), Lithuania (.71), Roumania (.55), Yugo-Slavia (.41), Hong Kong (.39), Morocco (.26), Portugal (.25), Palestine (.24), Tunis (.17), Siam (.16), Algeria (.15), Bulgaria and Esthonia (.13), Philippines (.11), Guatemala (.07), Turkey (.04), Singapore, Syria and Ceylon (.03), Albania (.02), Kenya (.019), 2 Brazil (.015), Dutch East Indies (.014), Madagascar (.006), Greece (.005), French Indo China (.004), and India (.0004), all had less than one per cent. of licences to population at the end of 1933.

NOTES:—1 United States of America: There is no licence system in America. The figures shown represent the estimated number of receiving sets in operation.

2 The figures shown against Brazil, Spain and the Soviet Union represent the number of registered listeners, but it is believed that the number of actual listeners is considerably greater.

In comparing Australia with Denmark, Sweden and the Netherlands, it must be remembered that the latter are able to receive clearly the programmes transmitted from the powerful stations of England, France, Germany, Austria and Russia, while here listeners must depend almost entirely upon programmes provided locally.

Programmes

DURING the current year the Commission has introduced few notable changes in its programme policy, other than those foreshadowed in its initial year of office. It has, however, continued to provide feature items whenever possible and in doing so to arrange for listeners in every State to have the benefit of them, though at the same time ensuring that the greater part of its broadcasting time, and, indeed, of all its activities, was devoted to the encouragement and development of local talent. Principal among these features was the visit of Sir Hamilton Harty, distinguished orchestral conductor, who formerly had conducted the Halle Orchestra at Manchester and who has, from time to time, acted as guest conductor for almost all the world's leading orchestras. He visited Australia towards the end of the year under review and conducted a series of nine public concerts, five in Sydney and four in Melbourne, all of which were relayed throughout the Network. His conducting is expected to prove of lasting bene-

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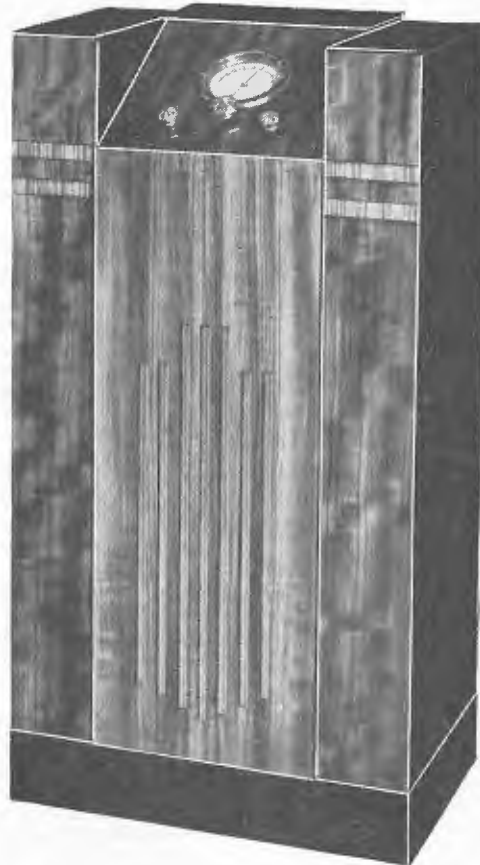
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2nd ANNUAL REPORT, A.B.C.—(Continued)

fit to the musicians who were fortunate enough to play under him, and to those members of the public who were enabled to see and to hear his performances.

Captain H. E. Adkins, Director of the Royal Military School of Music, Kneller Hall, England, was also engaged by the Commission, by courtesy of the British War Office, to come to Australia at the end of 1933 and the commencement of 1934, and while here conducted a Military Band formed for the occasion of leading players from all parts of Australia. Captain Adkins gave a number of public performances in both city and country in every State, and many of them were broadcast through the National Stations; his tour did much to stimulate interest in Military Band music among the Australian people, and has provided the Commission with a band of good quality which has since been retained in Sydney. A season of Grand Opera (including several works new to Australian audiences) was presented in Sydney, occupying a period of six months. A feature of this season was the employment of Australian artists.

While bearing in mind its obligations to develop local talent, the Commission at present intends to make a certain number of outstanding artists from abroad available to its listeners from time to time in order to raise the standard of the programmes, to develop the artistic appreciation of the public and, above all, to give to local performers an opportunity and an incentive to improve their technique.

Another feature worthy of particular mention has been the broadcasting of descriptions of the series of Cricket Test Matches between Australia and England which commenced in England early in June, 1934. At the end of the year under review most widespread and enthusiastic public attention had already been attracted to these "reconstructed" descriptions, whereby the fullest information of the progress of the game had been obtained by cable directly from the ground and had been converted by cricket experts into a running commentary upon the actual play of the entire match.

Summary of Further Contents

The report then proceeds to deal with a programme analysis, showing that musical items took up 49.36%, Drama 7.16%, Lectures etc., 10.55%, Sport 11.62%, Essential Services 12.38%, Devotional 4.94%, and Children's Sessions, 3.99%.

COMPETITIONS: The Commission conducted a competition for composers, and there is good reason to expect an entry even more satisfactory than was received for the similar competition in 1932.

EDUCATIONAL BROADCASTING: The Commission has maintained its policy of broadcasting lectures particularly designed for reception by schools, and is pleased to have in this work the co-operation and ready support of the educational authorities in the majority of States. The number of schools which have advised that they regularly make use of this service has greatly increased and is now in the vicinity of 600.

WOMEN'S INTERESTS: Again attention has been paid to topics which are of particular interest to women, and careful investigations, designed to ascertain the subject-matters most appreciated and the best methods of approach to them, have been and will be continued.

CHILDREN'S SESSION: The most notable development in this branch during the year 1933-34 has been the regular inclusion in the programmes of stories, whether published (a number of these having been made available by the publishers) or specially written for the purpose by local authors.

COUNTRY INTERESTS: Further steps have been taken to cater for the particular interests of country dwellers in Australia, and in addition to the technical lectures on Agricultural, Pastoral and Horticultural subjects, the market, river-height and meteorological reports and the news services, all regularly provided during the Commission's first year of office, a number of broadcasts from agricultural shows held at different points in the country have been introduced. This

work has evoked definite indications of appreciation, and the Commission is determined to expand it in the future.

Relays and Re-Broadcasts. Technical; Exhibitions; S.O.S. Messages, to the extent of 2,172 were broadcast during the year.

CHARITIES: The amount of £4,452/19/1 was collected in connection with Children's Session Greetings, etc.

ACCOMMODATION: During the twelve months just concluded there has been no great change in regard to the premises occupied by the Commission in the various States. In Sydney and Melbourne it has become obvious that the premises at present occupied do not nearly meet the Commission's requirements and the Commission has given much consideration to various sites and buildings which it has been suggested it might either rent or purchase. Finality has not yet been reached in either case, but it is essential that definite action be taken as soon as possible in both States. In Adelaide it has been decided to make certain alterations in the premises which the Commission owns in that city, and this work is already in hand; material improvement in the quality of the programmes is expected to result. Certain renovations have been effected in Brisbane and a slight extension of accommodation has been arranged in Rockhampton. The new premises at Newcastle have operated satisfactorily, and no immediate alteration in the accommodation arrangements is intended at either Crystal Brook or Corowa. The question of accommodation in Perth and Hobart is under consideration.

FINANCES: At the conclusion of the Financial Year 1933-34 the Commission's assets totalled £75,093/4/8, including Land and Buildings, £14,649/18/5, Furniture, Musical Instruments etc., £17,120/5/1, and Sundry Debtors (almost entirely accrued proportion of licence-fees), £13,463/1/10. Of the liabilities the item Sundry Creditors stood at £22,770/4/10 (representing principally payments falling due on account of copyright, purchase of property, line-charges, etc.), the Building Reserve Fund had increased to £50,000, and the Accumulated Fund totalled £2,322/19/10. It will be seen from the above figures that the Commission's financial position is a sound one, although the reserve for building is not as yet adequate for the anticipated requirements of the next few years.

The revenue for the year, from all sources, was £325,731, of which £314,126 represented the Commission's proportion of listeners' licence fees—an increase of £63,508 over that received during 1932-33. N.S.W. (£119,582) and Victoria (£111,846), were again the principal revenue producers; South Australia returned £33,649, Queensland £25,373, Western Australia £15,228, and Tasmania £8,448.

Expenditure for the year, under all headings, was £292,731/ made up of Programme Expenses, £159,129; Broadcasting Expenses (Copyright, Performing Rights, etc.) £53,502, and Administration Expenses, £80,106. From these figures it will be seen that more than 65 per cent. of revenue was put back into the actual programmes, irrespective of administration expenses. Programme costs for the year increased by approximately £40,000.

FUTURE POLICY: During the year the Commission's position has been materially strengthened by the experience which it and its officers have gained, and by the increasing numbers of its listeners. It is now being enabled more and more to organise its programme policy in advance instead of having to depend largely, as have all broadcasting organisations in this country in the past, upon the material which happened at the moment to be available. This policy it intends to extend progressively in the future. It will continue, too, to encourage and develop in every manner within the proper scope of its functions the local artistic talent of all parts of Australia, and to provide a service which will both represent truly and foster judiciously all appropriate phases of the national life of the Australian people.

Australian Broadcasting Commission

General and State Managers

Major W. T. Conder, General Manager. Born Tasmania, educated Church of England Grammar School, Launceston, and Tasmanian University. Served with the A.I.F. 1914-15. Was invalided home severely wounded; O. C. Langwarrin (Vic.) Camp, 1915-18. Thereafter Governor of Pentridge (Vic.) Gaol, and later Inspector-General of Prisons.



MAJOR W. T. CONDER
General Manager
Australian Broadcasting Commission.

Resigned in 1923 to join executive staff of J. C. Williamson. When this company became interested in broadcasting, Major Conder was appointed General Manager of the Broadcasting Company of Australia Ltd., and subsequently of Dominion Broadcasting Co. Ltd. He resigned from J. C. Williamson's in 1933 and became organiser of the Melbourne Centenary Celebrations, and then accepted the position of General Manager of the Australian Broadcasting Commission in the same year.

Horner, H. G., Manager for N.S.W. Educated at King's College, Canterbury; thereafter for a period of approximately three years travelled extensively, visiting every British Colony and many other parts of the world. He finally settled in Canada for a period four years, came to Australia in 1914, and has been in this country ever since. A quali-



MR. H. G. HORNER
Manager for N.S.W.

fied accountant and secretary, and has held the following positions: Secretary William Atkins Ltd., Secretary Palmolive Company, Assistant Secretary Sun Newspapers Ltd., Manager Broadcasters (Sydney) Ltd., Secretary Australian Broadcasting Co. Ltd., Manager N.S.W. Branch Australian Broadcasting Commission.

Lieut.-Colonel L. R. Thomas—Manager for Tasmania. Born England, educated Mill Hill School and Middle Temple, London, Barrister-at-Law. Military Service-Auxiliary Forces since 1903. Served in Gallipoli, Suvla Bay and Mesopotamia. Staff Officer Army Headquarters, Baghdad, 1917-1919 — Awarded D.S.O. 1917. Headquarters Staff—Southern and Northern Commands, England. Registrar University of Tasmania, 1922-1933. Controller of Talks and Educational Broadcasts, Australian Broadcasting Commission, Victorian Division of 1933-1934.

Bearup, Thomas William, Manager for Victoria. Joined Amalgamated Wireless (A/sia) Ltd. in 1916. Visited England to investigate, inter alia, developments in broadcasting.



MR. T. W. BEARUP
Victorian Manager.

December, 1923: Joined 2FC at its opening. October 1924-July, 1929: Studio Manager 3LO/3AR, Melbourne. July, 1929-June, 1932: Victorian Manager Australian Broadcasting Commission.

Kirke, Basil, Manager for Western Australia. Mr. Kirke was born in Australia, served in the A.I.F. and later was engaged in the planting industry in the Pacific Islands. He first became associated with broadcasting through 2BL Sydney, and was appointed Manager of 6WF in 1930.

Hosking, Charles Martin. Manager for South Australia. Prior to the advent of broadcasting most of his career was spent in the legal profession in Victoria. As interesting interludes, he journeyed to the Nor-west with Explorer Carr-Boyd and later explored the one-time waste and unsurveyed mallee.

**AUSTRALIAN BROADCASTING COMMISSION
MANAGERS—(Continued from Page 25)**



MR. C. M. HOSKING
Manager for South Australia

Between times he was General Organising Secretary of the last big Federal Referenda Campaign, and did a course in art.

He wrote several plays, one of which was produced in London by Charles Arnold, and was for some years a musical and dramatic critic and free-lance journalist.

Mr. Hosking became associated with 3LO, Melbourne, in 1925, and has served at various "A" class stations in a managerial capacity.



MR. E. J. LEWIS
Manager for Queensland

Lewis, E. J., Manager for Queensland. Saw service at Gallipoli and was invalided back to Australia. Joined the Broadcasting Company of Australia Ltd., at 3LO, in 1924. In 1929 joined 3DB, Melbourne. Appointed Manager of 7ZL, Hobart, in April, 1930. Later appointed Manager under the Australian Broadcasting Company in December, 1930, and remained in that position until the station was taken over by the Australian Broadcasting Commission in 1932. Was transferred to Brisbane in January, 1934.



*General View of a Modern Australian Condenser Factory
(Ducon—Waterloo)*

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aspects
of the
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Australian Broadcasting Commission

An Act relating to Broadcasting. No. 14 of 1932. (Assented to 17th May, 1932.)

BE it enacted by the King's Most Excellent Majesty, the Senate and the House of Representatives of the Commonwealth of Australia, as follows:—

Part 1.—Preliminary.

1. This Act may be cited as the **Australian Broadcasting Commission Act, 1932.**
2. This Act shall commence on a date to be fixed by Proclamation.
3. This Act is divided into Parts, as follows:—
 - Part I.—Preliminary.
 - Part II.—Establishment and Constitution of Commission.
 - Part III.—Powers and Functions of the Commission.
 - Part IV.—Finance.
 - Part V.—Issue of Debentures by the Commission.
 - Part VI.—Miscellaneous.
4. In this Act, unless the contrary intention appears—
 - “Commission” means a member of the Commission;
 - “National broadcasting stations” means stations made available by the minister for the purpose of the transmission of the National Broadcasting Programmes;
 - “the Commission” means the Australian Broadcasting Commission appointed under this Act; and
 - “the Fund” means the Australian Broadcasting Commission Fund established under this Act.

Part 2.—Establishment and Constitution of the Commission.

5. (1) For the purposes of this Act, there shall be a Commission, to be known as the Australian Broadcasting Commission, which shall be charged with the general administration of this Act.
 - (2) The Commission shall be a body corporate with perpetual succession and a common seal, and may acquire, hold and dispose of real and personal property and shall be capable of suing and being sued in its corporate name.
 - (3) All Courts, Judges and persons acting judicially shall take judicial notice of the seal of the Commission affixed to any document or notice and shall deem that it was duly fixed.
6. (1) The Commission shall consist of five Commissioners, one of whom shall be a Chairman, and one of whom shall be a Vice-Chairman.
 - (2) The Commissioners shall be appointed by the Governor-General, and shall hold office, during good behaviour, for the period for which they were appointed.
7. (1) Subject to this Act, the period for which the Commissioners first appointed under this Act shall hold office shall be, in the case of the Chairman, not exceeding five years, in the case of the Vice-Chairman, not

exceeding four years, and in the case of each of the remaining Commissioners not exceeding three years.

(2) After the appointment of the five Commissioners first appointed under this Act, each further appointment shall be for a period not exceeding three years.

(3) Each person who is appointed a Commissioner shall, upon the expiration of the term for which he was appointed, be eligible for re-appointment.

8. (1) Subject to this section, the Commissioners shall receive such salaries and allowances as the Governor-General determines.

(2) The salaries of the Commissioners shall not exceed the following:—

in the case of the Chairman	Five hundred pounds per annum;
in the case of the Vice-Chairman	Four hundred pounds per annum; and
in the case of each other Commissioner	Three hundred pounds per annum.

9. (1) In case of the illness or absence of the Chairman, the Vice-Chairman, if present, shall act as Chairman.

(2) In case of the illness or absence of both the Chairman and the Vice-Chairman, the Commissioners present may appoint one of their number to act as Chairman:

Provided that the Governor-General may, if he thinks fit, appoint a person to act as Chairman for such period as the Governor-General specifies.

(3) If the Governor-General appoints a person to act as Chairman the appointment shall be at such salary as is determined by the Governor-General, not exceeding the maximum salary fixed by section eight of this Act.

10. (1) In case of the illness or absence of any other Commissioner, the Governor-General may, if he thinks fit, appoint a person to perform the functions of the Commissioner during such illness or absence.

(2) The salary of any person so appointed shall be determined by the Governor-General but shall not exceed the maximum salary fixed by section eight of this Act in respect of that office.

11. In the event of the absence of any Commissioner, the Governor-General may determine the conditions as to remuneration or otherwise upon which leave may be granted.

12. The Governor-General may terminate the services of a Commissioner or an acting Commissioner for inability, inefficiency or misbehaviour, or for neglect or failure to carry out any of the provisions of this Act.

13. A Commissioner shall be deemed to have vacated his office—

- (a) if his appointment is terminated by the Governor-General in pursuance of this Act;
- (b) if he becomes bankrupt or compounds with his creditors or makes any assignment of his salary for their benefit or takes advantage of any provision of any Act relating to bankruptcy;

Australian Broadcasting Commission Act—(Continued)—

- (c) if he becomes of unsound mind;
 - (d) if he resigns his office by writing under his hand addressed to the Governor-General and the resignation is accepted by the Governor-General;
 - (e) if he absents himself (except on leave granted by the Governor-General) from all meetings of the Commission held during two consecutive months; or
 - (f) if he, in any way, otherwise than as a member, and in common with the other members, of an incorporated company consisting of more than twenty-five persons—
 - (i) becomes concerned or interested in any contract or agreement made by or on behalf of the Commission; or
 - (ii) participates, or claims to participate, in the profits of any such contract or agreement or in any benefit or emolument arising therefrom.
14. (1) The Commission shall hold such meetings as, in the opinion of the Chairman or at least three other Commissioners, are necessary for the efficient conduct of its affairs.

(2) At meetings of the Commission three Commissioners shall form a quorum, and the Chairman shall have a deliberative vote, and, in the event of an equality of votes, a second or casting vote.

15. (1) The Commission shall appoint a general manager and such other officers and such servants as it thinks necessary.

(2) The salaries payable to the general manager and the next six most highly paid executive officers of the Commission shall be subject to the approval of the Governor-General.

(3) Officers and servants appointed by the Commission shall not be subject to the provisions of the **Commonwealth Public Service Act, 1922-1931**, but shall be subject to such conditions (including tenure of office) as are determined by the Commission.

Part 3.—Powers and Function of the Commission.

16. The Commission shall provide and shall broadcast from the national broadcasting stations adequate and comprehensive programmes and shall take in the interest of the community all such measures as, in the opinion of the Commission, are conducive to the full development of suitable broadcasting programmes.

17. For the purpose of the exercise of its powers and functions under this Act, the Commission may compile, prepare, issue, circulate and distribute, whether gratis or otherwise in such manner as it thinks fit, such papers, magazines, periodicals, books, pamphlets, circulars and other literary matter as it thinks fit (including the programmes of national broadcasting stations and other stations):

Provided that, prior to the publication of any programme in pursuance of this section, a copy of the programme shall be made available at an office of the Commission on equal terms to the publishers of any newspaper, magazine, or journal published in the Commonwealth.

18. (1) Subject to this Act, the Commission may—
- (a) acquire by lease or purchase any land, buildings easements or other property, rights or privileges which it thinks necessary for the purposes of this Act; and
 - (b) sell, exchange, lease, dispose of, turn to account or otherwise deal with any property, rights or privileges of the Commission.
- (2) The Commission shall not, without the approval of the Minister—
- (a) acquire any property, the cost of acquisition of which exceeds the sum of Five thousand pounds, or in any manner dispose of any property having an original or book value exceeding the sum of Five thousand pounds; or
 - (b) enter into any lease for a period exceeding five years.

19. (1) The Commission shall provide such studios, offices and other accommodation as it thinks necessary for the purposes of this Act, and such accommodation in relation to the studios as the Minister requires for the proper carrying out of the technical services to be provided by the Minister, and shall take over, as arranged by the Minister and at the valuation determined by him, any existing studios, buildings, sites, fittings, furniture or other assets controlled by the Minister which are used for broadcasting purposes, and shall accept an assignment of any leases relating thereto, and of the rights and liabilities of the Minister under any agreements relating thereto.

(2) The location of any studios to be provided by the Commission in pursuance of this section shall be subject to the approval of the Minister.

20. (1) The Commission shall transmit free of charge from all of the national broadcasting stations, or from such of them as are specified by the Minister, any matter the transmission of which is directed by the Minister as being in the public interest.

(2) The Commission shall not, without the permission of the Minister, transmit or receive for transmission any message the transmission of which would, without the authority of, or licence granted by, the Minister administering the **Post and Telegraph Act, 1901-1923**, or the **Wireless Telegraphy Act, 1905-1919**, contravene the provisions of either of those Acts.

21. (1) The Commission shall not broadcast advertisements.

(2) Nothing in this section shall be construed as preventing the Commission from broadcasting, if it thinks fit—

- (a) any announcement of its own future programmes;
- (b) a programme supplied by any organisation, firm or person engaged in artistic, literary, musical or theatrical production or in educational pursuits; or
- (c) a programme supplied by any organisation, firm or person, provided the programme is not, in the opinion of the Commission, being used as an advertisement.

22. The Commission may collect in such manner as it thinks fit news and information relating to current events in any part of the world and may subscribe to news agencies.

Australian Broadcasting Commission Act—(Continued)—

23. The Commission shall, as far as possible, give encouragement to the development of local talent and endeavour to obviate restriction of the utilisation of the services of persons who, in the opinion of the Commission are competent to make useful contributions to broadcasting programmes.

24. The Commission shall endeavour to establish and utilise, in such manner as it thinks desirable in order to confer the greatest benefit on broadcasting, groups of musicians for the rendition of orchestral, choral and band music of high quality.

25. The Commission may, if it thinks fit, appoint Committees to advise it in relation to all or any matters connected with the provision or rendition of broadcasting programmes, or the exercise of any powers, duties or functions conferred or imposed upon it by this Act.

Part 4.—Finance.

26. (1) There shall be an Australian Broadcasting Commission Fund into which shall be paid from time to time out of the Consolidated Revenue Fund, which is hereby appropriated accordingly, an amount which represents such portion of the fees received from broadcast listeners' licences as is fixed by or under this Act.

(2) For the year commencing on the first day of July, One thousand nine hundred and thirty-two, the amount referred to in the last preceding sub-section shall be twelve shillings in respect of each broadcast listener's licence fee received, and this amount shall continue to be paid in each subsequent year unless some other amount is fixed by the Minister.

(3) The payments provided for by the preceding provisions of this section shall be made monthly, and as soon as possible after the last day of each calendar month, and shall in each case represent an amount approximating the appropriate sum relating to the licences in force during the previous month.

(4) The final adjustments shall be made as soon as conveniently possible after the end of each quarter.

(5) Any account certified by such officer of his Department as is designated for that purpose by the Minister and forwarded by the Minister to the Commission purporting to set out the sum payable to the Commission in pursuance of the foregoing provisions of this section shall be final and conclusive for all purposes.

(6) There shall also be paid into the Fund any other revenue or money received by the Commission.

(7) Income derived from the investment of any portion of the Fund shall form part thereof.

27. The moneys paid into the Fund shall be applied by the Commission as follows:—

- (a) In payment of the expenses, charges and other obligations incurred or undertaken by the Commission in the exercise of its powers, duties and functions under this Act;
- (b) In payment of the salaries, wages and allowances of Commissioners and of officers and servants of the Commission; and
- (c) In investment in any securities of, or guaranteed by, the Government of the Commonwealth or of any State.

28. Moneys held in the Fund, uninvested by the Commission, may be lodged either in an account at call or on fixed deposit, or partly in an account at call and partly in an account at fixed deposit, with the Commonwealth Bank, and while in such Bank shall be held to be moneys of the Crown.

29. Cheques drawn on any account referred to in the last preceding section shall be signed in such manner as the Commission directs.

30. (1) For the purpose of enabling the Commission to defray any expenses incidental to its establishment and operation, the Treasurer may advance, out of the Consolidated Revenue Fund, which is hereby appropriated accordingly, such amounts not exceeding in all the sum of Thirty thousand pounds as are, in the opinion of the Minister, required by the Commission.

(2) In addition to the moneys advanced in pursuance of the last preceding sub-section, the Treasurer may advance to the Commission such sums, if any, as are from time to time appropriated by the Parliament for the purpose.

(3) The terms and conditions of any advances made in pursuance of this section, including the security and basis of re-payment shall be as determined by the Treasurer.

31. (1) The accounts of the Commission shall be subject to inspection and audit, at least once yearly, by the Auditor-General for the Commonwealth.

(2) The Auditor-General shall report to the Minister the result of each inspection and audit.

32. The Commission shall, as soon as possible after the expiration of each financial year, prepare a profit and loss statement and balance-sheet in the form prescribed, and shall forward them, together with a report on the operations of the Commission during that year, to the Minister, for presentation to both Houses of the Parliament.

33. The payment by the Commission of compensation exceeding in any individual case, One hundred pounds to members of the Commission, its officers or servants, or other bodies or persons, shall not be made without the approval of the Minister.

34. The income, property, and operations of the Commission shall not be subject to any rates, taxes or charges, under any law of the Commonwealth or a State, to which the Commonwealth is not subject.

35. (1) The Commission shall exercise the powers and functions conferred and imposed upon it by this Act, in such a manner that its operations will be financially self-supporting.

(2) The Commission shall establish such sinking funds as are in the opinion of the Treasurer, necessary to enable the Commission to meet repayment of loans and other obligations and to meet losses and depreciation in assets, and may set aside out of its revenue such sums as it thinks proper as a reserve fund for such purposes as the Commission deems desirable (not being purposes for which any sinking fund has been established).

Part 5.—Issue of Debentures by the Commission.

36. (1) Subject to this section, the Commission may, from time to time, issue debentures to such amount,

Australian Broadcasting Commission Act—(Continued)—

bearing such rate of interest and subject to such conditions, as the Treasurer and the Minister approve.

(2) The total amount of debentures so issued, and current at any one time, shall not exceed Fifty thousand pounds.

37. Debentures shall be in accordance with the form approved by the Treasurer, and shall be under the seal of the Commission and shall be signed and countersigned in such manner as the Treasurer directs.

38. The Commonwealth by this Act guarantees the payment by the Commission of the principal and interest due in respect of any debenture issued by the Commission in pursuance of this Act, and the Consolidated Revenue Fund is hereby appropriated for the purpose of this section.

39. (1) Every debenture issued in pursuance of this Act shall be payable to the bearer thereof, and shall pass by delivery only without any assignment or indorsement, and the bearer of a debenture shall have the same rights and remedies as if he were expressly named therein.

(2) At the request of the bearer of a debenture, the Commission may in lieu thereof issue to him inscribed stock of the same currency, and bearing the same interest, and transferable only in manner prescribed.

(3) At the request of the holder of any inscribed stock of the Commission, the Commission may in lieu thereof issue to him debentures of the same currency and bearing the same interest.

40. The Commission may sell debentures, or cause them to be sold, at such times and at such places and in such sums and on such conditions as the Treasurer approves.

41. A trustee, executor or administrator may invest any trust moneys in his hands in the purchase of debentures issued by the Commission.

42. (1) Any person who, with intent to defraud—

- (a) forges any security of the Commission, or
- (b) utters any forged security of the Commission, or
- (c) makes any instrument for forging any security of the Commission, or
- (d) has in his possession any such instrument, or
- (e) has in his possession any forged security of the Commission, shall be guilty of an indictable offence.

Penalty: Imprisonment for ten years.

(2) Any person who, without authority, proof whereof shall lie upon him—

- (a) makes any form of security of the Commission,
- (b) has in his possession any form of security of the Commission, or
- (c) makes or has in his possession any instrument or thing by which any distinctive mark or signature on any security of the Commission may be made or imitated, shall be guilty of an offence.

Penalty: Imprisonment for two years.

(3) In this Part "security of the Commission" means any Commission debenture, Commission inscribed stock, or any coupon, warrant or document for the payment of interest thereon, and includes any transfer of any

Commission inscribed stock, and any indorsement on any coupon, warrant or document for the payment of interest on any security of the Commission.

43. All forged securities of the Commission, and all unauthorised forms of security of the Commission, and all unauthorised instruments and things by which any distinctive mark or signature on any security of the Commission, may be unlawfully made or imitated, shall be forfeited to the King and may be seized by any member of the police force of the Commonwealth or of a State.

Part 6.—Miscellaneous.

44. The Postmaster-General shall undertake the provision and operation of all technical services associated with the transmission of programmes, including any transmission and reception for the interchange of programmes with other broadcasting administrations which is mutually agreed upon between the Commission and the Postmaster-General.

45. (1) For the purpose of providing and operating the technical services referred to in this Act, the Postmaster-General, or any person acting under the authority of the Postmaster-General, may—

- (a) erect, place and maintain any electric line which is, in the opinion of the Postmaster-General, necessary for conveying electric current to a Broadcasting station, and in respect of the erection, placing and maintenance of any electric line, the Postmaster-General and any person acting under his authority shall have the same powers, and be subject to the same obligations, as are conferred or imposed under Part IV. of the **Post and Telegraph Act, 1901-1923**, in relation to the erection, placing and maintenance of telegraph lines; and
- (b) arrange for and obtain from any person the supply of any electric current which, in the opinion of the Postmaster-General, is necessary or advisable for the working of any broadcasting station or the operation of any apparatus for the transmission or reception of programmes.

(2) In this section "electric line" includes all means used for the purpose of conveying, transmitting, transforming or distributing electricity and any casing, coating, covering, tube, tunnel, pipe, pillar, pole, post, frame, bracket or insulator enclosing, surrounding, or supporting the same or any part thereof or any apparatus connected therewith.

46. The Postmaster-General shall provide free of cost to the Commission—

- (a) the transmissions emanating from recognised National Broadcasting Service studios which are to be radiated from the national broadcasting stations, including such simultaneous transmissions from two or more stations as are mutually agreed upon; and
- (b) microphones, pick-up equipment and all other necessary portable apparatus for occasional or periodical transmission from various places within the Commonwealth.

47. The Postmaster-General shall provide, at the expense of the Commission—

Australian Broadcasting Commission Act—(Continued)—

- (a) for the installation and operation of the apparatus referred to in paragraph (b) of the last preceding section;
- (b) the circuits required to connect the various pick-up points with the recognised relevant studios; and
- (c) apparatus required permanently for pick-up purposes or for other purposes affecting the rendering of programmes where such apparatus is to be installed at any place other than a recognised National Broadcasting Service studio.

48. Notwithstanding anything contained in this Act, the Commission shall not be empowered to enter into any agreement involving any expenditure in excess of Five thousand pounds, or extending over a period of more than five years, unless the approval of the Minister thereto has first been obtained.

49. The Commission shall at all times indemnify and keep indemnified the Postmaster-General against any action claim or demand brought or made by any person against the Postmaster-General or against any officer of the Postmaster-General's Department in respect of any act done by the Postmaster-General or by such officer on behalf, at the request, or in the interests, of the Commission.

50. The control of the provision and rendition of broadcasting programmes by the Commission shall commence on the first day of July one thousand nine hundred and thirty-two, but the Commission may exercise, prior to that date, any powers or functions conferred on it by this Act for the purpose of enabling it to assume full control on that date.

51. (1) The Minister may from time to time, by notice in writing, prohibit the Commission from broadcasting any matter, or matter of any class or character, specified in the notice, or may require the Commission to refrain from broadcasting any such matter.

(2) The Minister may at any time revoke or vary any requirement made in pursuance of the last preceding sub-section.

52. The Commission shall have the power to determine to what extent and in what manner political speeches may be broadcast.

53. The Governor-General may, whenever any emergency has arisen, which, in his opinion, renders it desirable in the public interest so to do, authorise the Minister to exercise during the emergency complete control over the matter to be broadcast from the national broadcasting stations, and, thereupon and so long as the emergency continues such persons as are thereto authorised in writing by the Minister shall have access at all times to any premises controlled by the Commission and may exercise full authority over all rights and privileges possessed by the Commission.

54. Nothing in this Act shall be deemed to diminish or affect the rights of any person under any contract or agreement made prior to the commencement of this Act to which the Commonwealth is a party.

55. The Governor-General may make regulations, not inconsistent with this Act, prescribing all matters required or permitted to be prescribed, or which are necessary or convenient to be prescribed, for carrying out or giving effect to this Act and in particular for providing for the issue, inscription, transfer, transmission, and redemption of inscribed stock of the Commission, and all matters in relation thereto.

AMALGAMATED WIRELESS

Agreement with Commonwealth Government—Wireless Agreement No. 37 of 1927.

An Act to approve the Agreement made between His Majesty's Government of the Commonwealth of Australia and Amalgamated Wireless (Australasia) Limited. (Assented to 22nd December, 1927.)

BE it enacted by the King's Most Excellent Majesty, the Senate, and the House of Representatives of the Commonwealth of Australia, as follows:—

1. This Act may be cited as the **Wireless Agreement Act, 1927**.

2. The Agreement made between His Majesty's Government of the Commonwealth of Australia and Amalgamated Wireless (Australasia) Limited (a copy of which is set forth in the Schedule to this Act) is approved.

3. The Consolidated Revenue Fund is hereby appropriated for the purpose of this Act to the extent necessary for the purpose of carrying out the Agreement on the part of the Commonwealth.

The Schedule

AN AGREEMENT made the fifteenth day of November One thousand nine hundred and twenty-seven between THE COMMONWEALTH OF AUSTRALIA (hereinafter called "the Commonwealth") of the one part and AMALGAMATED WIRELESS (AUSTRALASIA) LIMITED of Sydney in the State of New South Wales (hereinafter called "the Company") of the other part WHEREBY it is agreed as follows:—

Part 1.—Preliminary

1. This Agreement shall have no force or effect and shall not be binding upon either party unless and until it is approved by the Parliament of the Commonwealth of Australia.

2. This Agreement shall commence and come into full force and effect upon the date upon which it is so approved by the Parliament of the Commonwealth of Australia.

3. This Agreement shall be read and construed as supplemental to and amending the existing Agreements between the same parties dated the 29th March, 1922, and 20th August, 1924, respectively, and unless the context otherwise requires, as one with the said existing agreements.

4. (1) In this Agreement, unless the context otherwise requires—

“Commercial Wireless Services” includes wireless telegraphy, wireless telephony and all further developments of wireless transmission or reception for commercial purposes;

“Post and Telegraph Act” means the **Post and Telegraph Act, 1901, 1923**, and includes any amendments thereof;

“Principal Agreement” means the Agreement dated the 28th March, 1922, made between the parties hereto as amended by the Agreement of the 20th August, 1924, between the same parties;

“Wireless Telegraphy Act” means the **Wireless Telegraphy Act, 1905**, and includes any amendments thereof;

“Wireless Telephone Broadcasting Station” means a station operating under licence under the Wireless Telegraphy Act for the purpose of the transmission of speech or music intended for simultaneous reception by all listeners as distinct from point-to-point communication.

(2) In this Agreement the words “terminal charges,” “transit charges” and “land-line charges” have the same meanings respectively as in the International Telegraph Convention and Regulations thereunder.

Part 2.—Provisions Relating to Broadcasting and to the Use of Patents

This Part 2 of the Agreement was terminated as from March 1st, 1934.

Part 3.—General Provisions

12. (1) The Company shall retain all stations taken over by it under Clause 5 (h) of the Principal Agreement (hereinafter referred to as the “said Stations”) and shall complete, within three years from the commencement of this Part, the re-organisation of the said stations, including the modernisation of the equipment of the said stations, and shall continue to operate those stations in accordance with the Principal Agreement and this Agreement.

(2) In lieu of the method of payment for the said stations which is set out in Clause 6 of the Principal Agreement, the Company shall, on completion of the transfer of the said stations, pay to the Commonwealth the amount of the assets valuation thereof namely the sum of £56,500, the method of payment to be by deduction from payments due by the Commonwealth to the Company.

(3) As from 28th March, 1927, the Commonwealth shall pay to the Company as a contribution towards the maintenance of the said stations an annual subsidy of £45,000 per annum, and the Company shall pay to the Commonwealth thirty per centum of the revenue earned by the Company in the continuance of the services which were carried on by the said stations at the commencement of the Agreement made on the 28th day of March, 1922, between the parties to this Agreement.

(4) For the purposes of the last preceding sub-clause revenue earned by the Company from traffic of a kind which would at the commencement of the Principal Agreement have been carried on by one or more of the said stations, but which is diverted by the Company to another station, shall be deemed to be revenue earned by the Company in the continuance of the services which were carried on by the said stations at the commencement of the Agreement made on the 28th day of March, 1922, between the parties to this Agreement.

(5) The second paragraph of Clause 7 of the Principal Agreement is amended by omitting the words “seven years” and inserting in their stead the words “five years.”

13. In operating the stations referred to in the Principal Agreement, and in establishing and operating any new stations which may be licensed by the Commonwealth, the Company shall comply with the provisions of any International Radio Convention, International Telegraph Convention, and International Convention for the Safety of Life at Sea, to which the Commonwealth is for the time being a party, and the Wireless Telegraphy Act. In particular, the Company shall comply, as from 28th March, 1926, with the requirements of the Telegraph Convention and the Radio Convention concerning the fixing and the payment to the Commonwealth of terminal or transit or

land line charges on all messages received at or despatched from the Company's wireless stations.

14. (1) Clauses 4 and 13 of the Principal Agreement are hereby defined to mean that the Company is entitled, subject to the terms of the licences granted or to be granted by the Commonwealth to the Company, and to the provisions of any International Radio Convention, or International Convention for the Safety of Life at Sea to which the Commonwealth is for the time being a party, and to the Wireless Telegraphy Act, to establish and operate commercial wireless services between Australia and ships at sea, between Australia and commercial or private aircraft (except aircraft trading or operating exclusively within Australia), between Australia and any Territory under the authority of the Commonwealth (not being part of the Commonwealth), and between Australia and other countries, and to negotiate and enter into agreements for the conduct of such wireless services, and in such cases the licences and permits (other than licences for wireless telephone broadcasting stations and dealers' licences) shall be free of charge.

(2) Nothing in this clause shall affect the provisions of the Principal Agreement as regards feeder stations or the development and manufacture or sale of wireless apparatus by the Company.

(3) Notwithstanding anything contained in sub-clause (1) of this Clause the Commonwealth retains the right to determine whether or not any service which the Company proposes to carry on in addition to the proposed services between Australia and Fiji and any service which is in existence at the date on which this Agreement is approved by the Parliament are necessary in the public interest.

(4) Clause 5 (h) of the Principal Agreement is hereby defined as including an obligation on the Company to transmit and receive all official meteorological messages, and such messages shall in each year be transmitted and received by the Company without charge until the number of words contained in those messages exceeds by five per centum the number of words contained in similar messages transmitted and received by the Company free of charge during the previous year.

(5) Notwithstanding anything in Clause 11 of the Principal Agreement, the fixation of all rates for traffic to be charged by the Company shall be subject to the approval of the Commonwealth.

(6) Clause 15 of the Principal Agreement is hereby defined to mean that the Commonwealth shall not impose any conditions or restrictions of any kind upon the Company which exceed the conditions and requirements of the International Radio Convention, the International Telegraph Convention, the Wireless Telegraphy Act and the Post and Telegraph Act, and no Department of the Commonwealth shall carry on any commercial wireless service in competition with the Company.

(7) Clauses 17 and 18 of the Principal Agreement are to be read and construed as if the words “the Prime Minister” and “the Prime Minister of the Commonwealth” were deleted and the words “the Minister for the time being administering the Wireless Telegraphy Act” were substituted therefor.

(8) Clause 4 of the agreement of 20th August, 1924, between the parties to this Agreement is to be read and construed as if the words “and will pay to the Postmaster-General such amounts as may be due at standard tariff rates in respect of messages handled by the Post Office” were deleted.

15. (1) The Commonwealth shall, if so requested by the Company, provide for the Company the necessary land line connections for the operation of its wireless stations and shall transmit over the internal communication service of the Commonwealth any overseas messages handed in by the public at any post office or handed over to the Commonwealth by the Company for such transmission and the Company shall pay to the Commonwealth for such line and such services the usual rates charged by the Commonwealth.

Provided that no charge shall be made to the Company for lines from the Company's coastal stations to the local post office, or, at the Company's option, to the Company's local office, and provided that in all cases where terminal transit or land line charges are paid to the Commonwealth in accordance with Clause 13 of this Agreement no further charge shall be made for transmission of messages over the internal communication service of the Commonwealth.

(2) In this Clause "overseas messages" means messages received from or intended for transmission to—

- (a) a ship; or
- (b) a place outside Australia; or
- (c) commercial or private aircraft (other than aircraft trading or operating exclusively within Australia).

16. (1) The Company shall be entitled at all times, subject to the requirements of the Post and Telegraph Act, to accept from and deliver to the public through its own offices and agencies any overseas messages intended for transmission or received for delivery through its commercial wireless services and to relay such messages from one part of the Commonwealth to another through its wireless stations and/or land line connexions as it may consider most expedient, and where necessary, to a ship at sea, subject to payment of the terminal and/or transit charges, and the Company shall also be entitled to exchange, free of terminal, transit and land line charges, service messages among its wireless stations, but the Company shall not, otherwise than as provided in this Agreement, transmit or receive inland messages unless required by the Commonwealth in cases of interruption to line circuits.

(2) In this Clause—

"Overseas messages" means messages received from, or intended for transmission to—

- (a) a ship; or
- (b) a place outside Australia; or
- (c) commercial or private aircraft (other than aircraft trading or operating exclusively within Australia);

"Service messages" means not only service telegrams as defined in the Regulations under the International Telegraph Convention and in the Regulations under the International Radio Convention, but also includes any messages relating to the general conduct and supervision of the service, and to experimental work carried on by the Company.

17. The Company shall at all times, subject to the conditions of the necessary licence, be permitted to conduct research and experimental work for the further development of wireless and to establish and operate wireless stations and apparatus for the purpose of such research and experimental work, provided that the Company shall take all reasonable precautions to avoid interference with other wireless services.

18. (1) All the stations and services licensed in accordance with this Agreement and the Wireless Telegraphy Act shall be subject to inspection by any officer of the Commonwealth there-to authorised in writing by the Minister for the time being administering the Wireless Telegraphy Act, and the Company shall supply to the Commonwealth such particulars of the traffic as the Commonwealth from time to time requires.

(2) Any information obtained by any authorised officer in pursuance of sub-clause (1) of this Clause shall be used only for the purpose of administration of the Wireless Telegraphy Act, and the Post and Telegraph Act, and this Agreement, or any proceeding relating thereto.

19. In any wireless telephone service licensed by the Commonwealth and established by the Company in accordance with Clause 14 of this Agreement, the Company shall have the same facilities as herein provided for wireless telegraph services, and the Company shall pay the aforesaid terminal and/or transit charges in the case of written messages, and in the case of personal conversation between members of the public the Company shall pay such terminal charges as are fixed by the Commonwealth.

Part 4.—Other Provisions

20. Clause 20 of the Principal Agreement shall apply in like manner in relation to any disagreement arising between the Commonwealth and the Company under this Agreement as it applies in relation to disagreements arising under the Principal Agreement.

21. All rights granted to the Commonwealth or to any broadcasting station, broadcast listener, radio dealer, manufacturer, or newspaper, under Part II. of this Agreement shall cease immediately upon the determination of that Part, and the Company shall thereafter be at liberty to demand royalties from all users of patent rights of the Company and to institute and carry on proceedings to prevent infringement of the patents.

Provided that no demand shall be made or proceedings instituted in respect of any use of the patents which occurs during the currency of Part II. of this Agreement and is in accordance with that Part.

22. Nothing in this Agreement shall be construed to prevent the Company establishing and carrying on any other wireless service under licence from the Commonwealth.

23. The Company agrees that it will not, without the consent of the Commonwealth, appoint to or engage for its service any person who is not a natural born British subject, and that it will use its best endeavours to induce all its present and future officers and employees to become members of the Reserve of the Defence Force.

In witness whereof the parties hereto have executed these presents the day and year first above mentioned.

(Signed on behalf of Commonwealth Government by S. M. BRUCE, and on behalf of Amalgamated Wireless (A/asia) Ltd., by G. MASON ALLARD and E. T. FISK.)

The Commonwealth of Australia

Wireless Telegraphy Act, No. 8 of 1905.

An Act relating to Wireless Telegraphy. (Assented to 18th October, 1905.)

BE it enacted by the King's Most Excellent Majesty, the Senate, and the House of Representatives of the Commonwealth of Australia, as follows:—

1. This Act may be cited as the **Wireless Telegraphy Act, 1905.**

2. In this Act,—

"Australia includes the territorial waters of the Commonwealth and any territory of the Commonwealth;

"Wireless Telegraphy" includes all systems of transmitting and receiving telegraphic messages by means of electricity without a continuous metallic connexion between the transmitter and the receiver.

3. This Act shall not apply to ships belonging to the King's Navy.

4. The Postmaster-General shall have the exclusive privilege of establishing, erecting, maintaining, and using stations and appliances for the purpose of—

- (a) transmitting messages by wireless telegraphy within Australia, and receiving messages so transmitted, and
- (b) transmitting messages by wireless telegraphy from Australia to any place or ship outside Australia, and
- (c) receiving in Australia messages transmitted by wireless telegraphy from any place or ship outside Australia.

5. Licences to establish, erect, maintain, or use stations and appliances for the purpose of transmitting or receiving messages by means of wireless telegraphy may be granted by the Postmaster-General for such terms and on such conditions and on payment of such fees as are prescribed.

6. (1) Except as authorised by or under this Act, no person shall—

- (a) establish, erect, maintain or use any station or appliance for the purpose of transmitting or receiving messages by means of wireless telegraphy; or
- (b) transmit or receive messages by wireless telegraphy.

Penalty: Five hundred pounds, or imprisonment with or without hard labour for a term not exceeding Five years.

(2) Sub-section (1) of this section shall not, except as prescribed extend to appliances maintained on any ship, arriving from any place beyond Australia, for the purpose of enabling messages to be transmitted from or received on that ship by means of wireless telegraphy but all such appliances shall, while the ship is within Australia—

- (a) be subject to the control of the Postmaster-General; and
- (b) only be used by his authority or as authorised by the regulations.

Penalty: Five hundred pounds.

7. All appliances erected, maintained, or used in contravention of this Act or the regulations, for the purpose of transmitting or receiving messages by means of wireless telegraphy, shall be forfeited to the King for the use of the Commonwealth.

8. (1) If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that any appliance is established, erected, maintained, or used in contravention of this Act or the regulations, for the purpose of transmitting or receiving messages by means of wireless telegraphy he may grant a search warrant to any person.

(2) A search warrant under this section shall authorise the person to whom it is addressed to break and enter any place or ship, where the appliance is or is supposed to be, either by day or by night, and to seize all appliances which appear to him to be used or intended to be used for transmitting or receiving messages by means of wireless telegraphy.

9. (1) Proceedings for any offence against this Act may be instituted in any Court of Summary Jurisdiction, and any person proceeded against under this section may be dealt with summarily or may be committed for trial.

(2) The Court in dealing summarily with any accused person under this section may, if he is found guilty of any offence against this Act, punish him by imprisonment with or without hard labour for any period not exceeding six months or by a penalty not exceeding Fifty pounds.

10. The Governor-General may make regulations, not inconsistent with this Act, prescribing all matters which by this Act are required or permitted to be prescribed or which are necessary or convenient to be prescribed for carrying out or giving effect to this Act.

AMENDMENT No. 33 OF 1915.

An Act to amend the Wireless Telegraphy Act, 1905. (Assented to 6th September, 1915.)

BE it enacted by the King's Most Excellent Majesty, the Senate, and the House of Representatives of the Commonwealth of Australia, as follows:—

1. (1) This Act may be cited as the **Wireless Telegraphy Act, 1915**.

(2) The **Wireless Telegraphy Act, 1905**, as amended by this Act, may be cited as the **Wireless Telegraphy Act, 1905-1915**.

2. Sections four, five and six of the **Wireless Telegraphy Act, 1905**, are amended by omitting the words "The Postmaster-General" and inserting in their stead the words "the Minister for the time being administering the Act."

AMENDMENT No. 4 OF 1919.

An Act to amend Section Two of the Wireless Telegraphy Act, 1905-1915.

BE it enacted by the King's Most Excellent Majesty, the Senate, and the House of Representatives of the Commonwealth of Australia, as follows:—

1. (1) This Act may be cited as the **Wireless Telegraphy Act, 1919**.

(2) The **Wireless Telegraphy Act, 1905-1915** as amended by this Act, may be cited as the **Wireless Telegraphy Act, 1905-1919**.

2. Section two of the **Wireless Telegraphy Act, 1905-1915**, is amended by inserting in the definition of "Wireless telegraphy," after the word "telegraphic," the words, "or telephonic."

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Commonwealth Wireless Regulations

Under the Wireless Telegraphy Act, 1905-1919

Statutory Rules No. 101 of 1924 have been amended from time to time by No. 123 of 1925, No. 114 of 1926, Nos. 3-24-63-153 of 1927, Nos. 79-129 of 1928, No. 81 of 1929 and No. 113 of 1930, and the following are the existing regulations as applicable to Broadcasting in Australia. Details of regulations governing other wireless stations are available from Government Printer, Canberra, F.C.T., or from the Radio Inspector in any capital city.

Part III.—Broadcasting.

Division I.—Broadcasting Stations.

45. (1) The Postmaster-General may grant to any applicant a Broadcasting Station Licence.

(2) A Licence shall not be transferred without the approval of the Postmaster-General.

(3) The Postmaster-General shall not recognise any vested interest in the Licence, and compensation shall not be payable to the Licensee on the termination of the Licence.

46. An applicant for a Broadcasting Station Licence shall state in his application the following particulars:—

- (a) Name and address of applicant (in the case of a company; (1) the name of the company and the address of the head office thereof; (2) the name and address of the secretary or other person authorised to act on behalf of the company);
- (b) Technical qualifications of the applicant or of the persons whom it is proposed will operate the licensed installation (where the applicant does not possess the necessary qualifications and proposes to engage an expert to control the station after the issue of the Licence, this should be stated);
- (c) Location of the proposed station;
- (d) Type of transmitter and character of modulation proposed;
- (e) Proposed normal operating power of transmitter;
- (f) Hours of service; and
- (g) Class of service to be broadcasted and particulars of average programme.

47. (1) A Broadcasting Station Licence shall be prepared in duplicate, one copy of which shall be retained by the Department and the other shall be issued to the Licensee.

(2) A Licensee shall make his Licence available for inspection by any authorised officer as and when required.

48. (1) A Broadcasting Station Licence may be granted for any period not exceeding three years as the Postmaster-General determines.

(2) The Postmaster-General if he deems it desirable may from time to time renew a Licence for a period not exceeding one year from the date of expiration of the current Licence.

(3) A Licensee who desires a renewal of his Licence shall make application for the renewal thereof at least six months before the date of the expiration of his current licence, except in cases where a licence has been granted or renewed for a period of less than one year, when the application for a renewal shall be made at least one month before the date of expiration of the current licence.

49. A Broadcasting Station Licensee shall commence a satisfactory service in accordance with these regulations within three months from the date of the issue of the Licence or within such further period as the Postmaster-General approves.

50. The licensed installation of a Broadcasting Station shall be equipped, designed and controlled to the satisfaction of the Postmaster-General and shall not be altered without his consent.

51. The power of a Broadcasting Station shall be as approved by the Postmaster-General and shall not be altered without his consent.

52. (1) The frequency (wave length) on which each Broadcasting Station shall operate shall be as determined by the Postmaster-General.

(2) The operating frequency shall be maintained to a constancy to the satisfaction of the Postmaster-General.

(3) For the purpose of the last preceding sub-regulation, the transmitting apparatus shall include such equipment for indicating the accuracy of the operating frequency as the Postmaster-General approves.

53. The location of a Broadcasting Station and the periods of operation thereof shall be subject to the approval of the Postmaster-General.

54. (1) The Postmaster-General reserves the right, during the currency of a Broadcasting Station Licence, to vary the conditions upon which the Licence is granted, especially in regard to the power, location, frequency (wave length) and periods of operation of the licensed installation.

(2) The licensee shall, at his own expense and to the satisfaction of the Postmaster-General, give effect to any such variation.

55. The licensed installation of any Broadcasting Station shall only be operated by such persons as, in the opinion of the Postmaster-General, are competent to operate the installation.

56. The licensed installation of any Broadcasting Station shall, at all reasonable times, be open to inspection by any authorised officer, and every facility shall be given by the Licensee for ascertaining the conditions of the Station.

57. (1) A Broadcasting Station shall be connected by telephone with the public telephone exchange system of the area in which the Station is located.

(2) The Broadcasting Station Licensee shall enter into the usual telephone subscriber's agreement for the establishment of a service.

58. The Postmaster-General may require the licensee of a Broadcasting Station to include, without charge, such items of general interest or utility as the Postmaster-General, from time to time, determines.

Provided however that the requirements of the Postmaster-General shall not be such as to entail a period of occupation of the Station in excess of thirty minutes in each consecutive period of twelve hours.

59. (1) All matter including advertisements to be broadcasted shall be subject to such censorship as the Postmaster-General determines.

(2) The Broadcasting Station Licensee shall, before broadcasting any such matter which is of a controversial nature or likely to cause offence to any section of the community, direct the attention of the Postmaster-General or an authorised officer, to such matter.

60. (1) A Broadcasting Station Licensee may broadcast advertisements.

(2) A Licensee desiring to broadcast advertisements shall publish a tariff of advertising charges, and shall make his advertising service available without discrimination to any person or firm.

61. The Licensee of any Broadcasting Station may, to such extent as the Postmaster-General approves, by agreement with the Licensees of other Stations, relay or broadcast the programmes broadcast by these stations.

62. A Broadcasting Station Licensee shall:—

- (a) compile and maintain in a recognised business or commercial form, separate accounts in respect of his broadcasting activities;
- (b) make such accounts available for inspection by the Postmaster-General as required;
- (c) supply to the Postmaster-General as required duly audited annual balance sheets in detail for the year ending on the thirtieth day of June in each year or on some other date approved by the Postmaster-General; and
- (d) keep such records relating to the broadcasting service, as the Postmaster-General, from time to time, directs, and supply copies thereof to the Postmaster-General as required.

63. (1) The programme transmitted from a Broadcasting Station shall, both in rendition and transmission, be to the satisfaction of the Postmaster-General.

(2) The general terms of any announcement, whether complete in themselves or referring to items to be transmitted, shall be to the satisfaction of the Postmaster-General.

(3) Every announcer employed by the Licensee shall be of good education, style and personality, and possessed of clear enunciation, as far as possible free from any characteristic dialect.

64. (1) The licence fee for a Broadcasting Station Licence or any renewal thereof shall be £25 per year or part of a year payable in advance.

(2) This regulation shall be deemed to have come into operation on the first day of November, One thousand nine hundred and twenty-nine.

65. A Broadcasting Station Licensee shall at all times keep the Postmaster-General indemnified against any claim for royalties in respect of any equipment operated under his licence, or against any claims whatsoever arising out of the Licensee's operations.

66. A Broadcasting Station Licensee shall not—

- (a) transmit any work or part of a work in which copyright subsists except with the consent of the owner of the copyright; or
- (b) send out news or information of any kind published in any newspaper or obtained, collected, collated or co-ordinated by any newspaper, or association of newspapers or any news agency or service except with the full consent in writing, first obtained, of, and upon such payment and conditions as are agreed upon by the licensee and, the newspaper, association of newspapers, news agency or service.

67. (1) A Broadcasting Station Licensee who supplies in advance to the proprietor of any registered newspaper programmes of the items to be broadcasted by his Station shall, on application in writing, supply in advance such programmes on equal terms to the proprietor of any other registered newspaper.

(2) The proprietor of such other newspaper may publish such programmes in any registered newspaper owned by him.

(3) In this regulation "registered newspaper" means a newspaper registered under the Post and Telegraph Act 1901-1923.

68. A person shall not publish any portion of the text of a broadcasted item without the consent of the Broadcasting Station Licensee and the approval of the Postmaster-General.

69. A Broadcasting Station Licensee shall not, without the permission of the Postmaster-General, transmit any message or other communication, the transmission of which would be in contravention of the provisions of the Post and Telegraph Act, 1901-1923 if the licensed installation were a telegraph within the meaning of that Act.

70. Except where any inconsistency exists, nothing in this Part shall affect the generality of the provisions of any other Part of these Regulations.

71. The decision of the Postmaster-General with regard to the interpretation or application of any of the provisions of this Division shall be final.

72. The Postmaster-General may, on such terms and conditions as he thinks fit—

- (a) make contracts for the establishment, erection maintenance or use of wireless broadcasting stations or appliances on his behalf; and
- (b) for the purpose of using any wireless broadcasting stations or appliances established, erected or maintained by him or on his behalf, make contracts for the provision of programmes by such stations or by such appliances.

73. Any Licence for a Class B Station in force immediately prior to the commencement of this regulation shall be deemed to have been granted under and subject to the provisions of these Regulations.

74. Notwithstanding anything contained in this Division, any Licence for a Class A Station granted under the Regulations in force immediately prior to the commencement of this regulation shall not, on and from the commencement of this regulation, be renewed and those Regulations shall be deemed to apply to such Licence so long as it remains in force.

Division 11.—Broadcast Listeners' Stations

75. A Broadcast Listeners' Licence in accordance with Form 5 in the Schedule to these Regulations may be granted at any Money Order Office on payment of the prescribed fees.

76. (1) For the purpose of the granting of Broadcast Listeners' Licences and the payment of fees therefor, the Commonwealth and the Territories thereof shall be divided into two zones as follows:—

- (i) Zone 1 shall include all the territory within an approximate radius of 250 miles from such Broadcasting Stations as the Postmaster-General determines; and
- (ii) Zone 2 shall include all the territory of the Commonwealth and the Territories outside Zone 1.

(2) The Postmaster-General may determine the zone within which any Broadcast Listeners' Station is situated.

(3) The Postmaster-General may modify the boundaries of the Zones specified in sub-regulation (1) of this regulation, or establish additional Zones.

77. (1) The fees payable in respect of any Broadcast Listeners' Licence or any renewal thereof shall be as follows:—

- (a) For Zone 1, 21/- per annum; and
- (b) For Zone 2, 15/- per annum (from 6/8/34).

(2) Licence fees shall be paid in advance.

78. Where a Broadcast Listeners' Licence is being granted in respect of receiving equipment which has been used prior to the grant of the Licence, the Licence may be given the date and shall be deemed to have been effective from the date the receiving equipment was first used without a current Licence.

79. A Broadcast Listeners' Licence shall not be transferable from one person to another.

80. (1) The user of receiving equipment, capable of being utilised for the reception of broadcast programmes or other wireless signals, shall be in possession of a current Broadcast Listeners' Licence.

(2) Where a current Broadcast Listeners' Licence is not held in respect of equipment installed or connected up or capable of being connected up for the purpose of receiving broadcast programmes or other wireless signals in any dwelling house, office, shop, premises or place,

the occupier of any such dwelling house, office, shop, premises or place shall be guilty of an offence.

(3) It shall be a defence to a prosecution for an offence against the last preceding sub-regulation, if the occupier proves that he was not aware, or could not with reasonable diligence have become aware, of the existence in the dwelling house, office, shop, premises or place of the receiving equipment in question.

81. (1) Receiving equipment shall not, without the consent of the Postmaster-General, or an authorised officer, be used at a place other than that specified in the Broadcast Listeners' Licence.

(2) The Licensee shall notify the Department of any permanent change of address within two weeks of the change.

82. A Broadcast Listeners' Licence shall, at all reasonable times, be available at the address given thereon for inspection by an authorised officer.

83. A Licensee of a Broadcast Listeners' Station shall not divulge, except to an authorised officer or a legal tribunal, the contents of any commercial or defence wireless communications, other than those transmitted by a Broadcasting Station.

84. Any Licensee of a Broadcast Listeners' Station using reaction (back coupling) in such a manner as to cause interference to the reception at any other Station shall be guilty of an offence against these Regulations.

85. A person or firm shall not operate receiving equipment for the purpose of demonstration or test of receivers with the object of promoting the sale of receiving equipment without being in possession of a Broadcast Listeners' Licence.

Regulation 109 of the Wireless Telegraphy Regulations is repealed as from 2/10/30 and the following regulation inserted in its stead:—

"109. The fee for an Experimental Licence shall be £1 10s. 0d. per annum."

STATUTORY RULES

1933. No. 136.

AMENDMENT OF THE WIRELESS TELEGRAPHY REGULATIONS (BLIND PERSONS).

(Statutory Rules 1924, No. 101, as amended to this date.)

Regulation 12 of the Wireless Telegraphy Regulations is amended by adding at the end of sub-regulation (1) the following proviso:—

1. (1) Provided also that a Broadcast Listeners' Licence or any renewal thereof may be granted free of charge to any blind person over the age of sixteen years.

(2) This regulation shall come into operation on the first day of January, 1934.

P.M.G.'s Annual Report on Wireless Branch Operations

23rd Annual Report for 1932-33

The Twenty-Third Annual Report of the Postmaster-General's Department covering the period of 1932-33 Financial Year contains many interesting facts relating to Broadcasting Activities.

(This was issued too late for inclusion in the 1934 Radio Trade Annual)

Capital Investment. Amount expended and charged to capital account for Wireless equipment during the year was £32,035.

Profit and Loss. The accounts of the Wireless Branch show a surplus of £22,796, as compared with a surplus of £30,932 for 1931-1932.

The earnings for 1932-33 were £192,480, an increase of £31,904 or 19.87 per cent.

The expenditure, including interest charges, was £169,684, an increase of £40,040 or 30.88 per cent.

The increased expenditure arises from the fact that during the year under review the four new stations erected were in operation during the whole period and consequently the full maintenance and interest charges were involved. Moreover, substantial charges arose from the displacement of obsolete apparatus at stations which were acquired on the cancellation of the Class "A" Broadcasting licences from 1929 onwards.

The regional stations necessitate the use of long interconnecting lines and these, together with the trunk circuits which are freely used for simultaneous broadcasts, are charged against the Department. In accordance with the provisions of the Australian Broadcasting Commission Act, these facilities are provided free of charge to the Commission.

Trunk Line Channels Used. Trunk line channels were connected for the Australian Broadcasting Commission on 1,432 occasions during the year for the purpose of enabling programmes to be broadcast simultaneously by two or more stations or to be transmitted from a provincial centre for broadcasting by a station in the metropolitan area. Of these cases, 238 relays were extended to the stations in five States on the Mainland, 167 to four States, and 176 to three States.

On 1,449 occasions channels were also made available for the use of licensed broadcasting stations and in many cases the relays embraced all, or the majority, of the Mainland States. One relay involved the connection of 41 stations extended over the Mainland and used the most comprehensive programme network yet established in the Commonwealth for a simultaneous broadcast.

A feature of many of the relays was the retransmission over the National Stations of Empire programmes received by the Departmental Short-wave Station at Mont Park (Victoria) from the British Broadcasting Corporation's Station at Daventry (England).

Test Cricket Matches. During the 1932-33 Australian tour of the English Test Cricket Team an entirely new development in Commonwealth communication practice was successfully introduced. By arranging a network of lines between the cricket ground and the National Broadcasting Studios in the whole of the mainland capitals, a system was made available for the direct and simultaneous transmission of ball-by-ball descriptions from the observer on the field to the broadcast announcers, skilled telegraphists being employed at all points. A drop copy service operated at Melbourne permitting expeditious transmission of the descriptions to Tasmania for broadcast from the National Station at Hobart. This integration of telegraph and radio services, based upon a carefully planned organisation of lines equipment and selected personnel, afforded listeners throughout the continent a detailed description of each over, the announcers being able to describe events within 30 seconds of their occurrence.

(Continued on Page 39)

SUMMARY OF FINANCIAL RESULTS Wireless Branch

	N.S.W.	Vic.	Q'ld.	S.A.	W.A.	Tas.	Tot. Com. 1932-33	Tot. Com. 1931-32
	£	£	£	£	£	£	£	£
Earnings	73,742	71,440	14,424	20,394	7,360	5,120	192,480	160,576
Working Expenses (exclusive of Interest)	55,518	33,590	19,295	24,093	13,645	7,258	153,199	116,143
Earnings compared with Working Expenses—Surplus	18,424	37,850	—	—	—	—	39,281	44,433
Deficit	—	—	4,871	3,699	6,285	2,138	—	—
Interest on Capital including Exchange thereon	4,856	1,645	3,123	4,153	2,154	554	16,485	13,501
Result, after providing for Working Expenses and Interest—Surplus	13,568	36,205	—	—	—	—	22,796	30,932
Deficit	—	—	7,994	7,852	8,439	2,692	—	—
Percentage of Working Expenses to Earnings	75.01	47.02	133.77	118.14	185.38	141.76	79.59	72.34

**P.M.G.'s 23rd ANNUAL REPORT
WIRELESS ACTIVITIES—Contd. from P. 38**

National Broadcasting Service

THE Australian Broadcasting Commission undertook the responsibility for the provision of the programmes for the National Broadcasting Service on 1st July, 1932.

The Department continues to provide and operate the technical services. There are eight stations in the capital cities and four Regional Stations in the provincial areas transmitting programmes for an aggregate of 952 hours weekly.

Radio and Research. A modern high quality transmitting plant has been installed by the Department on the north-western side of Perth and was opened for service in December, 1932. This station (6WF, Perth) effectively serves approximately 50 per cent. of the population of Western Australia; the remaining portion of the population, which is situated in the country, will be served by the extension of the regional station programme now in process of development. The erection of four new national stations is being proceeded with, the relative tenders for their installations are due to close on the 12th September, 1933. These stations will be situated in the vicinity of Townsville, Sale, Grafton and Launceston.

For the reception of Empire programmes a short wave receiving station has been installed at Mont Park, Melbourne, apparatus having been successfully developed to pick-up and rebroadcast over the national system such programmes as are able to be received without undue interference from atmospheric or fading.

Licensed Broadcasting Stations. The popularity of the Licensed Broadcasting Stations is being maintained by the 48 stations now in operation for an aggregate of 2,400 hours per week.

Wireless Licences. A record number of broadcast listeners' licences was issued during the year, the total for the Commonwealth having increased in that period by 99,532 or 27 per cent. The total number of listeners' licences in force at 30th June, 1933, was 469,477, representing 7.14 per 100 of the population compared with 301,199 (4.75 per 100 of the population) when the National Broadcasting service was inaugurated in July, 1929.

Inspections and Prosecutions. During the year officers of the Wireless Branch made 65,656 inspections of stations. The Department unfortunately found it necessary to initiate a special campaign against unlicensed listeners. As a result, 1,711 persons were convicted for operating unlicensed receivers and fines and costs aggregating £3,812 were imposed. Up to 30th June, 1933, 5,120 persons had been convicted for offences against the Wireless Telegraphy Regulations, the total fines and costs to that date being £12,291.

Radio Inductive Interference. Since the advent of the electric receiver, interference to broadcast reception has increased considerably. Defects on power transmission systems, the operation of electrical transport services and the use of nearly all forms of electrical domestic and medical appliances are the cause of the unwanted and objectionable noises in receivers. It will thus be recognised that the ramifications of this nuisance are extensive.

Throughout the world, wherever broadcasting is in operation, radio inductive interference has presented a serious and widespread problem. Generally speaking, the various administrative authorities have endeavoured to deal with the situation by localising the disturbing sources which have given rise to complaint, and inducing the owners of appliances to rectify such defects in their plant as may be causing the interference, or to instal the necessary suppressing devices where the interference is the result of fundamental features of the design of the equipment.

In Australia the problem has been treated in this manner and the Department has received willing co-operation from many persons whose apparatus has been the cause of the trouble.

During the year the Department made special endeavours to assist listeners to eliminate unwanted noises in their receivers and publicly invited them to avail themselves of the services of its officers. The staff engaged on this class of work has been augmented and since October, 1932, 5,669 cases have been reported to the Radio Inspectors; 2,500 by metropolitan listeners and 3,169 by country listeners. Investigations by Departmental officers numbered 4,319 and the cause of the interference was located in 3,856 cases.

Statement of Net Revenue For Years Ended, 30th June, 1933 and 1932

This statement represents actual collections for the year as shown by records kept for Treasury purposes. The earnings of the Department for the same period are shown in the Profit and Loss Accounts.

	Year ended 30th June	Radio Revenue
Central Office	1933 1932	£ 1,378 2,729
New South Wales	1933 1932	79,702 63,384
Victoria	1933 1932	76,189 62,816
Queensland	1933 1932	15,728 12,600
South Australia	1933 1932	22,698 16,870
Western Australia	1933 1932	8,843 5,524
Tasmania	1933 1932	5,596 4,274
Totals	1933 1932	210,134 168,197

(Continued on Pages 40 and 41)

ANALYSIS OF GENERAL PROFIT AND LOSS RESULTS — Wireless Branch
The results of working the Wireless Branch are as follows:—

STATE	1932-33						1931-32					
	Deficit			Surplus			Deficit			Surplus		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
New South Wales				13,567	17	2	—			14,198	1	1
Victoria				36,204	18	2	—			33,642	13	4
Queensland	7,993	17	7	—			7,370	16	5	—		
South Australia	7,852	8	1	—			1,808	1	8	—		
Western Australia	8,438	18	1	—			5,027	13	9	—		
Tasmania	2,691	14	6	—			2,702	0	10	—		
	26,976	18	3	49,772	15	4	16,908	12	8	47,840	14	5
Total Net Surplus, 1932-33							£22,795 17 1					
Total Net Surplus, 1931-32							£30,932 1 9					

P.M.G.'s 23rd ANNUAL
REPORT—(Continued)

PROFIT & LOSS ACCOUNT
(on right)

FIXED ASSETS IN WIRE-
LESS BRANCH IN
P.M.G.'s DEPT.
(below).

FIXED ASSETS

Wireless Plant

DESCRIPTION	Value on July 1, 1932	Expenditure 1932-33	Gross Value on June 30, 1933	Dismantled Assets De- preciation written off, and Assets Transferred 1932-33	Net Value on June, 30, 1933
	£	£	£	£	£
National Station Equipment	95,358	16,133	111,491	5,840	105,651
National Studio Equipment	17,841	5,793	23,634	664	22,970
National Miscellaneous Assets	3,296	9,783	13,079	275	12,804
National Studio Furniture	3,427	64	3,491	3,121	307
Other Broadcasting and Wireless Assets	8,767	262	9,029	18	9,011
Total Wireless Plant	128,689	32,035	160,724	9,918	150,806

TABLE NO. 7
PROFIT AND LOSS ACCOUNT OF WIRELESS BRANCH FOR YEAR ENDED, 30th JUNE 1933

EXPENDITURE	Percentages of Net Income	REVENUE		Percentages of Net Income				
		£	s. d.		£	s. d.	£	s. d.
Upkeep and Operation of Broad- casting Stations	22.69	43,673	18 1	Gross Revenue	503,520	12 11		
Upkeep and Operation of Broad- casting Studios	14.95	28,779	7 9	Less—				
General Supervision and Cost of Issuing Licences	22.06	42,459	15 4	Payments to Amalgamated Wireless Limited	63,276	14 0		
Telephone Circuits used for Broadcasting and Miscellan- eous Expenditure	8.49	16,333	7 8	Payments to Australian Broadcasting Commission	247,763	18 6	311,040	12 6
	68.19	131,246	8 10	Net Revenue: Licence Fees, Fines, etc.			100.00	192,480 0 5
Proportion of Administration Expenses	1.44	2,778	0 0					
Depreciation	8.01	15,417	14 6					
Proportion of Superannuation Liability and Pensions	1.95	3,757	0 0					
	79.59	153,199	3 4					
Surplus exclusive of Interest, carried down	20.41	39,280	17 1				100.00	192,480 0 5
	100.00	192,480	0 5					
Interest and Exchange Charges Surplus, inclusive of Interest, transferred to General Profit and Loss Account	8.57	16,485	0 0					
	11.84	22,795	17 1	Surplus, exclusive of Interest, Brought down			20.41	39,280 17 1
	20.41	39,280	17 1				20.41	39,280 17 1

P.M.G.'s 23rd ANNUAL REPORT—
(Continued from Page 40)

General Profit and Loss (Table 3).

Expenditure as per Branch accounts, £153,199/3/4.
Surpluses, exclusive of Interest carried down, £39,280/17/1.
Interest and Exchange charges, £16,485.
Surplus after charging interest, £22,795/17/1.
Revenue, £192,480/0/5.

Depreciation Reserve (Wireless Plant)

N.S.W., £4,992; Vic., £1,194; Q'ld., £3,007; S.A., £3,702;
W.A., £1,393; Tas., £536; Total, £14,824.

Summary of Depreciation in Profit and Loss Account

Depreciation of stores in stock and miscellaneous plant:
N.S.W., £83; Vic., £167; Q'ld., £17; S.A., £20; W.A., £10;
Tas., £5; Total, £302.

Depreciation Reserve

N.S.W., £5,101; Vic., £1,223; Q'ld., £3,054; S.A., £3,763;
W.A., £1,421; Tas., £554; Total for Commonwealth, £15,116.

Balance-Sheet (Table No. 2)

Sundry Creditors: Wireless fees paid in advance, £291,228/5/9.
Assets: Fixed and plant. Wireless equipment, £150,805/18/1.

Postmaster-General's Department

Twenty-Fourth Annual Report on Wireless Activities For Year 1933-1934

PROFIT & LOSS — Wireless. The accounts of the Wireless Branch show a surplus of £87,235 as compared with a surplus of £22,796 for 1932-33. The earnings for 1933-34 were £269,640, an increase of £77,160 or 40.09 per cent. The expenditure, including interest charges, was £182,405, an increase of £12,721 or 7.54 per cent.

CAPITAL INVESTMENT. Wireless equipment, etc., £18,287.

TASMANIAN CABLE. Tenders were called for a cable to provide adequate telephonic and broadcasting facilities between the Mainland and Tasmania, and orders for both the cable and the associated apparatus have now been placed. The cable will be laid across Bass Strait from Apollo Bay, Victoria, to King Island, and thence to Stanley, Tasmania. Provision has been made for five telephone channels, seven telegraph channels and one channel suitable for use for transmitting programmes for broadcasting. These channels will be extended over the land lines on the Mainland and in Tasmania to provide channels between Melbourne and Launceston and Melbourne and Hobart.

It is anticipated that the installation will be complete by March, 1936.

OVERSEAS TELEPHONE SERVICE. During 1933-34 there was an appreciable improvement in the volume of business. One thousand five hundred and sixty-four calls were completed, 907 of which were originated in Australia.

In December, 1933, the charges for calls made on Saturdays between Australia and the British Isles, were reduced by 50 per cent. This change has led to a substantial increase in week-end calls without detriment to full-rate business.

Residents in Australia are now able to secure service to any one of approximately 32,000,000 telephones in various parts of the world, or 93 per cent. of the world's total telephones.

National Broadcasting Service

NATIONAL STATIONS. A modern high frequency (short wave length) transmitting station has been installed by the Department at Lyndhurst (Vic.). This station, which was placed in service in March, 1934, was erected to provide listeners with a service in the more remote parts of Central and Northern Australia, who are not at present served by the existing National stations. Station 3LR (Lyndhurst) is now a regular unit of the National Broadcasting System, and widespread expressions of pleasure at its establishment have been received from outback residents.

In connection with the extension of the National Broadcasting System, tenders have been accepted for the supply of the transmitting apparatus required for the erection of seven new regional broadcasting stations. It is anticipated that these stations will be in operation during the year 1935. These

(Continued on Page 42)

ANALYSIS OF GENERAL PROFIT & LOSS RESULTS — Wireless Branch

The results of working the Wireless Branch are as follow:—

State	1933-34				1932-33			
	Deficit		Surplus		Deficit		Surplus	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.
New South Wales	—	—	36,442	15 2	—	—	13,567	17 2
Victoria	—	—	55,427	4 10	—	—	36,204	18 2
Queensland	5,181	16 10	—	—	7,993	17 7	—	—
South Australia	—	—	3,405	0 1	7,852	8 1	—	—
Western Australia	683	11 6	—	—	8,438	18 1	—	—
Tasmania	2,174	11 0	—	—	2,691	14 6	—	—
	8,039	19 4	95,275	0 1	26,976	18 3	49,772	15 4
Total Net Surplus, 1933-34					£87,235 0 9			
Total Net Surplus, 1932-33					£22,795 17 1			

P.M.G.'s 24th ANNUAL REPORT—
(Continued from Page 41)

stations are being erected to serve the districts indicated hereunder:—

Northern Rivers, N.S.W.; West Central N.S.W.; Gippsland, Victoria; Western Victoria; Townsville, Queensland; South Western, W.A.; Northern Tasmania.

LICENSED BROADCASTING STATIONS.: There are now 53 licensed broadcasting stations in operation, including five new ones which were erected during the year. These stations are operated for an aggregate of 3,000 hours weekly.

USE OF TRUNK LINES FOR BROADCASTING PURPOSES. The demand for trunk line channels in connection with the activities of the Australian Broadcasting Commission and licensed broadcasting organisations has increased substantially, and during the financial year 1933-34 channels were made available for broadcasting purposes on 2,312 occasions for the Australian Broadcasting Commission and on 2,621 occasions for licensed broadcasting organisations, making a total of 4,933. Of this total, 197 relays were extended to five mainland States, 324 to four States, 472 to three States, and 786 to two States, the remaining relays involving stations in one State only.

The total time for which trunk lines were occupied for broadcasting purposes during the year exceeded 10,000 hours.

The total mileage of trunk line channels involved in each relay connecting the National stations in the five mainland States is approximately 4,400, and the capital value of the plant employed on each occasion approximates £270,000.

This extensive service rendered to the Australian Broadcasting Commission free of cost by the Post Office has had a marked influence on the character of the National Broadcasting Service. It has enabled the concentration of programme resources to take place at the larger centres as an alternative to the creation of comprehensive programmes at the individual studios throughout the Commonwealth. It has also been the means of affording people in every part of the Commonwealth the opportunity of listening to musical productions and to the description of important and interesting events taking place in every part of Australia. Programme items from overseas are also regularly transmitted over this nation wide telephone network.

The maximum number of broadcasting stations linked together for simultaneous broadcast was 41. In the descriptions of the Test Cricket played in England, over 8,000 miles of trunk line channels were employed nightly for broadcasting purposes from about 8 p.m. until 3.30 a.m., together with about 6,000 miles of telegraph circuit.

Statement of Net Revenue For Years Ended,
30th June, 1934 and 1933

This statement represents actual collections for the year as shown by records kept for Treasury purposes. The earnings of the Department for the same period are shown in the Profit and Loss Accounts.

	Year ended 30th June	Radio Revenue
Central Office	1934	£3,388
	1933	£1,378
New South Wales	1934	£127,453
	1933	£79,702
Victoria	1934	£115,238
	1933	£76,189
Queensland	1934	£28,169
	1933	£15,728
South Australia	1934	£36,250
	1933	£22,698
Western Australia	1934	£17,130
	1933	£8,843
Tasmania	1934	£9,229
	1933	£5,596
Totals	1934	£336,857
	1933	£210,134

Profit and Loss Account of Wireless Branch—For Year Ended, 30th June, 1934

EXPENDITURE	% of Net Income	£	s.	d.	REVENUE	£	s.	d.	£	s.	d.
Upkeep and Operation of Broadcasting Stations	13.80	£37,196	13	10	Gross Revenue	634,711	0	8			
Upkeep and Operation of Broadcasting Studios	10.05	£27,109	9	3	Less—						
General Supervision and Cost of Issuing Licences	20.56	£55,445	11	9	Payments to Amalgamated Wire-						
Telephone Circuits used for Broadcasting and Miscellaneous Expenditure	9.73	£26,229	18	10	less Limited	50,944	8	3			
					Payments to Australian Broadcast-						
					ing Commission	314,126	12	6			
Proportion of Administration Expenses	54.14	£145,981	13	8							
Depreciation (See Table 8)	1.02	£2,743	0	0	Net Revenue: Licence Fees, Fines, etc.				269,639	19	11
Proportion of Superannuation Liability and Pensions	6.62	£17,850	5	6							
	1.53	£4,136	0	0							
Surplus, exclusive of Interest, carried down	63.31	£170,710	19	2							
	36.69	£98,929	0	9							
Interest and Exchange charges	100.00	£269,639	19	11							
Surplus, inclusive of Interest, transferred to General Profit and Loss Account	4.34	£11,694	0	0							
	32.35	£87,235	0	0	Surplus, exclusive of Interest, brought down						
	36.69	£98,929	0	9	(equal to 36.69% of net income)						

P.M.G.'s 24th ANNUAL REPORT—

(Continued from Page 42)

There is every expectation that the use of trunk line channels for broadcasting purposes will continue to extend, for both the Service and economic advantages are of such obvious vital importance to broadcasting.

WIRELESS LICENCES. At 30th June, 1934, 599,159 Broadcast Listeners' Licences were in force, representing an increase for the year of 129,682, or 28 per cent., the highest annual gain yet recorded.

As from 1st January, 1934, free Broadcast Listeners' Licences have been issued to blind persons over the age of sixteen years.

Arrangements were made during the year for the issue to listeners of cards to which postage stamps of an individual face value of 6d. or more may be affixed for the purpose of permitting them to provide for their licence fees by regular instalments.

INSPECTIONS AND PROSECUTIONS. During the year 118,290 inspections were made. It was unfortunately neces-

sary to continue the special campaign against unlicensed listeners with the result that 2,866 persons were convicted for operating unlicensed wireless receivers. The fines and costs inflicted amounted to 6,974. Up to 30th June, 1934, 7,986 persons had been convicted for this offence, the fines and costs aggregating £19,266.

RADIO INDUCTIVE INTERFERENCE. Interference to broadcast reception continues to be widespread, and the Department is doing its utmost to assist listeners who are experiencing disturbance in their broadcast reception. The Department so far relies on co-operation and has been fairly successful in inducing those responsible for the operation of electrical systems and appliances which generate disturbing radiations of electrical energy, to adopt the remedial measures which are demonstrated to be effective. Special efforts have also been made to secure the co-operation of the radio traders and listeners in general to pay due regard to the installation of receiving aerials and apparatus so that by this means the effect of parasitic radiations may be minimised.

During the year the Department received 4,825 requests for investigation of interfering noises; 3,539 were investigated and the cause eliminated in 2,735 cases. The staff engaged on the work has been augmented so that listeners' requests for assistance may be attended to with the least possible delay.

Summary of Financial Results 1933-34

Wireless Branch

	N.S.W.	Vic.	Q'ld.	S.A.	W.A.	Tas.	Total 1933-34	Total 1932-33
Earnings	£ 102,703	£ 97,305	£ 20,472	£ 28,990	£ 12,883	£ 7,287	£ 269,640	£ 192,480
Working Expenses (exclusive of Interest)	62,764	40,394	23,192	23,004	12,304	9,053	170,711	153,199
Earnings compared with Working Exs.—								
Surplus	39,939	56,911	—	5,986	579	—	98,929	39,281
Deficit	—	—	2,720	—	—	1,766	—	—
Interest on Capital including Exchange thereon	3,497	1,484	2,462	2,581	1,262	408	11,694	16,485
Result, after providing for Working Expenses and Interest—								
Surplus	36,442	55,427	—	3,405	—	—	87,235	22,796
Deficit	—	—	5,182	—	683	2,174	—	—
Percentage of Working Expenses to Earnings	61.11	41.51	113.29	79.35	95.50	124.23	63.31	79.59

Depreciation Reserve

WIRELESS PLANT — Equipment:—N.S.W. £6,009, Victoria £1,762, Queensland £3,241, S. Australia £4,090, W. Australia, £1,812, Tasmania £638, Total £17,552.

Summary of Depreciation in Profit and Loss Accounts, 1933-34

Depreciation Reserve:—N.S.W. £6,116, Victoria £1,789, Queensland £3,288, S.A. (incl. N.T.) £4,143, W.A. £1,861, Tasmania £653. Total £17,850.

Fixed Assets — Wireless Plant

Description	Value on July 1, 1933	Expenditure 1933-34	Gross Value on June 30, 1934	Dismantled Assets Depreciation written off, and Assets Transferred 1933-34	Net Value on June 30, 1934
National Station Equipment	£106,785	£4,876	£111,661	£1,130	£110,531
National Studio Equipment	22,970	11,134	34,104	336	33,768
National Miscellaneous Assets	12,804	1,841	14,645	52	14,593
National Studio Furniture	370	155	525	—	525
Other Broadcasting & Wireless Assets	9,011	281	9,292	8	9,284
Total Wireless Plant	151,940	18,287	170,227	1,526	168,701

Auditor-General's Comments on the P. M. G.'s 24th Annual Report

A COPY of the Auditor-General's Report covering the year ended June 30th, 1934, was released last week, and paragraph 108 thereof deals with the published accounts of Amalgamated Wireless A/sia Ltd., for the year ended June 30th, 1934, which disclosed a nett profit of £137,934 from wireless services and other sources, including transfer of earlier provisions for contingencies not now required. This amount represents a return of 18.53 per cent on the paid-up capital of £744,283 and is £55,762 greater than the net profit for the previous year. In his report to the shareholders, the Chairman points out that part of the increase over previous periods should be regarded as non-recurring. Dividends at the rate of 10 per cent. per annum absorbing £74,428 have been paid for 1933-34, the Commonwealth receiving £35,000 1s. 5d. based on its capital holding of £350,000 14s. — 500,001 shares paid to 14s. In 1932-33 the rate of dividend was 8 per cent.

Under the Wireless Agreement Act 1927, the Company received the sum of £87,075 from the Government, on account of the year 1933-34. This sum consists of £36,130, the Commonwealth's net payment towards the maintenance of the coastal and inland radio stations and £50,945 patent royalties.

The payment to the Company of patent royalties ceased as from 1st March, 1934, the date on which that part of the Agreement relating to royalties, was determined. The royalty payments commenced on 1st November, 1927, and to the date of cessation, totalled £329,158.

Broadcasting

Broadcasting services in Australia are supplied by two classes of Stations—the National stations provided and maintained by the Commonwealth and the "B" class stations operating for profit. There are twelve National stations, eight originating stations in the Metropolitan areas and four regional stations. Fifty-three "B" class stations were broadcasting at the end of the financial year.

Licensed broadcast listeners at 30th June, 1934, numbered 597,000—approximately 130,000 more than the number 12 months before and 230,000 more than at 30/6/32. Important factors contributing to the increase are better and cheaper receiving sets, improved programmes from both National and "B" class stations and the activities of the P.M.G.'s Department. During the year, 2,866 unlicensed listeners were convicted, fines and costs totalling £6,974.

Listeners' Licence Fees

The distribution of the broadcast listeners licence fee of 24s. varied during the year. To 28th February, 1934, a patent royalty of 3s. per annum was paid to A.W.A., 12s. p.a. was made available to the Australian Broadcasting Commission, and the remaining 9s. was paid into Consolidated Revenue.

The patent royalty ceased on 1st March, 1934, and to 6th August, 1934, when the listeners licence fee was reduced to 21s., the proportion paid to Revenue was increased from 9s. to 12s. To 30/6/34, the additional amount paid to Revenue totalled £70,642, including £37,006 royalty at 3s. p.a. collected prior to 1/3/34, but not payable to the patent holding company, because of the termination of the agreement.

The position in regard to broadcasting transactions relating to listeners' fees for the year 1933-34 showed on the income side that the balance of undistributed fees in Trust Fund Wireless Broadcasting Account at 30/6/33, was £171,045 1s. Licence fees received from Broadcast Listeners and Experimenters during 1933-34, £716,045 8s., making a total of £887,090 9s.

Expenditure

Patent Royalty to A.W.A. £50,944 13s. 9d.; Australian Broadcasting Commission £314,126 12s. 6d.; revenue, £338,060 6s. 9d. Balance undistributed fees in Trust Fund Wireless Broadcasting Account, £183,958 16s., making a total of £887,090 9s.

Australian Broadcasting Commission

Total revenue £325,731 13s. 1d., made up of £314,126 12s. 6d. from listeners' licence fees, and other receipts of £11,605 0s. 7d., mainly the proceeds of concerts. The expenditure totalled £292,737 5s. 9d., leaving a revenue surplus of £32,994 7s. 4d.

For the purpose of comparing the Commission's operations for the past two years the following table has been prepared. In this table Copyright Fees, which in the previous year's accounts were partly estimated, have been adjusted to show the actual payments in respect of each year. The adjustments have the effect of altering the revenue surplus in each year to the figures shown:—

Expenditure

	1932-33		1933-34	
	£	Per cent.	£	Per cent.
To Artists' Fees and Programme Expenses (Payments to Artists, Orchestras, lecturers, announcers, accompanists and production costs)	126,692	50.6	170,406	52.3
Copyright Fees	30,090	12.0	33,787	10.4
Broadcasting Rights	2,439	1.0	8,060	2.4
Rental of Telephone Lines for Broadcasting and Outside Pick-up				
Costs	6,501	2.6	7,283	2.2
Commission's Fees	1,800	.7	1,800	.6
Staff Salaries	25,719	10.3	33,363	10.2
Rent of Offices and Furniture	6,770	2.7	8,901	2.8
Publicity	4,344	1.7	8,183	2.5
Depreciation	1,375	.5	3,443	1.0
Preliminary Expenses				
Written Off	1,357	.5	1,588	.5
Other Expenses	16,803	6.7	23,324	7.2
Balance carried down	26,729	10.7	25,594	7.9
	£250,619	100.0	£325,732	100.0

Receipts

	1932-33		1933-34	
	£	Per cent.	£	Per cent.
By Revenue from Licence Fees	£250,619	—	£314,127	96.4
Other Receipts	—	—	£11,605	3.6
	£250,619	—	£325,732	100

Revenue, year ended 30/6/33	£250,619
Revenue, year ended 30/6/34	£325,732
Expenditure, year ended 30/6/33	£223,890
Expenditure, year ended 30/6/34	£300,138
Surplus, year ended 30/6/33	£26,729
Surplus, year ended 30/6/34	£25,594
Reserve for Buildings & Accumulated Fund, 30/6/34	£52,323

(Continued on Page 45)

AUDITOR-GENERAL'S COMMENTS ON P.M.G.'s 24th REPORT—(Contd. from Page 44)

Although the Revenue for the year 1933-34 was greater by £75,113 than that for 1932-33, the surplus shown in the comparative statement, £25,594, is equal to only 7.9 per cent. of the Revenue, as against £26,729, or 10.7 per cent. of the Revenue for the previous year. This is explained by the large increase in revenue expenditure, which advanced from £223,890 in 1932-33 to £330,138 in 1933-34, an increase of £76,248 or 34 per cent. This increase has been fairly general including Artists' Fees and Programme Expenses £43,714, Broadcasting Rights £5,622, Staff Salaries £7,644, Rent of Offices and Furniture £2,131, Publicity £3,839 and Other Expenses £6,521.

Big Losses

Featured in the accounts are the results of the tour of the Captain Adkins' Military Band and of the Sir Hamilton Harty Concerts. The results were:—The Captain Adkins Military Band, total expenses, £17,074, Proceeds from concerts £7,044, Difference, £10,030. Sir Hamilton Harty Concerts showed Total Expenses £7,113, whereas the Proceeds were only £3,875, showing a difference of £3,238.

In both cases a loss was shown, the Military Band £10,030 and Sir Hamilton Harty Concerts, £3,238.

Thus, the net charge against listeners' fees for these two broadcast features was £13,268. The items of expense include these usually associated with the overtures of the theatrical entrepreneur, for example, newspaper advertising and publicity amounted to £2,090, while uniforms for the bandmen cost £593.

In two other instances the fares and fees of overseas artists groups exceeded £1,000 in each case. The cost of publicity, £8,183, is nearly double that for the previous year, and represents 2.5 per cent. of the revenue.

A.P.R.A. Fees

Copyright payments by the Commission to the Australasian Performing Right Association are subject to an agreement dated 2nd July, 1934. The amount payable to that Association in respect of the year 1933-34 was £30,847 11s. 10d.

Another agreement between the Commission and certain Gramophone Companies, is dated 5th April, 1934, and provides for payment by the Commission to those companies at the rate of £5,000 a year for the right to broadcast gramophone records. Payment under this agreement accounts mainly for the increase in Broadcasting Rights from £2,439 to £8,060.

The Commission's financial position is sound. In the Balance Sheet, Current Assets £40,406 exceed Liabilities to Creditors £22,770 by £17,636 and this excess plus the value of the remaining assets offsets the total reserves of £52,323. These reserves shown as "Reserve for Buildings, £50,000" and "Accumulated Fund £2,323" represent the surplus revenue for the two years ended 30th June, 1934. Land and Buildings have increased from £10,246 to £14,650 and Office Furniture, Musical Instruments and Equipment have more than doubled, increasing from £8,249 to £17,120.

A summary of Balance-sheet Items for two years follows:—

	Assets	
	30/6/33	30/6/34
	£	£
Land and Buildings—Freehold less Depreciation	10,246	14,650
Office Furniture, Musical Instruments and Equipment, less Depreciation	8,249	17,120
Stores and Stationery	944	1,330
Sundry Debtors	20,562	13,463
Payments in Advance	982	1,394
Cash in Hand and at Bank	14,463	25,549
Preliminary Expenses	2,709	1,587
Total	58,155	75,093

Liabilities

	£	£
Loan from Commonwealth Government	8,100	6,667
Sundry Creditors	30,727	16,103
Reserve for Buildings	17,500	50,000
Accumulated Fund	1,828	2,323
Total	58,155	75,093

Wireless Branch Accounts

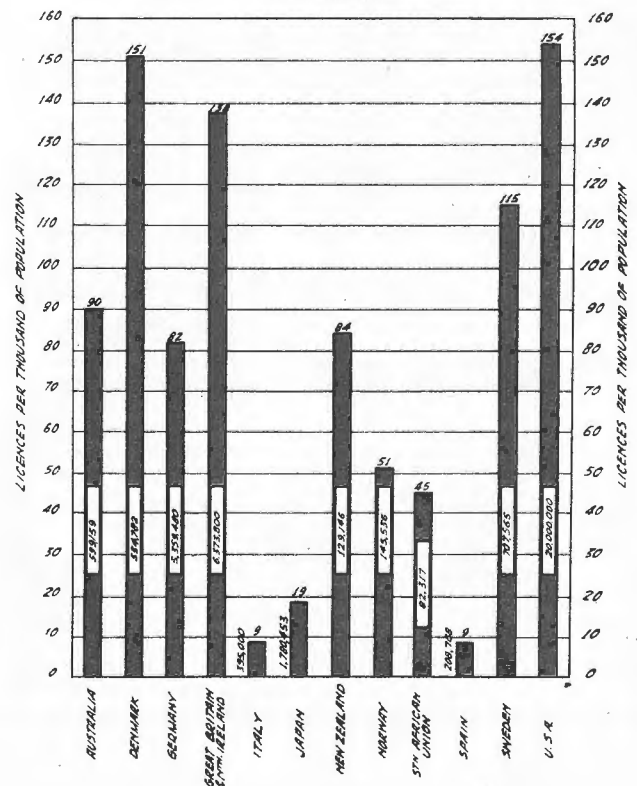
As stated in the last year's report the Postmaster-General's Department administers the Wireless Act generally, and in particular, supervises the issue of listeners' and other licences and collects the revenue. In addition as required by the Australian Broadcasting Commission Act 1932, the Department provides and maintains broadcasting station and studio technical equipment, and makes available both permanent programme lines to serve the regional stations and lines for relayed programmes mutually agreed upon with the Commission.

The Treasury accounts are not designed to show the net separate cost of the several branches of the Department, and because of this, the expenditure on wireless activities cannot readily be stated. The departmental Profit and Loss Accounts and Balance Sheet, which are not subject to my examination, and which appear in the Postmaster-General's report, show the following surpluses in the Wireless Branch Account, after making provision for depreciation, interest, exchange and superannuation:—

1930-31	£35,148
1931-32	£30,932
1932-33	£22,796
1933-34	£87,235

Wireless equipment appears in the Balance-sheet at 30/6/33, as £150,806, subject to a depreciation reserve. That figure had increased at 30/6/34 to £168,701.

BROADCASTING
DENSITY OF LISTENERS' LICENCES
IN AUSTRALIA AND OTHER COUNTRIES
AT 30th JUNE 1934



Wireless Control in Australia

Wireless activities in Australia, as in all other countries, are under Governmental control. With wireless transmission recognising no national boundaries it is obvious that some form of control is necessary. Consequently the various nations of the world work together under a form of agreement—the International Tele-communication Convention and its Regulations—to ensure freedom from interference.

IN the Commonwealth, the Postmaster-General's Department administers the required control and supervision under the powers of the Wireless Telegraphy Act and Regulations. The Act places the responsibility on the Postmaster-General of conducting wireless services or licensing other people to do so. Therefore, no person is permitted to erect, establish or maintain apparatus capable of transmitting or receiving wireless signals unless he is in possession of a licence from the Postmaster-General. The Wireless Telegraphy Regulations published herein set out the detailed conditions under which licences are obtained.

There are various types of licences covering the activities of the different classes of services. The licences issued by the Postmaster-General's Department are:—

Coast Station	Broadcast Listeners'
Ship Station	Portable
Land Station	Experimental Station
Broadcasting Station	Aircraft Station

and

Special Licences covering such services as the Beam Service, and other services for which specific licences are not provided.

With the exception of Broadcasting Station Licences and Special Licences, the applicant meets with scarcely any difficulty, provided that the required conditions are complied with. The name of the licence generally indicates the type of service to be covered which, with the exception of Broadcasting Station Licences, refer mainly to commercial wireless telegraph or telephony services.

It is very important, however, for all persons contemplating the installation of wireless apparatus to obtain full particulars from the Senior Radio Inspector in each State.

The issue of Broadcasting Station Licences is a matter of greater complexity because the number of such licences is necessarily limited by technical considerations. In accordance with an International agreement only a certain number of broadcasting frequencies or wave-lengths is available for broadcasting services if interference, both national and international, is to be avoided. In the interests of listeners it is essential that the wave-lengths of the different stations have a minimum frequency separation compatible with the performance of average broadcast receivers. Consequently the obligation rests on the Department, and it is viewed very seriously, to see to it that the stations are properly placed within the spectrum of frequencies comprising the broadcast band. And as the first demands on these frequencies must necessarily come from the national stations, it follows that only a limited number of broadcasting channels or wave-lengths are left for the stations established by private enterprise, known as Commercial Broadcasting Stations. Therefore, the grant of such a licence gives to the licensee something of a monopoly and consequently the Department must select very carefully from the applicants those to whom licences are to be granted, keeping in view the essential factor that service to listeners must be the paramount consideration.

Inspection of Stations

When licences are granted, regular inspections are made by officers of the Department in order to ensure that the conditions of the licence are complied with. Those conditions may be referred to shortly as the stipulated service to be given and adequate precautions to be taken to avoid interference with other services.

Operators' Certificates of Proficiency

Under the international and local wireless laws, the Department stipulates the conditions pertaining to the issue of Operators' Certificates of Proficiency. These certificates are issued, after appropriate examinations have been passed, to candidates who desire to operate particular types of stations; the examination being conducted with the object of allowing the candidates to demonstrate their possession of the required knowledge of proficiency.

The examinations are held periodically for the following certificates:—

Commercial Operators' First Class	Second Class
Limited (Telephony), Limited (Telegraphy)	
Amateur Operators.	

Interested persons should communicate with the nearest Senior Radio Inspector for full details.

Broadcast Listeners' Licences

This is the type of licence which in recent years has obviously become the most popular one owing to the progress of the broadcasting services. There are several differences between this type of licence and the others. Broadcast listeners are not required to sign any document as in other cases and the licence fee is on a different basis. In all other cases the licence fee is a nominal amount, sufficient to defray the administrative costs incurred by the Department.

In the case of Broadcast Listeners' Licences, however, the fee includes not only the administrative costs but also an amount forming a method of payment for the services which the listener receives, which may be described as a subscription to the service. Only a small portion of the licence fee covers the administrative costs, the far greater part being what might be termed the subscription fee.

The annual fee of 21/- for Broadcast Listeners' Licences applies to all listeners situated within an area of about 250 miles from a National Broadcasting Station; that area is known as Zone 1. Outside that area, in Zone 2, the annual fee is 15/- per annum.

The licence fee is divided between the Australian Broadcasting Commission which receives 12/- for the provision of programmes, and the Postmaster-General's Department which retains the balance for:—

- the provision of the technical services of the National Broadcasting Stations (installation, erection and operation);
- the inter-connecting telephone circuits between the various National Stations;
- other technical services, including the investigation of radio inductive interference and research; and
- administrative costs in connection with the issue and recording of licences.

Despite the obligation on listeners to obtain a licence, it is unfortunately necessary for the Department to maintain a permanent staff in each State for the purpose of locating unlicensed listeners. When these listeners are detected they are brought before the Police Magistrates and during the year 1934 there were more than 2,800 convictions for this offence.

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OCTODE EQUIPPED

DUAL WAVE MODELS

LICENSE POCKET

NEW CABINETS

A COMPLETE RANGE

PHILIPS

"FOR GREATER PROFITS"

Payment of Listeners' Licence Fees By Postage Stamps

Provision may be made for the payment of broadcast listeners' licence fees by purchasing postage stamps and affixing them to cards which are provided for the purpose. The following notes, printed on the back of the card, state the conditions under which the Department permits licence fees to be paid in this manner—

Postage stamps not otherwise used or defaced, of an individual face value of 6d. or more, when affixed in the spaces provided on this card, will be accepted at any Post Office Licence Issuing Office in partial or full payment for a new listener's licence or for the renewal of an existing licence.

Stamps to the value of more than 21/- should not be affixed to this card.

This card does not take the place of a listener's licence, and, even if it contains stamps to the value of a licence, it is illegal to use a receiving set until the actual licence has been obtained.

If, after certain stamps have been affixed, the owner of this card does not wish to purchase a broadcast listener's licence, the stamps so affixed will be re-purchased at the G.P.O. in any State, but a discount of 10% (minimum 2d., maximum 2/-) will be charged.

No wireless set may be used until the user is actually in possession of a Broadcast Listener's Licence.

Free Broadcast Listeners' Licences for the Blind

Broadcast listeners' licences are issued free to any blind person over the age of 16 years. These licences are granted to—

- (a) blind pensioners;
- (b) blind soldiers in receipt of a pension;
- (c) any other person over the age of 16 years on production of a Certificate from a qualified medical practitioner stating that he or she has no useful vision.

Forms of application may be obtained from the Senior Radio Inspector.

Radio Inductive Interference

The department endeavours to give as much service as possible to broadcast listeners and one of these services which has received special attention during recent years is that of the investigation of radio inductive interference. This form of disturbance to broadcast reception has unfortunately increased, with the introduction of receivers obtaining their power from the house lighting system and the Department has energetically extended its activities in combating the nuisance. Specially qualified Radio Inspectors in each State undertake the investigation of complaints received from groups of listeners in different localities. The investigations have been responsible for considerable success in determining the cause of the interference and in almost every case it is possible for the Inspectors to demonstrate the method of eliminating or reducing the interference by the installation of suppressors.

The installation of the suppressing equipment, which is comparatively inexpensive, is obviously not a responsibility of the Department. The cause can be diagnosed, the curative measures to be taken can be demonstrated and it only remains for the owners of the offending electrical equipment to take the necessary steps to instal the suppressors. While in many cases the Department gladly records the co-operation which has been afforded by electric authorities and private owners of offending equipment, it is unfortunate that in some cases the desired co-operation has not been forthcoming.

Radio dealers can be of great assistance in this connection, particularly in country districts where they are familiar with the conditions and have business or other contacts with the listeners and the owners of electrical equipment. By a recognition of a reasonable community spirit, the co-operation could be fostered by the tactful action of radio dealers, whose interests, of course, would be served by listeners generally being more satisfied with their broadcasting services.

The Department is anxious to hear from listeners who are experiencing any trouble in connection with radio inductive interference and invites them to inform the Department of their conditions by filling in a Wireless Reception Questionnaire Form, obtainable from any Post Office, and sending it completed to the Senior Radio Inspector. In every case the Senior Radio Inspector communicates with the complainant and it is pleasing to note that in most cases a satisfactory result has followed.

The Department has augmented its staff to enable the ever-increasing volume of complaints to be handled expeditiously. Over 6,600 cases were reported by listeners last year and received attention.

Demonstrations by Radio Dealers

A broadcast listener's licence obtained by a radio dealer in respect of a particular address does not entitle the dealer to demonstrate or in any other way use a receiver in the home of a prospective buyer. This is a point which many dealers have overlooked. The Department, however, has always endeavoured to assist radio dealers in the conduct of their business, recognising that the radio trade has a very important part to play in the development of broadcasting.

It is recognised that the dealers must give demonstrations away from their shops and the Department grants the concession of allowing these demonstrations to be conducted without the obligation of obtaining a licence. The conditions under which these special arrangements can be made may be learned by consultation with the Senior Radio Inspector. Generally, it is the practice to permit a demonstration period of three days in the metropolitan area and one week in country districts.

The Department has been reluctantly compelled to take action against several dealers who failed to comply with its conditions covering the demonstration of receivers. In some instances receivers were seized and forfeited to the Commonwealth.

Radio Inspectors' Addresses.

The addresses of the Senior Radio Inspectors in each capital city are as follows:—

Sydney: Mr. W. T. S. Crawford, Haymarket Post Office Chambers, 635 George Street, Phone: BY 040.

Melbourne: Mr. J. M. Martin, Treasury Gardens, C.2, Phone: Central 5551.

Brisbane: Mr. T. Armstrong, General Post Office, Phone: BY 8371.

Adelaide: Mr. H. W. Harrington, Pirie Chambers, Pirie Street, Adelaide Phone: Central 6100.

Perth: Mr. G. A. Scott, General Post Office, Phone: B 6023.

Hobart: Mr. E. J. G. Bowden, Telephone Buildings, Harrington Street, Phone: (Prefix not used in Hobart) 5081.

Full particulars relating to Departmental Wireless Matters can always be obtained from any of the Senior Radio Inspectors listed above.

RADIO REVIEW OF AUSTRALIA

A technical Journal incorporating proceedings of the Institution of Radio Engineers, Australia, and the progress of radio in Australia.

SUBSCRIPTION FORM

.....193

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Herewith please find Postal Note for 10/- being my subscription to "Radio Review" for the next 12 issues, post free.

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Technical Progress in Radio Broadcasting in Australia

An account of the activities of the Post-Master General's Department in the Radio Broadcasting Field in Australia

Introduction.

THE Australian system of broadcasting is unique in that it allows for a National undertaking and private enterprise to function side by side. The success of the arrangement may be gauged from the fact that there are over 700,000 licensed listeners and a licence density which is exceeded by few countries in the world.

The National Service is financed from listeners' licence fees and is intended to supply satisfactory reception of at least one National Station throughout the Commonwealth. The commercial stations rely on advertising for their revenue. They are licensed by the Postmaster-General's Department.

Technical Activities of the Department.

The Postmaster-General's Department has important functions in connection with the technical aspect of broadcasting. It provides the technical services for the National stations and, as the Department administering the Wireless Telegraphy Regulations, it controls the operations of the commercial stations.

The Department's activities, insofar as the National Service is concerned, include the following:

- (a) Provision, maintenance and operation of the technical equipment at the stations and studios.
- (b) Provision of the necessary networks of lines for the simultaneous transmission of programmes through the various stations.
- (c) The investigation of developments in other parts of the world, so that no new features are overlooked which can, with profit, be adapted to Australian conditions.

Development of National Service.

In 1929 a basic plan was prepared, having as its aim the provision of sufficient stations to ensure satisfactory reception in all but the very sparsely populated districts of the Commonwealth.

That plan is gradually being brought into operation. Unfortunately, progress towards completion of the scheme has been slow owing to the state of the country's finances, but a substantial forward move is now being made, and eight additional stations will soon be in operation, bringing the total to twenty-one. Particulars of the existing and projected stations are published herein.

Station Sites.

IN the planning of a new station, the greatest care has to be taken in the choice of suitable sites. This involves the use of portable transmitting and measuring equipment. The transmitter is operated from each of a number of sites, and the resulting field strength is measured at various points in the area which the proposed station is designed to cover. The results are tabulated and studied in conjunction with other data, such as that relating to the availability of power supply, etc., so that the location finally selected may be the most suited to ensure the maximum possible service area, free from fading, and the highest possible signal to noise ratio.

Operation and Maintenance of Studios and Stations.

THE technical equipment of stations and studios of the National Service is, as aforesaid, provided by the Department, the Australian Broadcasting Commission being responsible for the provision of the studio accommodation. The technical equipment is constantly being added to and replaced to conform with the latest standards.

With the increasing use of programmes originating at points outside the studios, the facilities for the smooth changing over from point to point, many of them many hundreds of miles apart, has become of very great importance, and considerable investigation has been made into the most satisfactory methods to adopt. The procedure which has been laid down involves the most careful timing of items where switching is done in conformity with a time table, where items are synchronised to the second and where, in addition, cue words are adopted in order that the various members of the staff who are involved in the transmissions may be informed of the progress of the transmissions from time to time.

Equipment has been added to facilitate auditions and rehearsals, and also to assist the dramatic production of studio plays, etc.

It will be appreciated that in the operation of a National System, where so many stations are constantly being brought together for the simultaneous broadcasting of important items, the utmost co-operation is required between the members of the staff of the Commission and the Department's officers. The many problems which have arisen have been handled by the two staffs in the most cordial manner and mutually satisfactory solutions have been found.

Perhaps one of the most important of the matters which have been under investigation during the past year has been the determination of the most satisfactory type of microphone for use for particular types of service and the placement in the various studios and halls used by the Commission. Many new microphones of the moving coil type and of the ribbon type have been added to the plant during the year.

The maintenance of studios and stations is carried out in accordance with a strict procedure designed to ensure that no part of the plant is overlooked, and that breakdowns due to negligence shall not occur. This maintenance procedure has been carefully reviewed during the year, and a system of recording and analysing all interruptions to service has been developed. The causes of all faults are determined, and all recurring troubles are followed up, in an effort to remove from the plant any inherent weaknesses due to design or types of equipment.

The Department has introduced a training scheme for mechanics who are employed in stations and studios. Juniors who are taken straight from school are given a thorough training for a period of five years in all branches of the technical side of telephone and radio work. Subsequently, before the trainee is employed as a mechanic in a studio or station, he is required to pass an examination testing his qualifications. It will be appreciated, therefore, that with such a method of staff recruitment a very high standard in personnel is ensured.

Lines from Studios to Stations.

THE lines used for the transmission of programmes from studios to the broadcasting transmitters have received considerable attention during the past year. The lines had originally been designed to transmit frequencies from 35 cycles per second to 5,000 cycles per second, but it was considered that such frequency range was not in conformity with modern standards. These lines, in the case of stations close to the cities, are generally in underground cables, and have a rising attenuation characteristic with increase in frequency. As a result of measurements, it was ascertained that in practically all cases it would be practicable to re-design the equalisers to provide for the transmission of a band of frequencies from 35

TECHNICAL PROGRESS—

(Continued from Page 49)

cycles per second to 8,000 cycles per second, and this has now been completed.

In the case of lines to certain of the regional stations situated at considerable distances from the studios, the problem is more difficult of solution. Many of these lines are equipped with filters having cut-off frequencies between 5,000 and 6,000 cycles in order that the lines may be used with carrier telephone systems superimposed. The work of conversion to the wider frequency band is continuing, however, and will be proceeded with until all stations are provided with the wider frequency band programme transmission lines.

Lines and Equipment for Outside Broadcasts.

NOTABLE developments in the equipment at outside broadcasting points have resulted from the broadcasting arrangements during the visit of the Duke of Gloucester. The authorities in charge of the tour decided that when the Duke was broadcasting or speaking at any ceremony, one microphone only was to be used on the dais. It was further decided that the Department was to be responsible for the technical arrangements, and this involved the provision of microphone pick-up facilities for the following services:

- (a) Those broadcasting stations (national or commercial) transmitting the ceremonies.
- (b) The public address systems in use at the place where the ceremony was being held.
- (c) The sound recording systems; and
- (d) Other interested parties.

Two complete sets of equipment, suitably designed for the purpose, were built in the Departmental Workshops, Melbourne, and gave complete satisfaction throughout the tour. The first ceremony at which they were used was the landing of the Duke at Fremantle, W.A., and after being used in each of the other States in turn, they were used at the description of the farewell ceremonies when he left Brisbane, Queensland. Each set provided for switching in any one of the four microphones and ten separate outlets were provided. The programme from these outlets was then distributed as desired by the various parties who were taking part in the ceremony; those outlets used for broadcasting stations were subsequently again split up into many more outlets at the various trunk line terminating offices of the Department.

A further interesting development has been the design of portable ultra-short wave transmitters and receivers which are used to describe topical events from points where lines cannot be made available. Duplex arrangements are available, which render it practicable to speak from the receiving point to the announcer in order to give instructions for commencement, etc. The receiver is located at any convenient point and the programme, after reception at that point, is transmitted to the studio in the usual manner.

Interstate Relays.

THERE has been a considerable increase in the demand for interstate lines for the transmission of programmes. This has not been restricted to the National Service, as the commercial stations have also shown a definite tendency to form networks requiring provision by the Department of considerable plant to meet the peak demands.

Additional programme channels have been provided from Brisbane to Sydney, from Sydney to Melbourne, and from Melbourne to Adelaide. Further additions are contemplated in the near future, as requisitions for services are such that the present plant is proving inadequate. As an indication of the extent to which lines are used for these transmissions, it is not an uncommon occurrence to have as many as five channels in use simultaneously between Sydney and Melbourne during Saturday afternoons.

The quality of performance of the existing and new channels has been given very close attention, and during the year channels have been made available capable of transmitting frequencies from 35 cycles per second to 8,000 cycles per second, while work is proceeding to convert to this same standard other channels now operating on the frequencies from 35 cycles to 5,000 cycles.

A further technical improvement which is, perhaps, more noticeable to listeners, has been effected in the channels. Most of the channels now used for transmitting programmes have been so equipped that there is almost complete freedom from any background noise, so much so that it is generally not practicable for the listener to determine whether the programme he is listening to is coming from his local studio or is being transmitted over perhaps many hundreds of miles of line.

During the next few months, a telephone cable will be laid across Bass Strait from the Victorian coast to Tasmania. This submarine cable will be connected to land lines from Melbourne to Apollo Bay in Victoria, and from Stanley to Launceston and Hobart in Tasmania.

Recording and Reproduction of Programmes.

INVESTIGATIONS have been proceeding into the recording of programmes for subsequent reproduction. There are, of course, the well known wax disc and film recording methods available, but both methods suffer from the disability of requiring too long a time to elapse between the recording and the subsequent reproduction.

Several special material disc type recording systems were investigated, which allow for the immediate re-playing of the records, but none was found to meet the needs fully, although certain of them were found to be quite useful.

The steel tape method of recording of programmes, i.e., magnetic recording, has also been investigated and a recording machine capable of giving a playing time of 30 minutes has now been purchased. The quality of reproduction of the machine is much better than that of earlier types and it is anticipated that very considerable use will be made of the system in future.

Research.

THE Department has met this need by gathering together in its Research Laboratories a group of physicists, engineers and other officers specially qualified for this type of work. In these laboratories any developments giving promise of being useful in this country are tested, and local problems arising in the engineering, operation or maintenance of radio systems are investigated.

Separate premises, providing 16,500 square feet of floor space, have been set aside to accommodate the Research Staff and to house its equipment, valued at approximately £23,000. Upwards of 40 officers are continually engaged on various problems relating to radio and the other engineering activities of the Department.

In addition to the main laboratories housed at 69 Little Collins Street, Melbourne, there are two field laboratories used mainly for radio investigations; one at Mont Park and the other at Lyndhurst, both in Victoria. This portion of the Department's organisation dealing with broadcasting also maintains close contact with the Radio Research Board, a course designed to ensure the maximum of mutual assistance and to avoid any overlapping.

The bulk of the technical problems met with in broadcasting are basically similar to problems met with in modern telephone engineering, and are susceptible to attack along the same lines and with the same equipment as the latter. The association of the radio research and investigation work with the work already being done by the Department in connection with its telephone and telegraph services has, therefore, avoided unnecessary duplication of expensive equipment, and brought to the radio work research facilities on a scale which would not otherwise have been possible.

Short Wave Services.

IN March, 1934, a short wave broadcasting service was inaugurated from the Department's station, 3LR, at Lyndhurst, Victoria. This station was intended more particularly for reception in the interior of Australia, and reports indicate that it is providing a very satisfactory service in many places where reception of the stations in the normal broadcasting band is seriously marred by static. The station operates on a frequency of 31.3 metres.

Two types of aerial are employed, one which is only partly directive and is used during ordinary broadcasting transmissions, and a second aerial of the "Rhombic" type, which is directed on Great Britain.

The present hours for Station 3LR are: Monday to Friday 6.15 to 10.30 p.m., Saturday 1.30 to 10.30 p.m., but it is hoped to give more extended transmissions in the future.

TECHNICAL PROGRESS—

(Continued from Page 50)

The Department has a receiving station at Mont Park, Victoria, for the reception of short wave programmes from overseas stations. This station is equipped with directional receiving aerial, and is provided with a modern form of receiver, such as is used on long distance short wave telephone channels.

In collaboration with the British Broadcasting Corporation investigations have been proceeding in the endeavour to improve the transmission of programmes to Australia from the Empire stations at Daventry. Attention has been given to the matter of frequencies of transmission most suitable for use during the various hours of the day, and at present different types of transmitting aerials are being tested.

Tests have also been conducted with the League of Nations short wave station at Geneva (Radio Nations). Very successful transmissions are now being made and each reception at Mont Park has been rebroadcast over the National System.

Frequency Allocations.

UNDER the International Telecommunication Convention, the frequencies allotted for broadcasting purposes are those between 550 and 1500 kc/sec., and in certain instances 160 to 224 kc/sec. To date, in Australia, use has only

been made of the former band, with the result that some 91 channels are available to be shared by National and Commercial stations. The allocation of these channels requires constant and careful consideration. Geographically adjacent stations must be separated sufficiently in the frequency band to facilitate receiver design and avoid mutual interference, channels must be allotted so as to avoid heterodyne interference from broadcasting stations in Japan, China, New Zealand and other countries, and at the same time an equitable distribution of frequency as between the various States of the Commonwealth has to be preserved.

The revised frequency allocation recently published has been designed to meet the requirements named above, and it is hoped that, as a result, manufacturers of radio receivers, knowing that the allocation will remain in force for many years to come, will be able to design sets for particular purposes with greater freedom than has been the case in the past.

The measurement of frequencies of all stations throughout the Commonwealth is still performed weekly by the Research Laboratories of the Department. It is interesting to note that these measurements during the past twelve months have disclosed a very definite improvement in the frequency stability in most of the stations. Departures from the assigned frequencies are not nearly as great as they had been previously, although in many cases there is still room for improvement.

Communication Services of the Postmaster-General's Department

AUSTRALIA is a land of vast distances with a few widely separated rather densely populated areas of small extent and extensive territories carrying extremely small densities of population.

The area of the Continent is roughly 3 million square miles and its present population is about $6\frac{1}{2}$ millions, $3\frac{1}{4}$ millions of whom are resident in the six State capital cities. The average distribution of the remainder is therefore only one per square mile. To traverse the boundaries of the Continent one would have to travel 12,000 miles. A mental picture of these conditions is helpful in forming a conception of the nature and magnitude of the problem of providing comprehensive communication services. The problem is mainly one of economics resulting from the necessity to maintain long lines of communication—postal, telegraphic and telephonic—for the transaction of comparatively small volumes of business. Almost anything may be achieved if the cost need not be counted.

The Post Office has managed to establish mail services of so extensive a character that it is doubtful whether there is any locality permanently inhabited by so few as two or three white people which is not systematically served with letter delivery. Neither the telegraph nor telephone can claim to be so far-reaching, but as will appear later their ramifications are remarkably extensive.

The internal postal system depends upon scheduled despatches over 27,000 miles of railway and in addition makes use of 5,000 independent road services to localities which have not railway facilities. These road services are maintained under contract conditions and cover 130,000 miles of route. The frequency of the journeys varies in the aggregate from once daily to once a week with a comparatively small percentage extending to once a fortnight or slightly more. It will be realised, there-

fore, that the journeys during a year would total many millions of miles. Over the road routes mail matter is conveyed by motor vehicle, horse-drawn vehicle, on horse-back, pack-horse, and occasionally by camel. For many miles in the outlying parts roads are not available and somewhat indefinite tracks point the way.

Coastal vessels sailing over the entire circuit of the Continent are also used in the regular transportation of mails. A weekly air-mail service was inaugurated in December, 1934, to link up with the Imperial Airways Service between London and Singapore.

The air-mail services, including the Darwin-Singapore section, cover roughly 11,000 miles of route, the journeys over which total 1,500,000 miles per annum.

MAIL steamers provide a weekly mail service in each direction between Australia and the United Kingdom, these ships running to schedule so that they may effect connection with railway services and air services at various places both at the terminal ports and at intermediate calling places. Letters are landed at Fremantle and conveyed by rail to Adelaide (1,698 miles), Melbourne (2,181 miles), Sydney (2,771 miles), and Brisbane (3,384 miles).

The articles of mail matter posted in the Commonwealth total nearly 1,000,000,000 per annum and the incoming items from overseas which require distribution over the whole Continent reach over 38,000,000 per annum.

The telephone system comprises 492,000 telephones and apart from about 14,000 in Tasmania there is almost complete inter-communication over the whole Continent; a subscriber in Cairns, Queensland, can talk to a subscriber in Geraldton, Western Australia, over lines 4,800 miles in length, possibly a world's record for a continuous land-line circuit.

COMMUNICATION SERVICES—

(Continued from Page 51)

Four hundred million local and 30 million trunk line calls are established annually through 6,000 telephone exchanges by the use of $2\frac{1}{2}$ million miles of wire.

The aerial lines are supported by 25 million insulators carried on 3 million poles.

199,000 telephones are provided with dials and connected to automatic exchanges.

The capital value of the telephone equipment and buildings is £44,000,000.

Direct radio telephone services are established from Australia to the United Kingdom, to New Zealand and to Java. There are few places in the world to which it is impossible to telephone from Australia. Out of a total of 35 million subscribers in the world 92 per cent. are in countries accessible to Australian subscribers and in addition it is possible to telephone to passengers aboard transatlantic liners whilst on their journey between England and the United States.

The telegraph service is conducted from 10,000 offices inter-connected by 169,000 miles of circuit. It deals with 15 million telegrams per annum. Like the telephone service it has been completely modernised and uses every device which will aid in securing speedy and accurate service with lessened cost. Automatic direct printing telegraph apparatus is used extensively and long distance circuits, such as Perth to Sydney (2,770 miles), are equipped with this system. The typing of a message on a typewriter keyboard in Perth results in an almost simultaneous replica being produced in Sydney.

Carrier circuits which are derived by impressing a continuous train of moderately high frequency electrical oscillation on a metallic circuit have been established extensively for both telephone and telegraph purposes with great benefits from the technical, traffic and economic aspects. The various technical methods of providing for the simultaneous transmission of a number of messages over one metallic circuit have been exploited to the utmost. As a case in point, over one pair of wires between Sydney and Melbourne 36 telegrams are transmitted by machine printing system simultaneously with a telephone conversation. If the traffic offering were sufficient to warrant more carrying capacity the output could be increased to 88 telegrams and one simultaneous telephone conversation.

Pictures of high quality are also transmitted over 600 miles of carrier circuit between Melbourne and Sydney and it is possible for a photograph of, say, a Melbourne Cup to be available in Sydney within about an hour of the running of the race.

Broadcasting services also are of an extensive character. They are divided into two groups. One comprises the national service—Government owned—the programmes being supplied by the Australian Broadcasting Commission and the technical services by the Post Office, the other consisting of licensed stations operated by private enterprise. There are eight national stations in the capital cities and four in the country areas. The number of regional stations in the country areas will be added to substantially in the near future. These stations form a network designed to provide

extensive coverage and on completion of the scheme will be sufficient to service effectively about 95 per cent. of the total population.

The land-line telephone circuits have been equipped to make them suitable for broadcasting transmissions, and any desired grouping of broadcasting stations can thus be arranged for the simultaneous radiation of any particular programme. From the Rockhampton station in Queensland to the Perth station in Western Australia the circuit distance is 3,800 miles and on several occasions programmes have been simultaneously broadcast at these extreme distances with many other of the intermediate broadcasting stations transmitting the same programme at the same time.

The privately-owned group consists of 46 broadcasting stations which are distributed in the more densely populated areas of the Commonwealth. Frequently, by mutual arrangements amongst the managements of a number of these stations, extensive simultaneous broadcasting is effected. In a recent instance there were no less than 42 privately-owned stations simultaneously transmitting by means of the Post Office telephone trunk system an opera from one of the Melbourne theatres.

The Post Office employs 42,000 people to conduct its postal, telephone, telegraph and radio activities. In 1933-34 its working expenses were £9,200,000, and its earnings £13,200,000, and its turnover £140,000,000. The capital value of fixed assets and plant on 30th June, 1934, was £53,500,000.

RATES OF POSTAGE

Within the Commonwealth and to Lord Howe Island, Norfolk Island, Papua, the Territory of New Guinea, and the following islands in the Pacific, viz.: Bismarck, Archipelago (New Britain, New Ireland, New Hanover, Admiralty Islands, etc.), Nauru, Bougainville, and Buka (Solomon Islands).

Letters and Letter-Cards—2d. per oz.

Postcards—1½d. each.

Second-Class Matter—(a) Commercial Papers, Patterns, Samples and Merchandise, 1d. per 2 oz., (b) Printed Matter (comprising Printed Papers, Circulars and Catalogues, and Books, Periodicals and Newspapers not registered at a General Post Office), 1d. per 4 oz.

NOTE.—Commercial Papers include partly printed routine communications as prescribed, and formal documents such as accounts, invoices, etc.

Printed Matter includes wholly printed communications such as acknowledgments of the receipt of correspondence, orders or remittances, and notifications of the despatch of goods, etc., also catalogues containing samples of material subject to prescribed conditions.

Permit Mail, i.e., large quantities of circular letters posted in sealed envelopes under permit previously obtained—Printed matter rate plus special fee of ½d. per article.

Third Class Mail Matter (comprising books, periodicals and Newspapers registered at a General Post Office for transmission as such)—1d. per 6 oz.

Beyond the Commonwealth.—Letters and Letter-Cards. To places within the British Empire, and to New Hebrides, Banks and Torres Islands—2d. per oz.

To all other places—3d. first oz., 2d. each additional oz.

Postcards—To places within the British Empire and to New Hebrides, Banks and Torres Islands—1½d. each.

To all other places—2d. each.

Commercial Papers—To New Zealand and the islands annexed thereto, and Fiji—1d. per 2 oz.

To all other places—1d. per 2 oz., with a minimum of 3d.

Printed Matter—To places within the British Empire, and to New Hebrides, Banks and Torres Islands—1d. per 4 oz.

To all other places—1d. per 2 oz.

Newspapers—To New Zealand and the islands annexed thereto, and Fiji—1d. per 6 oz.

To the United Kingdom and Irish Free States via France or America—1d. per 4 oz.
via All Sea Route—1d. per 6 oz.

To all other places Printed Matter Rates apply.

Samples—To places within the British Empire, and to New Hebrides, Banks and Torres Islands—1d. per 2 oz.

To all other places—1d. per 2 oz., with a minimum of 2d.

Merchandise—To New Zealand and the Islands annexed thereto, and Fiji only—1d. per 2 oz.

Small Packets (transmissible to certain countries only)—2½d. per 2 oz., with a minimum of 6d.

Postal Notes—1/- to 2/6, 1d.; 3/- to 4/6, 1½d.
5/- to 7/6, 2d.; 10/- to £1, 3d.

Existing Australian National Broadcasting Stations

Station. 1.	Approximate Location. 2.	Frequency kC. 3.	Wavelength m. 4.	Power Watts (a) 5.	Service Commenced (b) 6.
2BL, Sydney	Coogee, 4½ miles S.E. of G.P.O.	855	351	3,000	13. 11. 1923 (22. 7. 1929)
2CO, Corowa	3½ miles N.N.E. of P.O., Corowa.	560	536	7,500	16. 12. 1931
2FC, Sydney	Pennant Hills, 11¼ miles N.W. of G.P.O.	665	451	3,500	5. 12. 1923 (17. 7. 1929)
2NC, Newcastle	Beresfield, 11½ miles W.N.W. P.O., Newcastle.	1,245	241	2,000	19. 12. 1930
3AR, Melbourne	North Essendon, 8 miles N.W. Eliz. St. P.O.	610	492	4,500	26. 1. 1924 (8. 8. 1929)
3LO, Melbourne	Braybrook, 5¾ miles W. Elizabeth Street P.O.	800	375	3,500	13. 10. 1924 (22. 7. 1929)
4QG, Brisbane	25 chains S.W. of G.P.O.	760	395	2,500	27. 7. 1925 (30. 1. 1930)
4RK, Rockhampton	6 miles S.W. of P.O.	910	330	2,000	29. 7. 1931
5CK, Crystal Brook	2½ miles N.E. of P.O.	635	472	7,500	15. 3. 1932
5CL, Adelaide	Brooklyn Park, 3¼ miles W. of G.P.O.	730	411	2,000	20. 11. 1924 (14. 1. 1930)
6WF, Perth	7 miles N. of G.P.O.	690	435	3,500	4. 6. 1924 (1. 9. 1929)
7ZL, Hobart	Radio Hill, 1¾ miles S.W. of G.P.O.	580	517	1,000	17. 12. 1924 (14. 12. 1930)
3LR, Lyndhurst	5 miles from Dandenong.	9,580	31.31	600	March, 1934)

(a) Column 5—indicates unmodulated aerial power.

(b) Stations 2BL, 2FC, 3AR, 3LO, 5CL, 6WF and 7ZL were formerly operated by private enterprise under licence granted by the Postmaster-General. 4QG was formerly operated under licence issued to the Queensland Government. These stations were transferred to the N.B.S. on the dates shown in brackets.

(Projected National Stations continued on Page 54)

Projected National Stations

Call Sign.	Location.	Power in Aerial (Unmodulated Carrier)		Frequency kC/s.	Wavelengths m.
		Initially kw. 3.	Ultimately kw. 4.		
1.	2.			5.	6.
2CR	Cumnock, near Dubbo, N.S.W.	10	60	550	545
2NR	Lawrence, near Grafton, N.S.W.	7	30	700	429
3GI	Longford, near Sale, Vic.	7	30	830	361
3WV	Near Horsham, Vic.	10	60	580	517
4QN	Clevedon, near Townsville, Qld.	7	30	600	500
6GF	Kalgoorlie, W.A.	2		720	417
6WA	Minding, near Wagin, W.A.	10	60	560	536
7NT	Kelso, near Launceston, Tas.	7	30	750	400



AN AUSTRALIAN RADIO FACTORY—where over 800 broadcast receivers are made per week.

[Photo by Courtesy of Amalgamated Wireless (A/sia) Ltd.]

The Long Distance Telephone System-- Its Relation to Broadcasting

THE growing popularity of radio broadcasting as a means of entertainment, and the establishment of broadcasting stations in various localities throughout the Commonwealth, have given rise to the need for inter-connecting facilities so that programmes of general interest being radiated from one station may be simultaneously transmitted by others.

The most satisfactory means of effecting transmissions of one programme simultaneously in various parts of the Commonwealth is by the utilisation of the telephone trunk line service which, by the adoption of the latest scientific developments, has been brought to a high standard of efficiency. The trunk line system is now in daily use for broadcasting purposes, and if such facilities were not available many events of outstanding importance or unusual interest would reach only those listeners within the normal range of the station transmitting the particular event.

The first simultaneous broadcast of a really National character involving the use of trunk lines took place about August, 1925, when a transmission from Melbourne to Sydney, Brisbane and Adelaide was effected. What was then a unique event has now become a happening of almost hourly occurrence.

The utilisation of telephone trunk lines in connection with broadcasting has created many complex problems from the engineering standpoint. Telephone trunk lines channels are normally designed for two-way telephone speech, but, when required for broadcasting, the characteristics of these circuits must be changed completely to permit of the highest quality transmission in one direction only of both speech and music. To make these circuit changes, a special and highly skilled staff must be provided which is capable of making the adjustments to the many pieces of delicate apparatus employed in the circuits used. As an example, when stations in the five Mainland States of the Commonwealth are linked together for a simultaneous broadcast, highly trained officers are required at Perth, Merredin, Kalgoorlie, Rawlinna, Cook, Tarcoola, Port Augusta, Gladstone, Adelaide, Bordertown, Ararat, Melbourne, Wangaratta, Wagga, Goulburn, Sydney, Maitland, Tamworth, Glen Innes, Warwick, and Brisbane.

The preparation of telephone circuits, or the "lining up" as it is known, is controlled by experienced technical officers from specified points known as "zone controls," and the circuit changes have so to be arranged that after each zone is proved out the whole network of stations concerned is brought together and tested out in time for the broadcast to commence to schedule.

The substantial increase which has taken place in the number of occasions on which telephone trunk lines have been used for broadcasting purposes during the last three years is evidenced by the following figures:

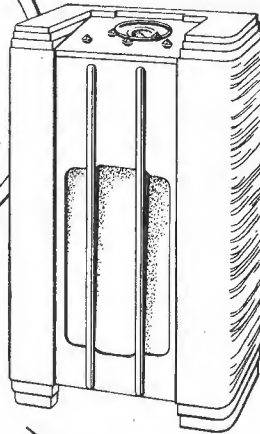
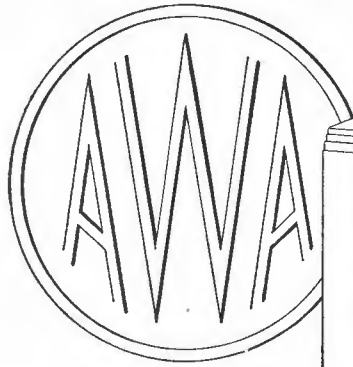
Year ended	No. of transmissions over trunk lines
December, 1932	2,118
" 1933	3,478
" 1934	7,679

The total mileage of trunk line channels involved in the hook-up of National Stations in the five Mainland States is 4,400, and the capital value of the plant employed on each occasion that such a hook-up is arranged approximates £270,000. The aggregate length of line used for all relays during 1934 was about four million miles, trunk line channels being occupied in connection with the transmission of programmes for about 15,000 hours.

The largest number of broadcasting stations which have been linked together for simultaneous broadcasts in Australia is forty-seven which involved the use of over 11,000 miles of trunk line. Probably the most interesting of the simultaneous broadcasts which have taken place here are the Christmas Day Empire programmes arranged in conjunction with the British Broadcasting Corporation, listeners throughout the length and breadth of Australia being able to participate in the pageant of Empire over the air. Every type of musical programme, however, has been transmitted over these channels in addition to descriptions of all sorts of sporting events and talks on almost every subject.

Of the total programmes relayed over trunk lines during 1934, 1,351 involved broadcasting stations in two States, 651 went to three States, 426 to four States, and 345 to five States, whilst the remaining 4,906 concerned only stations in the State where the programme originated.

Whilst the National Stations are not concerned with advertising, this important phase of our commercial life forms a big feature of the operation of licensed broadcasting stations. In order that advertisements may cover a wide field, it is the common practice now for licensed broadcasting stations in different States and different country centres to be linked together regularly for the transmission of programmes of various types sponsored by commercial firms, and in this direction the requests for the use of trunk lines are daily becoming more numerous. Although the field for National radio advertising is considerably limited in the Commonwealth when compared with some of the more thickly populated countries overseas, it is felt that in the future there will be a gradually increasing realisation of the value of this medium and that the Department will be called upon to handle a substantially greater number of requests for such services than has been the case in the past year or two.



**Australia's
Finest
Broadcast
Receiver**
*manufactured in
Australia's largest
Radio - Electric
Works*

The
FISK RADIOLA

MANUFACTURED AND GUARANTEED BY AMALGAMATED WIRELESS (A/SIA) LTD.

Beam Wireless — A Great Australian Service

Spanning the gap between Australia and Great Britain is the longest telegraph service in the world, yet the means of communication are invisible, being an unseen track through the intangible ether.

The Beam differs from other forms of wireless communication inasmuch as it concentrates the rays of energy bearing the message in a particular direction, very much in the same way as a searchlight projects a ray. Such a system has the advantage of conserving the power used and not dissipating it in every direction.

The possibilities of a Beam system were investigated early by Mr. E. T. Fisk, Chairman of Amalgamated Wireless, who, working in collaboration with the Marchese Marconi on the other side of the world, realised the great advantages of such a method. Indeed, it was one of several main objectives towards which Mr. Fisk was directing his scientific and organising ability. Seven years ago the Beam was brought into operation by A.W.A.

To Most Parts of the World

To-day anyone can enter the Beam Offices at Sydney or Melbourne or any Post Office in the Commonwealth and lodge a message via Beam to even the remote places of the earth—to Esthonia or Finland 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. Day and night messages are being despatched direct by Beam to Great Britain and Canada, whence they are relayed to surrounding countries as required.

It was on April 8th, 1927, that the Beam Wireless Service between Australia and Great Britain was opened for commercial traffic, and on June 16th, 1928, the service from Australia to North America was instituted. The latter service provided not only communication with the New World but also a second link with England and the Continent via the Montreal-London Beam circuit.

Travelling by electrical impulse, the Beam Wireless messages actually bridge the gap between Australia and England in about one-seventh of a second. The messages are usually sent by mechanical means at the rate of about 1250 letters per minute. The Beam Offices in Sydney and Melbourne are open for traffic day and night.

Automatic Transmissions

The Beam Wireless transmitting centre in Australia is located at Fiskville, about fifty miles north-west of Melbourne, and the receiving centre is at Rockbank, thirty miles from Fiskville. Both stations are connected by special telegraph lines with the Beam Wireless Offices of Amalgamated Wireless at Melbourne and Sydney. At Fiskville there are three transmitters. One is used for sending messages to England, another transmits to Montreal all messages for North and South America, and the third for the transmission of pictures or messages. A great deal of the equipment is in duplicate,

some in triplicate, to insure continuity of service under all conditions. Each station is supervised by a technical staff. The transmission of messages originates at the Beam Offices at the heart of Melbourne or Sydney. The telegraph operators at these centres, working with special telegraph lines to the Beam station, automatically cause the transmitters at Fiskville to radiate the messages. Incoming messages from London or Montreal are received at Rockbank and automatically pass on to the telegraph centres at Sydney or Melbourne, where they are recorded on tape.

As the messages are lodged at the Post Offices throughout the Commonwealth or at the Beam Offices they are passed on in a continuous stream to telegraphists who are seated at machines resembling typewriters. Actually these machines are high-speed automatic perforators. As quickly as an expert types, the messages are transcribed by this machine, but instead of recording them in letters of the ordinary alphabet, the machine punches in the form of a series of small perforations on paper tape about half an inch wide, similar to music rolls in player pianos. There is a distinctive series of perforations corresponding to ordinary Morse character to each letter. The rate of transmission is much greater than the rate at which an operator can work a perforating machine, and it is therefore necessary to keep several operators employed punching tape to satisfy the speed of transmission.

The tape after being punched is passed through an automatic transmitter at high speed and the signals are picked up by the Beam receiving station at Skegness, England, or Yamachiche, Canada, and relayed to London and Montreal respectively, where they are recorded by machines.

The A.W.A. Beam Wireless Picturegram Service

Pictorial reproduction is playing an ever-increasing part in modern business and the Picturegram Service will undoubtedly mean a vast expansion in the usefulness of pictures of all kinds.

The A.W.A. Beam Wireless Picturegram Service between Australia and Great Britain and the Continent, which was opened for commercial traffic on 16th October, 1934, provides an entirely new and speedy facility to the Australian business man. It saves at least a month in the delivery of important rush documents and pictures as compared with the usual time-consuming mail routes. It enables all documents and printed and typewritten matter to be transmitted rapidly and accurately.

It enables business transactions in which photographs, drawings, plans or signatures are concerned to be carried out with almost the same facility that obtains in telegraphic communications. Pictures of events occurring in Australia to-day can be speedily transmitted to England and published within a few hours. It provides new avenues for business enterprise in the featuring of illustrations.

Radio and Television Patents

The Transactions of 1934

COMPARED to the previous year, 1934 was a period of peace and quietness in patent matters.

The acceptance of a licence by the manufacturers and the amalgamation of the main patent holding groups brought into being a state of affairs which although it may not be entirely satisfactory to all parties at any rate succeeded in establishing the patent situation on a fairly secure foundation and enabled all parties to proceed with their main business without fear of immediate distracting complications. The unhappy experiences of 1933 are now well on the way to being forgotten, but whether or not the lesson that should have been learnt during the turmoil will be usefully applied is a matter that only time can tell. There are indications that in the future a similar situation cannot occur again.

During 1934 the Commonwealth Patent Office accepted 286 applications for patents relating to radio and television circuits and apparatus and other arrangements which might be fairly considered to have some bearing on these subjects. Brief particulars of these, summaries of their countries of origin and the patentees are set out in the lists and tables attached hereto.

Compared to 1933 the acceptances increased from 178 to 286, a substantial gain. Radio circuits, etc., rose by 67 to 176, television arrangements from 35 to 48 and other apparatus from 34 to 62. As a supplier of inventions the United States again took pride of place, increasing its contribution from 76 to 144. England, which last year came forward with 43 only added six and fell back into third place, Germany increasing its total by 35 to contribute 66, next in order to the U.S.A. Australia's meagre effort was only 11, a falling off of two, but the other countries of the world increased their figures from five to 16.

The Marconi Company, which drew on both England and the U.S.A. for its ideas, was again by far the largest individual patentee although its proportional increase was only about half of that of the Telefunken Co. The former concern increased its contribution from 95 to 133, but the Telefunken quota grew from 29 to 63. The International General Electric Co. Inc. only increased its total by one, but the Hazeltine interests nearly doubled their activities.

The disquieting factor in these figures is the poor showing made by Australia. The grand total grew by 60 per cent., but this country's efforts, small as they were the previous year, fell away by 15 per cent. If patent applications are any indication of the technical progress and research carried out by an industry the Australian radio industry's efforts in this respect are practically negligible.

The transactions show that the domination exercised by overseas countries and by the A.R.T.S. group in technical progress which has been so apparent in recent years has not diminished, but is in fact increasing. The smallness of numbers of local applications may perhaps be excused when consideration is given to the fact that there are a vastly greater number of research workers

and laboratories in other countries, but the type of invention is not encouraging, a large proportion of the inventions which originated here being concerned with more or less minor and unimportant aspects of receiver design and construction.

The policy of protecting every invention is still being followed up by the patent holding concerns who continue to amass a considerable number of patents. Their right to do this cannot be disputed as they are fully entitled to take whatever steps they deem necessary to protect the fruits of their investigation and to obtain a return for the expenditure incurred. The only thing that the patent user can do is make as sure as he can that when he is called upon to contribute royalties he is not paying more than a fair price. If he is to make sure that such is not the case he must supply himself with all the information he can relating to patents, past, present and future so that when a discussion as to royalties arises he may be able to deal with the matter at least intelligently and not find himself in a bewildering maze of technicalities.

Sooner or later the commercial application of television must be seriously considered by radio manufacturers. When that time comes a "patent situation" will unavoidably arise. In England it has apparently arisen because the report of the Television Committee appointed by the British Postmaster-General says among other things "the present position is difficult; the number of patents relating to television is very large and in regard to many of them there are conflicting views as to their importance and their validity." The Committee states that it is right that inventors and concerns who have devoted time and money to research and experiment should gather the fruits of their labour and further that the growth of a new industry should be encouraged as freely as possible. It suggests that the ideal solution is a patent pool, in which all television patents should be placed, but that because of the doubt as to the relative value of the numerous television patents the formation of such a pool is not possible at the moment.

A situation of this sort will arise in Australia and there will be the same doubt as to the value and validity of television patents. Radio manufacturers have two courses open to them. They may, as they have done until recently, cheerfully forget all about patents and then when a demand is made rush round and make whatever arrangements they can.

Alternatively, they may carefully observe what has been done and will be done in regard to television patents, collecting information and assessing the practical values of such patents as are in force or may come into force so that when the time does come for the matter of royalties to be discussed they may at least meet the patent holders on equal terms and determine the matter intelligently and equitably. If the lessons of the past have been fully learnt this latter proceeding will be followed.

PATENTS—RADIO & TELEVISION TRANSACTED DURING 1934.

SUMMARY

Countries of Origin

	U.S.A.	Eng.	Ger.	Aust.	Others	Tl.
Radio	99	25	38	2	12	176
Television	22	15	11	—	—	48
Miscellaneous	23	9	17	9	4	62
Totals	144	49	66	11	16	286

Ownership

	Radio.	Tele- vision.	Miscell.	Tl.
Marconi Co.	93	30	10	133
Telefunken Co.	38	11	14	63
I.G.E.	10	—	—	10
Hazeltine Corp.	10	—	1	11
N. V. Philips' Gloeilamp- penfabrieken	6	—	1	7
Amalgamated Wireless (A/sia.) Ltd.	5	—	1	6
Sundry	14	7	35	56
Totals	176	48	62	286

Radio Circuits

Marconi Wireless Telegraph Co. Ltd.

No.	Subject.	Country of origin
10590/32	Aerial systems, supplying power to lamps	England
10761/33	Ultra short wave receiver	U.S.A.
10764/33	Carrier transmission systems (phase modulated)	U.S.A.
10836/33	A.V.C. in receivers	U.S.A.
11119/33	A.F. amplifiers	U.S.A.
11189/33	Crystal controlled oscillators	U.S.A.
11190/33	Super-regenerative circuits	U.S.A.
11220/33	Automatic gain control	U.S.A.
11255/33	Piezo-electric oscillator	U.S.A.
11272/33	Auto-alarm devices	England
11287/33	Push-pull amplifier	U.S.A.
11347/33	Relaying signals	U.S.A.
11503/33	Direction finding apparatus	England
11519/33	Communication system	U.S.A.
11520/33	Barkhausen-Kurz short wave oscillators	England
11578/33	Oscillators	U.S.A.
11581/33	Oscillation generators	U.S.A.
11689/33	Superhet. receivers	U.S.A.
11690/33	Oscillatory system	U.S.A.
11691/33	Oscillation generation	U.S.A.
11693/33	Transmission systems	U.S.A.
11694/33	Oscillation generators	U.S.A.
11790/33	Transmission lines	U.S.A.
11791/33	Facsimile telegraph system	U.S.A.
11819/33	Selection means	England
11860/33	Transmission	England
11869/33	Phase modulated transmission systems	U.S.A.

11951/33	Oscillation generators	U.S.A.
11952/33	Short wave communication	U.S.A.
11953/33	Multiplex telegraphy	U.S.A.
12056/33	Amplifiers, gain constant	U.S.A.
12055/33	Valves and amplifiers, relays or multipliers	U.S.A.
12103/33	Receivers for use near internal combustion engines	England
12201/33	Aerials for use on short waves (directional)	England
12259/33	Modulated wave transmitters (phase modulation)	U.S.A.
12260/33	Modulated carrier wave transmitters	U.S.A.
12273/33	Receivers	England
12420/33	Signalling systems	U.S.A.
12421/33	Repeating stations	U.S.A.
12456/33	Modulated carrier wave transmission systems	England
12457/33	Oscillation generators	England
12738/33	Carrier wave system (phase or frequency modulated)	U.S.A.
12795/33	Receivers	England
12797/33	Radio telephone systems (inversion of speech frequencies)	England
12798/33	Direction finding (reception of a television signal)	England
12817/33	Direction finding (television signals types of impulses)	England
12864/33	Modulated carrier wave receivers	U.S.A.
12890/33	Constant potential system	U.S.A.
12956/33	Modulated carrier wave systems	U.S.A.
12957/33	Coupling system (transmitter output)	U.S.A.
13111/33	Electrical coupling devices	U.S.A.
13112/33	Modulated carrier wave transmitters	U.S.A.
13117/33	Modulation systems	England
13230/33	Electron discharge devices	U.S.A.
13304/33	Directional aerials	England
13348/33	Modulated signalling systems	U.S.A.
13349/33	Modulated transmitters	U.S.A.
13457/33	Frequency selective circuit	England
13570/33	Detectors	England
13650/33	Push-pull amplifier arrangements	U.S.A.
13750/33	A.F. circuits	U.S.A.
13830/33	Automatic volume control	U.S.A.
13941/33	Modulated carrier wave transmitters	U.S.A.
13942/33	Receivers	U.S.A.
13943/33	Receivers	U.S.A.
13944/33	Receivers	U.S.A.
14045/33	Directional antenna systems	U.S.A.
14139/33	Aerial systems	U.S.A.
14140/33	Modulated signalling systems	U.S.A.
14240/33	Modulated carrier wave transmitters	U.S.A.
14331/33	Modulated carrier transmitting apparatus	U.S.A.
14411/33	Crystal controlled oscillator	U.S.A.
14412/33	Valve oscillation generator arrangements	U.S.A.
14413/33	Oscillators	U.S.A.
14509/33	Volume control	U.S.A.
14511/33	Modulated carrier transmitter	U.S.A.
14512/33	Coupling system	U.S.A.
14597/33	Frequency control	U.S.A.
14598/33	Frequency multiplier	U.S.A.
14646/33	Selective circuit arrangements	England

**PATENTS—RADIO AND TELEVISION—
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14679/33	Signalling systems	U.S.A.
14814/33	Receivers	U.S.A.
14815/33	A.V.C. Receivers	U.S.A.
14935/33	Automatic volume control	U.S.A.
14936/33	Oscillators	U.S.A.
15012/33	Direction finding apparatus	U.S.A.
15080/33	Television amplifiers	U.S.A.
15082/33	All-wave receivers	U.S.A.
15177/33	Modulated carrier wave transmitters	U.S.A.
15274/33	Oscillation generators	U.S.A.
15354/33	Thermionic amplifiers	U.S.A.
15355/33	R. Frequency modulated carrier wave apparatus	U.S.A.
15559/33	Multiplex signalling	U.S.A.
Telefunken Co.		
10765/33	Valve amplifier	Germany
11036/33	Broadcast systems	Germany
11037/33	Barkhausen-Kurz carrier wave transmitters	Germany
11126/33	Frequency control	Germany
11212/33	Reception of modulated waves	Germany
11271/33	Oscillation production	Germany
11344/33	Multi-grid rectifier	Germany
11377/33	Reflector for short waves	Germany
11787/33	Directional aeriels	Germany
11788/33	Barkhausen-Kurz ultra short wave circuits	Germany
12239/33	Super-heterodyne receivers (ultra short waves)	Germany
12240/33	Signalling systems	Germany
12241/33	Electron discharge devices or valves	Germany
12649/33	Demodulating rectifiers	Germany
12652/33	Superhet receivers (regulating cathode valve mixer)	Germany
12865/33	Aerial and feeder arrangements (effective length changed)	Germany
12866/33	Thermionic valves (supplying auxiliary currents)	Germany
12955/33	Thermionic valves	Germany
13022/33	Frequency converters	Germany
13236/33	Very short wave oscillation generators	Germany
13350/33	Circuit arrangements	Germany
13754/33	Thermionic circuit arrangements	Germany
14048/33	Automatic gain control valve circuits	Germany
14049/33	Receivers	Germany
14051/33	Variometers for variably tunable circuits	Germany
14237/33	H.F. Amplifiers	Germany
14238/33	Oscillation generators	Germany
14329/33	Ultra short wave directional aeriels	Germany
14417/33	Valve circuits	Germany
14514/33	High powered amplifier	Germany
14816/33	Amplifiers	Germany
14934/33	Spill-over oscillators	Germany
15013/33	Frequency wobbling	Germany
15178/33	Thermionic valve circuit arrangements	Germany
15448/33	Modulated carrier wave transmitters	Germany
15555/33	Valve circuit arrangements	Germany
15551/33	Thermionic valve circuit arrangements	Germany
15652/33	Short wave valve transmitters	Germany
International General Electric Corporation		
11923/33	Static reduction	U.S.A.

12159/33	Super-regenerative receivers	U.S.A.
12287/33	Short wave transmitters	U.S.A.
12303/33	Resistance capacitance coupled amplifiers	U.S.A.
13142/33	Diversity factor receiving systems	U.S.A.
14599/33	Direction finding	U.S.A.
14600/33	Direction finders	U.S.A.
14601/33	Direction finders	U.S.A.
14602/33	Ultra high frequency amplifier	U.S.A.
17484/33	Modulation means for carrier wave signalling	U.S.A.

Hazeltine Corp. or Neutrodyne Pty. Ltd.

12085/33	Automatic volume control	U.S.A.
12086/33	Oscillator-modulators	U.S.A.
12785/33	Receiver	U.S.A.
13036/33	Noise suppression	U.S.A.
13139/33	Tuning indicator	U.S.A.
14000/33	Tone control	U.S.A.
15508/33	Selective circuits for tuning systems	U.S.A.
15509/33	Image frequency rejection system	U.S.A.
15510/33	Receiver	U.S.A.
15511/33	Vacuum tube amplifier	U.S.A.

N.V. Philips Gloeilampenfabrieken

15131/33	Uniform amplification (wide range of frequencies)	Holland
15545/33	Circuit arrangements for the selective reception and/or amplification of electrical oscillations	Holland
17039/33	Detectors	Holland
17240/33	Amplifiers and frequency multipliers	Holland
17398/33	Volume control of amplifiers	Holland
17584/33	Decreasing damping of the tunable circuit	Holland

Amalgamated Wireless (A/sia) Ltd.

10658/33	Tuning receiving circuits	England
11175/33	Antennae for receivers	Australia
11701/33	A.F. Amplifiers	Australia
12073/33	Transmitting systems (low power modulation)	Poland
15134/33	Receiving circuits (tone control)	England

The Westinghouse Brake and Saxby Signal Co. Ltd.

12398/33	Receiver automatic volume control	U.S.A.
17059/33	A.V.C. for receivers	England

Radio Frequency Laboratories, Inc.

17798/34	A.V.C. (receivers)	U.S.A.
17799/34	A.F. transmission circuits	U.S.A.

S.F. Radio Electricque

11954/33	Antenna system—horizontally polarised waves	France
15439/33	Modulated high frequency transmitter	France

Sundry Applicants

9702/32	Magnetic core inductance device—Johnson Laboratories Inc.	U.S.A.
11153/33	Magnetron transmitters—Compagnie General de T.S.F.	France
12164/33	Receiving antennae (avoiding local interference — International Communications Laboratories Inc.	U.S.A.
12848/33	Eliminating interference—P.L.V. Lambert	Channel Islands
14162/33	Avoiding static, etc.—A. V. Pettmann and W. Reed-Lethbridge	N.Z.
14676/33	Electric discharge tube oscillation generators—The M-O Valve Co., Ltd.	England

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- 14727/33 Potential changers ("B" supply)—P. R. Mallory and Co. Inc. U.S.A.
- 16827/33 Signalling systems—The General Electric Co. Ltd. England

TELEVISION

Marconi Wireless Telegraph Co. Ltd.

- 10180/33 Television amplifiers England
- 10531/32 Picture and sound television receiving system U.S.A.
- 10762/33 Tele-cinematography scanning U.S.A.
- 10763/33 Film scanning device television U.S.A.
- 11583/33 Television system U.S.A.
- 11441/33 Synchronising U.S.A.
- 11625/33 Television, etc., transmitters England
- 11692/33 Television modulation U.S.A.
- 11861/33 Mirror wheel for television England
- 11950/33 Cathode ray television system (variable velocity scanning) U.S.A.
- 12508/33 Amplifiers U.S.A.
- 12509/33 Cathode ray television (deflecting circuit) U.S.A.
- 12262/33 Cathode ray television system U.S.A.
- 12274/33 Photophones England
- 12275/33 Synchronising systems England
- 12570/33 Light sources for television and the like England
- 12796/33 Television systems England
- 13347/33 Television systems U.S.A.
- 13614/33 Stereoscopic television U.S.A.
- 14072/33 Television systems England
- 14183/33 Picture telegraph scanning apparatus England
- 14239/33 Printing telegraph systems U.S.A.
- 14330/33 Television apparatus U.S.A.
- 14415/33 Television apparatus U.S.A.
- 14416/33 Television apparatus U.S.A.
- 14510/33 Television and like oscillographic apparatus U.S.A.
- 15176/33 Synchronizing apparatus for telegraph and like signalling systems U.S.A.
- 15487/33 Television systems England
- 15557/33 Television transmitters U.S.A.
- 15558/33 Television systems U.S.A.

Telefunken Co.

- 11038/33 Cathode ray tubes Germany
- 11345/33 Scanning films in tele-cinematograph transmitters Germany
- 11346/33 Cathode ray tubes for television—magnetic focussing Germany
- 11789/33 Cathode ray tubes for television and the like Germany
- 13751/33 Cathode ray tubes for television Germany
- 14327/33 Cathode ray tubes Germany
- 14513/33 Cathode ray tubes Germany
- 14678/33 Television transmitter Germany
- 15014/33 Producing peaked a.c. waves Germany
- 15015/33 Cathode ray tubes Germany
- 15272/33 Television and facsimile telegraph Germany

A. C. Cossor Ltd.

- 11451/33 Television system England
- 16050/34 Television system England

Baird Television Ltd.

- 13464/33 Kerr cells England
- 14399/33 Kerr cells England

Sundry Applicants

- 11222/33 Amplifiers (flat characteristic over a wide band)—Television Laboratories Ltd. ... U.S.A.
- 13383/33 Avoiding damage to a screen in cathode ray television—Electrical and Musical Industries Ltd. England
- 17346/33 Coloured television—International General Electric Corp. U.S.A.

Miscellaneous Patents

Marconi Wireless Telegraph Co. Ltd.

- 10757/33 Indicating devices for receivers, dial readings U.S.A.
- 11003/33 Multiplex telegraphy England
- 11348/33 Mosaic electrode structure for television cathode ray tubes U.S.A.
- 11582/33 Microphone installations, direction sound response U.S.A.
- 11584/33 Microphone installations, reflector types U.S.A.
- 12692/33 Ribbon microphones U.S.A.
- 13456/33 Glow discharge lamp for television England
- 14046/33 High resistance alloys U.S.A.
- 14047/33 Manufacture of thermionic valves U.S.A.
- 14138/33 Valves U.S.A.

Telefunken Co.

- 10140/33 Valve and amplifier arrangements Germany
- 11127/33 Valves Germany
- 11440/33 Cathode ray tubes Germany
- 11579/33 Photo-electric cells Germany
- 11580/33 Automatically indicating shapes of curves Germany
- 12418/33 High frequency cables Germany
- 12510/33 Resistances Germany
- 13232/33 Cathode ray tubes Germany
- 13233/33 Cathode ray tubes Germany
- 13234/33 Loud speakers Germany
- 13235/33 Cathode ray tubes Germany
- 14050/33 Fluorescent screens Germany
- 14418/33 Thermionic valves Germany
- 15651/33 Thermionic valves Germany

P. R. Mallory & Co., Inc.

- 14725/33 Battery cell U.S.A.
- 14726/33 Condensers U.S.A.
- 14728/33 Potential changers U.S.A.
- 14943/33 Electrical current rectifiers U.S.A.

The Rola Co.

- 14497/33 Loud speaker voice coil mounting ... U.S.A.
- 16964/33 Loud speakers U.S.A.
- 18110/33 Loud speaker U.S.A.

Magnavox (Aust.) Ltd.

- 13144/33 Diaphragm spider U.S.A.
- 13145/33 Diaphragm coil and terminal support ... U.S.A.

Allgemeine Elektricitate-Gesellschaft

- 14633/33 Cathode construction Germany
- 15036/33 Photo-electric cell Germany

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Sundry Applicants

10157/32	Valves—W. R. Bullimore	England	13520/33	Radio logging device—V. E. Stanton	Australia
10233/32	Accumulator — Metall Intarsia Werke G.m.b.H.	Germany	13561/33	Condensers—Ruben Condenser Co.	U.S.A.
10805/33	Valve construction—Standard Telephones & Cables (A/sia) Ltd.	England	13874/33	Variable coupling inductances—R. Weingott	Australia
11399/33	Air de-polarising carbon cells—T. E. D. Marks and A. W. Beauchamp	Australia	14148/33	Anode construction—M.O Valve Co. Ltd.	England
11700/33	Mounting loud speakers (Amalg. Wireless (A/sia) Ltd.	Australia	14521/33	Dynamic speakers—J. Sharp	Australia
12396/33	Pick-up and needle holder—The General Electric Co. Ltd.	England	14604/33	Moving coil speaker—two or more diaphragm—V. H. Fray	N.Z.
12596/33	Magnetic sound recording and reproducing—J. T. Cummings and A. W. Carlin	Australia	14907/33	Acoustic apparatus—A. H. Midgley	England
12774/33	Mechanical drive mechanism—Radio Corporation of America	U.S.A.	15063/33	Magnetic cores—Kenzoku Zaigo Kank-yusha	Japan
12939/33	Valves (demountable types)—Compagnie General de T.S.F.	France	15123/33	Stabilised resistances—Continental Carbon Inc.	U.S.A.
13331/33	Multi-range meters — The Automatic Coil Winder and Electrical Equipment Co. Ltd.	England	15369/33	Electron discharge device—Neutrodyne Pty. Ltd.	U.S.A.
13450/33	Time stopping and starting—G. P. Patrick	Australia	15950/33	Receiver cabinets—E. F. Wilks & Co. Ltd.	Australia
			16096/34	Valves—N. V. Philips Gloeilampenfabrieken	Holland
			17069/34	Dynamic speakers, centring diaphragm—D. T. Hitchen	Australia
			17209/34	Rheostats or potentiometers — International Resistance Co.	U.S.A.
			17678/34	Selective circuits employing valves—Siemens Brothers & Co. Inc.	England
			17687/34	Piezo-electric vibrator devices—Sontone Corporation	U.S.A.

Patents, Trade Marks and Designs

UNLIKE land, money, goods or other kinds of property an idea, whether it be what is commonly known as an invention or a musical or literary work, is an intangible thing. When once disclosed it will become common property unless the originator takes the proper legal steps to keep control of it. It is he who must take the necessary steps for obtaining protection and in the case of industrial invention or similar property he must take proceedings under the Patents, Trade Mark or Designs Acts.

Patent Law in Australia is based upon the Statute of Monopolies, which was passed by the English Parliament in 1624, and which declared monopolies in general to be bad but which expressly excepted "new manufactures." This exception was made because it was felt that it would be to the advantage of the State to encourage inventors as invention is a valuable factor in the development of industry. Since 1624 many other Acts have been brought into force but they deal mainly with the machinery for the granting and enforcement of patents, the broad question of whether a grant may be legally made being determined by the original Statute. The phrase "new manufactures" includes any new apparatus, device, machine or process and a grant of Letters Patent for invention gives to the inventor or his legal representatives the sole monopoly to make, use or sell the invention for a term of sixteen years, subject to the payment of annual renewal fees after the fourth year. The holder of the rights has, subject to certain wide limitations, the sole control of the manufacture and sale of the article and at the end of the

period, upon the lapsing of the Patent, the Crown obtains the benefit of the invention. The grant of a patent is thus not a matter of right in that the inventor can demand protection, but is a mutual contract made between him and the State and in return for a full and complete disclosure of the invention and the method of carrying it out the State grants to him the monopoly referred to above. There are other requirements and should the inventor not carry out his side of the bargain properly the patent, even after it has been granted, may be declared invalid by any Court which has the necessary jurisdiction.

Patent Registration

The fundamental requirements which have to be observed before a Patent can be successfully applied for and maintained are subject matter, novelty, utility and the sufficiency of the description of the invention. As to the first, it is necessary that the invention must be a "manner of manufacture," which is roughly equivalent to saying that it must have a commercial application and be of benefit to the trade. Mere ideas are not patentable unless wrapped up in something which can be applied practically. Thus it happens that a theory or scientific principle is not patentable nor is a book-keeping system, although certain kinds of rulings in books are often necessary for the latter. Summarised what may be patented can be set out as:

- (1) New or old methods of applying new principles or new methods of applying old principles.

PATENT REGISTRATION PROCEDURE—

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- (2) New contrivances applied to new or old objects or purposes;
- (3) New combinations of parts which will produce material objects or a process;
- (4) New methods of applying old devices or processes provided that invention is exercised in arriving at the new method.
- (5) Improvements on existing combinations, devices or processes and the application of materials or devices to useful purposes.

In all cases invention must be exercised in arriving at the alleged invention.

It is absolutely necessary that the invention be new although the degree of novelty may be slight, which means that the invention must be something more than would be normally carried out by a skilled operator engaged in the particular trade to which the invention relates. Utility is also equally important for it is of no benefit to the State or to the inventor for a patent to be granted for something which is useless.

In making application for a patent the applicant must supply what is known as the specification and this must set out clearly the nature of the invention and the way in which it is to be performed. Sometimes the applicant is tempted not to disclose some features of the process or machine, thereby hoping to retain for himself the benefit of the invention for a longer period than he would by making a full disclosure. This, however, is a highly dangerous proceeding because an omission to describe the invention fully or intentional mis-description would be quite sufficient to render the patent invalid if it should ever be brought into Court.

The main object is to describe the invention in such a manner that an ordinary skilled workman engaged in the same trade can put it into operation and obtain the same result as the inventor could. There is no need, however, to go into such minute detail that those not engaged in the trade could follow it out, but on the other hand, the specification must not need a specialist to understand how it is to be put into practice. Because of the importance of fully and correctly describing the invention it is highly desirable for an intending applicant to seek professional assistance in making his application, although he is not compelled to. There is, of course, additional expense attached to this procedure but such expenditure will undoubtedly pay in the long run.

The application may be made in either of two ways, viz.:

- (a) By the filing of a provisional specification to be followed later by the complete specification, or
- (b) By the filing of the complete specification in the first instance.

In an application accompanied by a provisional specification the applicant is not required to describe his invention in full detail. It is only necessary that its nature should be outlined so that when, and if, the complete specification is filed the Patent Office Examiners will have no difficulty in identifying that which follows with the invention described in the provisional application. The term of a **provisional application is nine**

months and it is usually filed in cases where the inventor has not been able to bring his ideas to their complete form before he finds it necessary to make an application. If during the currency of the provisional protection he should find that it is desirable to abandon the application he may do so without any additional expense. The application dates from the day upon which the first specification is filed, but in the case of a provisional specification the applicant **has no rights whatever** and can take **no steps to prevent infringement**. Obviously a **patent cannot exist** until it is granted and that cannot be until after the complete specification is filed and accepted and the patent issued.

During progress of the application the complete specification, drawings, etc., when filed are examined and if there is nothing in the Patent Records that would prevent the grant the application is accepted. It is then advertised for a period of three months during which any party may, if he can supply sufficient satisfactory evidence, oppose the grant. If no opposition is made or if it is dismissed, the Patent is sealed and the full rights of the patentee commence although they are **retrospective to the date of acceptance**. The period of advertisement is to allow anyone who may know of some bar of which the Patent Office is ignorant to come forward. For instance, the applicant may not be the inventor or his legal representative, or the invention may not be new having been put into practice or published in some technical journal, foreign patent specification or otherwise before the date of application.

As to overseas applications, Australia is a member of what is known as the International Convention which, in a few words, means that a local applicant may at any time during the twelve months succeeding the date of his application apply in any other convention country and obtain as the effective date of that patent the date of his Australian patent. This is a very useful arrangement as the detrimental effect of publication of the invention abroad, before the application is made, may be avoided. Conversely, applications made in Australia may be dated back and thus a device originating overseas **may apparently not be the subject of an application and yet be adequately protected subsequently**.

Trade Marks

FROM the point of view of the average trader the matter of trade marks which are inseparably wrapped up with goodwill is not to be neglected because although there may not be much importance attached to a trade mark in the early stages of the development of a business or of a new activity of an established concern, in later years the trade done in the goods covered by the mark may reach large proportions and unless the mark has been well chosen in the beginning the goodwill of the business may not acquire its full value. It is, therefore, wise to choose the best available mark right at the start.

The underlying feature of a trade mark is its ability to distinguish the goods of the proprietor from the goods of others engaged in the same line of business and throughout all trade mark law this question of **ability**

TRADE MARKS—

(Continued from Page 63)

to **distinguish** is paramount. Registration, which, by the way, is not compulsory but which is highly desirable, **requires this quality** of a trade mark beyond all others.

A registerable trade mark may consist of a name of a Company, individual or firm put up in a distinctive manner; the signature of the applicant or some predecessor in business; an invented word or words; a word or words having no direct reference to the character or quality of the goods and not being according to its ordinary meaning a surname or a geographical name; or any other distinctive mark such as a label, combination of devices, letters, numbers or monograms which can be fairly held to be distinctive of the goods of the proprietor. It **must not**, however, be **so like any existing mark** on the Register of Trade Marks or any mark used in connection with similar goods as to lead to any possibility of confusion or deception in the minds of the trade or the public.

An invented word or words is possibly the best type of trade mark, good examples of this being "Kodak," "Magnavox," "Osram" and such words. This kind of word may in an indirect manner introduce some allusion to the character or quality of the goods but as long as it is not entirely obvious they are acceptable. Ordinary English language words if used as trade marks cannot have any direct reference to the character or quality of the goods and therefore such words as "Best" or "Perfect" are **not** registerable. Otherwise, words such as "Kangaroo," "Cornstalk," "King Dick" are acceptable. Trade Mark law will not allow any word which may fairly describe the goods to be **monopolised** by any maker, nor will it permit a geographical name such as "Sydney" to become the property of any one individual while **surnames** are **also not** registerable trade marks unless they have acquired the necessary ability to distinguish by long and wide use of the mark, "Dunlop" and "Pears" being examples of this type of mark. Certain other of the unregistrable marks may also by reason of long use be acceptable, but it is not wise to choose such a mark for until they have this long use they are difficult to maintain, as being unregistered it is necessary for the proprietor to fully establish his title before he can get any redress at common law and then he must supply evidence of passing off and deception. On the other hand registration immediately supplies prima facie proof of ownership which after seven years becomes conclusive unless the mark was acquired by fraud in the beginning. Furthermore, registration gives a right for infringement proceedings to be taken and mere possession of goods wrongfully marked may be an offence. It is not necessary to prove the passing off.

Registration is not a very difficult matter, but although a selected mark may conform to the definitions of what is registerable laid down in the Trade Marks Act it is desirable that a search be made in the existing records before the application is filed or the mark used so that there can be no risk of conflicting with a mark already

on the register. For the purpose of registration all goods are divided into fifty classes and registration is effected in one or more of these according to the goods in respect of which the mark is to be used. Proprietors of trade marks may conduct their own proceedings with the Trade Marks Office, but as in patents it is advisable that skilled professional assistance be obtained, for there are many little points which have to be watched. The period of registration extends for fourteen years, but upon proof being furnished that the mark has been used during its period of registration it may be renewed for a further period of fourteen years.

Designs

There is another form of protection which in general principle resembles that given by the Patents Act but which is commonly known as **registration of designs**. According to the Act governing this matter, design means "**an industrial design applicable in any way or by any means to the purpose of the ornamentation of pattern or shape or configuration of an article to any two or more of these purposes.**" Putting this in other words, the protection is given to that which appeals to the eye in regard to the shape, configuration, ornamentation or pattern of the article. It does not cover any principle of construction or operation of the device and if it is desired to cover any mechanical principle, process or method of manufacture Letters Patent must be applied for. In radio work cabinets are often the subject of design registrations, but such registrations only cover the outward appearance and do not give any protection for any constructional features there may be in the device. Likewise the external appearance of a switch or a transformer may be registered as a design, but the only way to protect the method of manufacture or the mechanism of the device would be to apply for patent. As in a trade mark the register is divided into classes and registration must be made in one or other of these classes.

For registration purposes **exact** drawings, photographs or samples of the design must be provided. Upon registration the proprietor is given exclusive right to use the design and any manufacturer who infringes or imitates the copyright in a registered design whether knowingly or otherwise may be proceeded against in the appropriate courts. There is, however, an important provision in the Designs Act which is to the effect that each article to which the design is applied must be marked before delivery for sale with the prescribed mark to denote that the design is registered. Failure to mark in this manner renders the maker liable to a penalty of £20 and moreover may cause the proprietor to lose his rights to get damages for infringement. On the other hand any wrongful application of a marking to indicate that the article is registered renders the person so marking liable to a similar penalty. The usual marking is "Registered No. 12345" or some abbreviation as "Reg'd."

The term of registration is five years, but it may be extended for two further periods of five years each.

Australian Patent Licence

Licence No. 1

(Issued 1934 by Australian Radio Technical Services and Patents Company Limited.)

A Licence to use and exercise certain Australian Letters Patent for certain specific purposes as within in connection with Wireless Broadcast Receiving Apparatus and/or Radiogramophones.

AN AGREEMENT made this day of 193 BETWEEN AUSTRALIAN RADIO TECHNICAL SERVICES & PATENTS COMPANY LIMITED having its registered office at 47 York Street Sydney in the State of New South Wales (hereinafter called "the Grantor") of the first part, and

of (hereinafter called "the Licensee") of the second part

WHEREAS the AUSTRALIAN RADIO TECHNICAL SERVICES & PATENTS COMPANY LIMITED has the right to grant licences to the extent purpose and for the period of this agreement for all patents owned or controlled by AMALGAMATED WIRELESS (AUSTRALASIA) LIMITED, STANDARD TELEPHONES AND CABLES (AUSTRALASIA) LIMITED, N. V. PHILIPS GLOEILAMPEN-FABRIEKEN and NEUTRODYNE PROPRIETARY LIMITED but only from the first day of March, 1934, with respect to patents owned or controlled by AMALGAMATED WIRELESS (AUSTRALASIA) LIMITED and only from the second day of April, 1934, with respect to patents owned or controlled by NEUTRODYNE PROPRIETARY LIMITED.

AND WHEREAS the Licensee claims to be a bona fide manufacturer of wireless broadcast receiving apparatus and/or radio gramophones and as such manufacturer has applied to the Grantor to grant and the Grantor has agreed to grant to the Licensee a licence under the Letters Patent and upon the terms and conditions hereinafter mentioned and in consideration of the royalties herein reserved and assessed upon the basis agreed between the parties as being convenient. NOW IT IS HEREBY AGREED AS FOLLOWS:

1. (a) The expression "Broadcast Receivers" when herein used shall mean broadcast receiving apparatus (other than valves and loud speakers) for the reception of speech or music transmitted and intended for simultaneous reception by all listeners as distinct from point to point communication but only for private or domestic use or for the purpose of lectures or demonstrations in any institution of a charitable educational philanthropic or religious character (such lectures or demonstrations not being open to the public and not being held for payment) but not otherwise and shall not include such receivers combined with gramophones but shall include sets of component parts.

(b) The expression "Set of component parts" for broadcast receiving apparatus when herein used shall mean a number of component parts which are capable of being assembled so as substantially to constitute a broadcast receiver.

(c) The expression "Radiogramophone" when herein used shall mean a unitary instrument which is designed to incorporate valves (whether or not equipped with the valves themselves) and which is designed for the reproduction of sound through an electrically-operated loudspeaker alternatively from (a) apparatus designed for the reception and translation into sound of modulated electrical oscillations broadcast to the public and (b) apparatus (such as a turntable and pick-up) designed for the translation into sound of vibrations recorded on a sound record. Such expression does not include valves and does not include any radiogramophones combined with other apparatus dependent thereon either wholly or in part for its operation but does include battery eliminators as hereinafter defined when incorporated in a radiogramophone and any set of component parts which are capable of being assembled to substantially constitute a radiogramophone.

(d) The expression "Battery Eliminator" when herein used shall mean an apparatus which renders unnecessary the use of one or more batteries in the operation of broadcast receiving apparatus or a radiogramophone by facilitating the substitution thereof of electricity mains.

(e) The word "Valve" (or "Valves") when herein used shall be deemed where the context so admits to include inter alia a multiple valve a valve for rectifying electric current and other apparatus used in direct substitution for a valve.

(f) The expression "Multiple Valve" when herein used shall mean a valve designed to operate with more than one cathode-anode stream.

(g) The expression "Place of Public Entertainment" when herein used shall mean a place of public entertainment now existing or which during the subsistence of this Licence may exist and at which entertainment tax is or shall be payable or would be payable but for any statutory exemption granted subsequent to the first day of January, 1934. If during the subsistence of this Licence entertainment tax should be abolished then thereafter the expression shall mean a place of public entertainment now existing or which during the subsistence of this Licence may exist of the character of those places of public entertainment at which at the present time entertainment tax is in fact payable or would be payable but for any statutory exemption granted subsequent to the first day of January, 1934.

(h) The expression "Private or Domestic Use" as used herein shall be deemed to include also the manufacture and sale of broadcast receiving apparatus and radiogramophones for use in Public Houses Hotels Boarding Houses Restaurants, Cafes Tea Houses and/or small Dance Halls (only) PROVIDED that such are not attached to or do not form part of a theatre or cinema.

(i) The expression "Selling" when herein used shall be deemed to include selling on the so-called hire-purchase system.

2. (a) The Grantor grants and agrees to grant to the Licensee subject to the terms and conditions herein appearing a personal non-exclusive non-assignable license to use and exercise all or any of the inventions the subject of the Letters Patent applicable to broadcast receiving apparatus and radiogramophones respectively in respect of which and insofar as the Grantor now has or may hereafter during the subsistence of this Licence have power to grant Licences or Sub-Licences for the purposes and on the terms hereof (which Letters Patent are herein collectively called "the said Letters Patent") for the purpose of manufacturing using selling or letting on hire within the Commonwealth of Australia and such territories as may from time to time be administered under mandate by the said Commonwealth (a) broadcast receiving apparatus and (b) radiogramophones but in both cases only for private or domestic use or for the purpose of lectures or demonstrations in any institution of a charitable educational philanthropic or religious character (such lectures or demonstrations not being open to the public generally and not being held for payment) and not otherwise. Such Licence shall be deemed to have commenced on the first day of January 1934 insofar as relates to the patents owned or controlled by Standard Telephones & Cables (A/sia) Limited and N. V. Philips Gloeilampfabrieken respectively and on and from the first day of March 1934 insofar as relates to the patents owned or controlled by Amalgamated Wireless (A/sia) Limited and on and from the second day of April 1934 insofar as relates to patents owned or controlled by Neutrodyne Proprietary Limited and shall continue until the thirty-first day of December 1938 unless previously revoked as hereinafter provided.

(b) The Licensee undertakes that all companies or firms now or hereafter during the subsistence of this Licence directly or indirectly owned or controlled by the Licensee and all Companies or Firms formed by the Licensee during the subsistence of this Licence and directly or indirectly owning or controlling the Licensee shall if engaged in any field of business to which this Licence is applicable forthwith accept Licences from the Grantor upon the same terms as this Licence and the Grantor agrees to grant such Licences accordingly. If the Licensee shall become directly or indirectly owned or controlled by a company or firm which does not hold or forthwith obtain a Licence from the Grantor upon the same terms as this Licence the Grantor shall be at liberty to revoke this Licence.

3. (a) Nothing contained herein shall be deemed to license the Licensee to manufacture sell or let on hire

- (a) valves of any kind, or
- (b) loudspeakers of any kind, or
- (c) television receiving apparatus.

(b) Nothing herein contained shall be deemed to license the Licensee to manufacture sell or let on hire any individual component part of broadcast receiving apparatus or a radiogramophone other than in and forming part of broadcast receiving apparatus or a radiogramophone.

(c) The Licence hereby granted shall not authorise the use or exercise of broadcast receiving apparatus or any radiogramophone for any purpose whatsoever other than the purposes herein set forth and in particular shall not authorise the use or exercise of any of the said apparatus by operating the same for revenue-earning purposes. Nor shall this Licence authorise the use or exercise of any of the said apparatus for purposes of receiving broadcasting or operating any radiogramophone in relation in any manner to the service of any place of public entertainment or of any place in which any business requiring any Licence from public authority is conducted (except insofar as such use is authorised under the definition of "private and domestic use") or for use with a microphone.

4. The Licensee agrees with the Grantor as follows:

(a) Not without the previous written consent of the Grantor to export or sell for export or knowingly permit to be exported any broadcast receiving apparatus or radiogramophone.

(b) Not without the previous written consent of the Grantor to sell let on hire or put into use in the territory for which this Licence is granted any broadcast receiving apparatus or radiogramophones which have not been manufactured in the territory for which this Licence is granted.

(c) From time to time on the request of the Grantor to furnish to the Grantor diagrams and/or samples of all broadcast receiving apparatus and radiogramophones for the time being manufactured sold or let on hire by the Licensee.

(d) To attach or cause to be attached in a prominent position to all broadcast receiving apparatus and radiogramophones sold or put into use by the Licensee (or in the case of sets of component parts of such apparatus to supply for attachment by the constructor to the assembled apparatus) a plate indicating the number of valves (as hereinbefore defined but subject to the provisos contained in Sub-Clauses (f), (i) and (ii) of this Clause) on which the royalty for such apparatus is payable and bearing the following words: With respect to broadcast receiving apparatus:—

"No..... This instrument was manufactured under a licence granted by Australian Radio Technical Services and Patents Company Limited in respect of patents controlled by it for the reception in the Commonwealth of Australia and such territories as may from time to time be administered under mandate by the said Commonwealth of sound broadcast by wireless but only for private use and not for operation for any public or commercial or revenue-earning purpose. N.B.—A Post Office Licence is necessary."

With respect to radiogramophones:—

"No..... This instrument is manufactured under a licence granted by the Australian Radio Technical Services and Patents Company Limited in respect of patents controlled by it for the reception in the Commonwealth of Australia and such territories as may from time to time be administered under mandate by the said Commonwealth of sound broadcast by wireless and for the reproduction within the said territory of sound from records but only for private use and not for operation for

any public or commercial or revenue-earning purpose.

N.B.—A Post Office Licence is necessary."

Such plates shall be obtained only from and shall be supplied by the Grantor and no such plate shall be removed from any apparatus to any other without the previous consent in writing of the Grantor and no apparatus shall be considered as duly franked hereunder unless such plate be attached thereto. In addition if required the Licensee shall mark in accordance with the requirements of the Patent Acts of the Commonwealth of Australia or any amendments thereof made during the subsistence of this Licence all apparatus manufactured sold let on hire or put into use by the Licensee hereunder.

(e) So far as is reasonably practicable to make the conditions of this Licence a condition of every sale or hire binding upon and observable by every purchaser or hirer of any broadcast receiving apparatus or any radiogramophone sold or put into use by the Licensee.

(f) To pay to the Grantor by way of royalty:—

(i) In respect of each and every broadcast receiving apparatus sold let on hire or put into use by the Licensee employing or designed to employ a valve or valves

(a) in respect of patents owned or controlled by Standard Telephones and Cables (A/sia) Limited and N. V. Philips Gloeilampenfabrieken from the first day of January 1934 up to and including the twenty-eighth day of February 1934 the sum of one shilling and sixpence (1/6d.) and

(b) on and from the first day of March 1934 the sum of three shillings and sixpence (3/6d.) in respect of each and every valve included or intended to be employed therein whether or not such apparatus embodies or utilises or is designed or intended to embody or utilise any invention the subject of any of the said Letters Patent PROVIDED that in the case of multiple valves employed or intended to be employed in such broadcast receiving apparatus each and every cathode-anode stream contained therein shall be deemed to be one valve and the royalty shall be calculated accordingly;

(ii) In respect of each and every radiogramophone sold or let on hire or put into use by the Licensee employing or designed to employ a valve or valves (a) the sum of three shillings and sixpence (3/6d.) in respect of each and every valve employed or intended to be employed therein and in addition (b) the sum of three shillings and sixpence (3/6d.) whether or not such radiogramophone embodies or utilises or is designed or intended to embody or utilise any invention the subject of any of the said Letters Patent PROVIDED that in the case of multiple valves employed or intended to be employed in such radiogramophone each and every cathode-anode stream contained therein shall be deemed to be one valve and the royalty shall be calculated accordingly.

PROVIDED that at the end of each year of the term of the Licence granted to any Licensee an account shall be prepared by the Grantor showing the amount of royalties paid by such Licensee during such year under paragraph (1) of this sub-clause and such Licensee shall according to the Licensee's actual output of Broadcast Receivers during such year be entitled to a reduction on the royalties so paid by him calculated on the basis of the difference between the royalties so paid by the Licensee and the rates of royalty set out in the schedule hereto and the amount of such difference which may be payable to such Licensee shall be credited to such Licensee by the Grantor PROVIDED ALWAYS that no royalty shall be payable under paragraphs (i) and (ii) of this Sub-Clause (f) in respect of a battery eliminator incorporated in and forming part of a complete broadcast receiver or radiogramophone and PROVIDED ALWAYS that in respect of broadcast receiving apparatus or radiogramophones manufactured or sold by the Licensee which employ any patent under which the Grantor may become liable to pay a royalty to a third party or share a royalty with a third party the Grantor shall offer to the Licensee and the Licensee may accept the right to the inclusion in this licence of that patent on payment to the Grantor of an additional royalty of such amount as may be required to enable the Grantor out of the total royalties paid by the Licensee both to retain the royalties payable under paragraphs (i) and (ii) of this Sub-Clause (f) and to satisfy the terms of the Licence or Agreement under which royalty is or shall be payable by the Grantor. The Grantor shall if so required in writing by the Licensee furnish the Licensee with proof of the third party's claim to royalty. The Grantor shall upon request of the Licensee and the Licensee shall upon request of the Grantor permit the Grantor to examine free of charge diagrams and/or samples of broadcast receiving apparatus and radiogramophones manufactured or proposed to be manufactured by the Licensee and advise whether such apparatus embodies or utilises any invention the subject of any of the said Letters Patent under which the Grantor may be liable for royalty to a third party as herein mentioned. The Grantor shall inform the Licensee of the amount of any such additional royalty and

any such additional royalty shall be shown separately in the returns hereinafter mentioned.

(g) Keep proper and accurate and separate accounts of everything necessary to ensure an accurate return to be made each calendar month in conformity with any of the provisions of this Licence showing separately the royalties payable under each of the paragraphs (i) and (ii) of the last preceding Sub-Clause (f) and to render such accounts within fifteen (15) days of the last day of each calendar month in each year to such person as the Grantor may designate to the Licensee from time to time and to accompany each such account with a remittance in respect of the royalties thereby shown to be due. In the event that the Licensee fails to keep the books of account above mentioned in addition to any other rights and remedies the Grantor may have the Licensee agrees to pay to the Grantor above mentioned the amount of royalty which the Grantor may by notice in writing to the Licensee stipulate as the amount estimated to be due unless the Licensee proves that the royalty due should be some other amount.

(h) The Licensee shall furnish monthly returns verified by the Auditor of the Licensee or by a Statutory Declaration of the proper officer and in the event of any dispute shall permit the Grantors to appoint a Public Accountant to inspect the books and accounts of the Licensees relative to this Licence.

(i) To pay to the Grantor on the execution hereof for the first yearly period of this Licence and thereafter so long as the Licensee shall continue to manufacture sell let on hire or put into use broadcast receivers and/or radiogramophones in advance each year during the period of this Licence the sum of one hundred and fifty pounds (£150) as minimum royalty for the yearly period, which sum shall in no event be returnable but from the initial minimum royalty payment under this Clause shall be deducted and regarded as full settlement of all claims for past infringement of patents owned or controlled by Standard Telephones and Cables (A/sia) Limited, as distinct from any claims under any patents owned or controlled by Amalgamated Wireless (Australasia) Limited or others the sum of ten pounds (£10) for every one thousand (1000) broadcast receivers manufactured during one year by the Licensee. For the purpose of computing such number the production of the Licensee for the quarter ending 31st March 1934 will be taken as the basis.

(j) Not at any time during the subsistence hereof to dispute or impeach or to assist others to dispute or impeach the validity of the said Letters Patent.

(k) Not without the previous written consent of the Grantor to sell or let on hire or put into use or permit to be sold let on hire or put into use any broadcast receiving apparatus or any radiogramophone except under the Licensee's own trade mark or trade name or any other trade mark or trade name which may be approved by the Grantors from time to time.

(l) Not to assign transfer mortgage grant sub-licences under or in any manner part with the possession or control of this Licence or any part of it without the previous written consent of the Grantor.

5. During the subsistence of this Licence the Grantor will keep the Licensee fully indemnified against costs and damages arising in connection with all actions proceedings claims and demands which may be made against the Licensee by any third party who seeks to establish or establishes to the satisfaction of a court of competent jurisdiction within the Commonwealth of Australia and such territories as may from time to time be administered under mandate by the said Commonwealth his right to restrain the user and exercise by the Licensee under the Grant contained under this Licence for any of the said Letters Patent on the ground that such user and exercise is an infringement of any legal rights or legal interests of such third party in such Letters Patent PROVIDED ALWAYS that the Grantor is immediately informed of the institution of such proceedings and is given full and complete rights to take over at its own cost and through its own solicitors the defence of such proceedings if it so requests and in that event the Licensee shall assist the Grantor in every reasonable manner but the Grantor shall be at liberty to compromise submit to judgment in abandon discontinue or otherwise dispose of the same as to it may seem expedient.

6. The Grantor may revoke this Licence upon the happening of any of the following events:—

(a) If any royalty return or any royalty shown to be due is not rendered or is unpaid for thirty days (30) after the last day of any preceding month and remains un-rendered or unpaid for seven days after notice in that behalf from the Grantor, or

(b) If there be any breach on the part of the Licensee of any other of the Agreements herein contained and the same be not remedied made good or desisted from within seven (7) days of notice on that behalf from the Grantor; or

(c) If the Licensee shall become bankrupt or compound with his creditors (or being a company) shall go into liquidation whether voluntary or compulsory; any revocation of this Licence shall be without prejudice to all claims of the Grantor against the Licensee for outstanding royalties or prior breaches of this Licence or otherwise and also without prejudice to the provision of Clause 7 hereof.

7. (a) The Licensee agrees to grant to the Grantor upon request a non-exclusive non-transferable licence (but with the right to sub-licence subsidiary or associated companies) to make use exercise and vend all or any of the inventions the subject of Letters Patent applicable to broadcast receiving apparatus and/or a radiogramophone in respect of which and insofar as the Licensee has or shall hereafter have power to grant a licence for the purposes of manufacturing using selling or letting on hire within the Commonwealth of Australia and such territories as may from time to time be administered under mandate by the said Commonwealth broadcast receiving apparatus and/or radiogramophones but only for private or domestic use or for the purpose of lectures or demonstrations in any institution of a charitable educational philanthropic or religious character (such lectures or demonstrations not being open to the public generally and not being held for payment) and not otherwise.

(b) If any invention in respect of which any such licence is herein agreed to be granted by the Licensee comes within the scope of the claims of any Letters Patent in respect of which the Licence is granted or agreed to be granted hereunder by the Grantor then the Grantor shall pay no royalty. If any such invention does not come within the scope as aforesaid then the Grantor shall be entitled to such licence on payment of a royalty at a rate not exceeding the lowest rate paid by any Licensee in respect of the same invention or if there is no other Licensee then at a rate not exceeding five per cent. (5%) of the net selling price of the article manufactured in accordance therewith or (whether or not there is another licensee) not exceeding the rate paid by the Licensee to the Grantor hereunder whichever is the smaller.

(c) Any such licence granted by the Licensees shall continue until the thirty-first day of December 1938 or for such other period as may be agreed upon.

IN WITNESS WHEREOF the parties hereto have duly executed these presents the day and year first hereinbefore written.

THE SCHEDULE HEREIN REFERRED TO

Annual Output of Broadcast Receivers employing or designed to employ the following aggregate number of valves as herein defined.	Rate per valve as defined excluding Rectifier, from	
	1/1/34	1/3/34
4 to 1999	1/6	3/6
2000 " 3999	1/5½	3/5
4000 " 5999	1/5	3/4
5600 " 7199	1/4½	3/3
7200 " 9999	1/4	3/2
10000 " 12879	1/3½	3/1
12880 " 17999	1/3	3/-
18000 " 23199	1/2½	2/11
23200 " 35999	1/2	2/10
36000 " 43999	1/1½	2/9
44000 " 59999	1/1	2/8
60000 " 75999	1/0½	2/7
76000 " 105999	1/-	2/6
106000 " 135999	11½	2/5
136000 " 191999	11	2/4
192000 " 245999	10½	2/3
246000 " 343999	10	2/2
344000 " 442799	9½	2/1
442800 and over	9	2/-

The above rebates do not apply to Radiogramophones.

Australian Radio Tariff Schedule

In accordance with Customs Tariffs 1933 and Customs Tariff Proposals No. 1 of December 7, 1934.

In the following Schedules the first duty is British Preference Tariff and the second General Tariff.

In addition to the rates of import duty shown hereunder primage duty is payable on goods covered by certain items as follows:—

Tariff Items.	Primary Duty.	
	British Preferential Tariff.	General Tariff.
Item No. 180 (E)	5%	10%
„ „ 180 (G) (1) and (3)	5%	10%
„ „ 180 (1)	5%	10%
„ „ 181 (A) (2)	10%	10%
„ „ 404	Free	4%
„ „ 404A	„	4%
„ „ 415A	„	4%

The import duty on goods admissible at the British Preferential Tariff Rate under Tariff Items Nos. 180 (E), 180 (G) (1) and (3) is subject to a deduction in accordance with the Customs Tariff (Exchange Adjustment) Act, 1933, and in this connection the extract embodying Section 5 of that Act is as follows:—

5. The duties of Customs (other than primage duty and duty imposed by the Customs Tariff (Industries Preservation) Act 1921-1933 or any Act amending or in substitution for that Act) which would, but for the provision of this Act, be payable on goods to which protective duties apply and which are admissible under the British Preferential Tariff and which are entered for home consumption on or after the fifth day of October, One thousand nine hundred and thirty-three, shall be varied in accordance with the following provisions:—

(a) Whenever at the date of exportation of any such goods Australian currency is depreciated to the extent of not less than sixteen and two-thirds per centum in relation to the currency of the British country from which those goods are imported, a deduction from the amount of duty payable on those goods in accordance with any law of the Commonwealth for the time being in force imposing Duties of Customs (other than primage duty and duty imposed by the Customs Tariff (Industries Preservation) Act 1921-1933 or any Act amending or in substitution for that Act) or in accordance with Customs tariff proposals shall be made of—

- (i) one-fourth of that amount of duty; or
- (ii) twelve and one-half per centum of the value for duty, whichever is the less; and

(b) Whenever at the date of exportation of any such goods Australian currency is depreciated to the extent of not less than eleven and one-ninth per centum and less than sixteen and two-thirds per centum in relation to the currency of the British country from which those goods are imported, a deduction from the amount of duty payable on

those goods in accordance with any law of the Commonwealth for the time being in force imposing Duties of Customs other than primage duty and duty imposed by the Customs Tariff (Industries Preservation) Act 1921-1933 or any Act amending or in substitution for that Act) or in accordance with Customs Tariff proposals shall be made of—

- (i) One-eighth of that amount of duty; or
- (ii) six and one-quarter per centum of the value for duty whichever is the less.

180 (E) Wireless Receivers, Parts thereof, and Accessories therefor, viz.:—

1. **Chargers, Battery**, .4 ampere to 1 ampere, both inclusive, each 7/-—10/-.
2. **Chargers, Battery**, exceeding 1 ampere and up to and including 3 amperes, each 21/-—30/-.
3. **Choke Coils**, suitable for use in connection with battery eliminating devices, each 5/-—10/-.
4. **Condensers, Fixed Mica**, each 5d.—6d.
5. **Condensers, Variable**, of capacities exceeding .0001 microfarad, but not exceeding .001 microfarad—with gang or drum control—per each Condenser contained therein, 1/6—3/-; without gang or drum control, each 1/6—3/-.
6. **Condensers, Variable, Midget**, of .0001 microfarad capacity or less, each 1/-—1/6.
7. **Dials, Vernier**, each 10d.—1/3.
8. **Dials, n.e.i.**, each 1½d.—2d.
9. **Eliminators, "A" Battery**, each 35/-—50/-.
10. **Eliminators, "B" Battery**, each 27/6—40/-.
11. **Eliminators, "BC" and "ABC" Battery, Power Packs**, and similar devices, whether imported separately or incorporated in a wireless receiving set, each 40/-—60/-.
12. **Resistances, Fixed**, having a resistance value of 2 megohms and over, each 4½d.—6d.
13. **Headphones**, each 2/6—4/-.
14. **Jacks, Phone and Loudspeaker**, each 4d.—6d.
15. **Knobs**, each 1½d.—2d.
16. **Lightning Arresters**, each 4d.—6d.
17. **Loudspeakers and Parts thereof:—**
 - (a) Loudspeakers, including transformers, each 10/-—12/6.
 - (b) Parts of loudspeakers imported other than in complete loudspeakers, viz.:—
 - (1) Field Coils, each 2/-—3/-.
 - (2) Field Coil Cores, each 9d.—1/3.
 - (3) Field Coil Housing, each 1/-—1/6.
 - (4) Cones with or without voice coils, each 1/3—1/9.

- (5) Cone Housings, each 1/9—2/3.
- (6) N.E.I., other than transformers ad. val., 35 per cent.—55 per cent.

Provided, however, that in the case of combinations of any of the above-mentioned parts duty shall be payable on such combinations as though the parts were imported separately.

- 18. Plugs, Phone and Loudspeaker, each 3d.—4½d.
- 19. Rheostats, Potentiometers and Variable Resistance, each 6d.—8d.
- 20. Sockets, Valve, each 3d.—4½d.
- 21. Transformers, Audio and Radio, each 1/9—2/6.
- 22. Transformers, Power, each 10/-—15/-.
- 23. Power Transformers and Choke Coils, combined, each 15/-—25/-.

Or as to all the goods covered by paragraphs 1 to 23 of sub-item (E), with the exception of the goods covered by clause 6 of sub-paragraph (b) of paragraph 17, the following rates, if same return a higher duty, viz.: ad. val., 35 per cent.—55 per cent.

24. Parts, n.e.i., of wireless receivers, other than cabinets, ad. val., 35 per cent.—55 per cent.

25. Wireless Receiving Sets wholly assembled partly assembled or unassembled, excluding cabinets, valves, loudspeakers, headphones, batteries, or any device for eliminating batteries:—
Per valve socket, excluding sockets for valves forming part of any battery eliminating device, 12/6—25/-; or ad. val., 35 per cent.—55 per cent., whichever rate returns the higher duty.

Provided, (1) in the absence of valve sockets, the sets shall be charged duty at the above rates on the basis of the number of valves for which they are constructed or designed. (2) In the instance of sets constructed or adapted for use with multiple purpose valves, the sets shall be charged duty equal to that payable on sets having an equal number of unit stages using unit function valves.

26. Wireless Receiving Sets and Gramophones combined, excluding cabinets, valves, loudspeakers, headphones, batteries, or any device for eliminating batteries, each 20/-—25/-; and in addition per valve socket excluding sockets for valves forming part of any battery eliminating device, 12/6—25/-, or as an alternative the cumulative fixed rates provided above ad. val., 35 per cent.—55 per cent., whichever rate returns the higher duty.

Provided—(1) in the absence of valve sockets the combined sets shall be charged duty at the above rates on the basis of the number of valves for which they are constructed or designed. (2) In the instance of combined sets constructed or adapted for use with multiple purpose valves, the combined sets shall be charged duty equal to that payable on combined sets having an equal number of unit stages using unit function valves.

180 (G) Storage Batteries and parts thereof, viz.:—

- (i) Storage batteries for wireless receiving sets, whether imported separately or incorporated in or forming part of a wireless receiving set.
ad. val. 50 per cent. 70 per cent.
- (3) Composition parts including containers for storage batteries for wireless receiving sets.

180 (I) Dry Batteries and Dry Cells of all descriptions, whether imported separately or incorporated in any article or appliance B.P.T. Customs Tariff per lb 2d. or ad val. 25 per cent. plus 5 per cent. primage. General Tariff Customs Duty per lb. 5¼d. or ad val. 48¾ per cent. plus 10 per cent. primage, whichever rate returns the highest duty.

And for each £1 by which the equivalent in Australian currency of £100 sterling is less than £125 at the date of exportation an additional duty of B.P.T. per lb. .02d. or ad val. .4 per cent. and General Tariff per lb. .02d. or ad val. .4 per cent., whichever is applicable.

181 (A) (2) Valves for wireless telegraphy and telephony including rectifying valves each 2s. 3d. and 3s. 6d.

or ad. val. 20 per cent. 40 per cent whichever rate returns the higher duty.

Division XVI.—Miscellaneous.

404. Materials and Minor Articles, of a class or kind not commercially produced or manufactured in Aus-

tralia, for use in the manufacture of goods within the Commonwealth, as prescribed by Departmental By-laws including the following:—

Ad. val. Free and 15 per cent

- Resistance alloys in the form of wire, bars, rods, sheets or strips.
- Porcelain insulating beads of sizes less than ¾ inch diameter x ¾ inch long over all measurements.
- Cotton covered copper wire finer than 30 gauge (I.S.W.G.)
- Fixed electrolytic condensers.
- Insulating tubes except:
 - Tubular cotton covered braiding or sleeving.
 - Bakelised paper.
 - Porcelain.
 - Hard rubber.

For use in the manufacture of all kinds of electrical apparatus and appliances.

Metal rectifying elements for the manufacture of battery eliminators for wireless receiving sets.

Speaker units for the manufacture of magnetic type loud speakers.

Permanent magnets for the manufacture of loud speakers.

Battery cables (not including terminals) consisting of several flexible cords contained in one braided cover

For the manufacture of wireless receiving sets.

Woven antenna, i.e., aerial tape without terminals.

Cotton covered loop antenna wire for inside aerials.

Record changing devices imported unassembled, excluding pick-ups 12 inch turntables and motors, for use in the manufacture of combined radio gramophone sets.

Plain aluminium sheets for all purposes.

404A. Materials and Minor Articles, of a class or kind not commercially produced or manufactured in Australia or the United Kingdom, for use in the manufacture of goods within the Commonwealth, as prescribed by Departmental By-laws. Free and Free.

415A (2) Insulating boards of a quality or kind which the Minister of Customs is satisfied is not being made in Australia. Ad valorem (Foreign) 15%

Copper braid (made of wire of gauges finer than No. 30 L.S.W.G.)

For use in electrical apparatus and appliances.

Uncovered Copper Cable (stranded, made of wire of gauges finer than No. 30 L.S.W.G.)

Cotton covered flat laid cords with terminals affixed thereto, for use in radio head sets.

Standard signal generators.
Beat frequency and low frequency oscillators.

Being instruments for testing radio equipment.

Carbon being amorphous carbon or consisting principally of amorphous carbon which has been subjected to no other process of manufacture than the formation into plain blocks or plain rods.

Carbon being synthetic graphite or consisting principally of synthetic graphite which has been subjected to no other process of manufacture than the formation into plain blocks or plain rods.

Dry Batteries and Dry Cells

1934 Tariff Board Reports

No Satisfactory Explanation of Wide Difference Between Prices in United Kingdom and Australia

Under date 15/11/34, The Commonwealth Tariff Board issued a further report to the Federal Parliament concerning the manufacture of dry batteries and dry cells in Australia.

The report contains the Board's summation of the evidence given and then proceeds with its finding as published below.

Importations

Country of Origin.	1928-29		1929-30		1930-31		1931-32		1932-33	
	No.	£	No.	£	No.	£	No.	£	No.	£
United Kingdom	171,878	14,861	276,407	19,755	109,448	2,490	7,199	298	1,203	183
Other British	2,576	216	516	77	250	20	12	7	270	21
Denmark	150,266	14,095	98,198	6,966	121	5	*	*	*	*
Germany	673,244	15,289	459,413	10,529	2,501	160	*	*	*	*
United States of America	1,603,542	134,597	1,547,675	77,437	90,620	1,229	58,358	1,680	60,305	872
Other Foreign	58,109	1,383	32,142	523	98	7	508	46	21,649	364
Total	2,659,615	180,441	2,414,351	115,287	203,038	3,911	66,077	2,031	83,427	1,440

* Included in other foreign.

Tariff Board's Comments

THE question of duty on dry batteries and dry cells has been the subject of three inquiries by the Tariff Board since the duties were increased—by tariff proposals—in December, 1929. Before this date there was no specific provision in the tariff for dry batteries and importations were classified as "Electrical Appliances n.e.i." with duties of 27½ per cent. (British Preferential Tariff) and 40 per cent. (General Tariff). A new item introduced in 1929 provided duties as under—

	British	General
	Preferential	Tariff
Item 180 (I)—		

Item 180 (I)—

Dry Batteries and Dry Cells of all descriptions whether imported separately or incorporated in any article or appliance—

- (1) Up to and including 1lb. in weight each 4d. 6d.
- (2) Over 1lb. in weight per lb. 7d. 10d.

These duties have since been ratified by Parliament and are incorporated in the Customs Tariffs 1933; the British Preferential Tariff rates are, however, subject to reduction in accordance with the Customs Tariff (Exchange Adjustment) Act 1933.

The first inquiry was held in March and April, 1930, and the Board, on the 3rd November, 1930, reported that in its opinion the increased duties were not justified, and recommended a reversion to the previous rates of 27½ per cent. (British Preferential Tariff) and 40 per cent. (General Tariff).

The second inquiry was held in November, 1932, and the Board in its report of the 11th April, 1933, recommended the imposition of duties of 35 per cent. (British Preferential Tariff) and 55 per cent. (General Tariff). Under the Customs Tariff (Exchange Adjustment) Act introduced later, the 35 per cent. British Preferential Tariff rate would have yielded a net duty of 26½ per cent.

On the 1st June, 1933—less than two months later—the question was referred back to the Tariff Board following representations by the local manufacturers to the Minister that the duties recommended were insufficient and would result in the extinction of the local industry.

In view of its having dealt with this subject in two previous and comparatively recent reports, the Board proposes to confine this report to a consideration of the main question at issue and refers to its reports already quoted for other details of the local industry.

In 1930, the principal evidence regarding overseas competition was in respect of importations of "Columbia" batteries from

the United States of America; previously these batteries had had a large share of the local market. By 1932, conditions had changed considerably. The depreciation of Australian currency and of sterling had so increased costs of importing from the United States of America that the possibility of importations from that country was remote. The source of possible overseas competition then shifted to the United Kingdom, and at the 1932 inquiry the evidence of the local manufacturers was directed principally to the need for maintaining a high duty in the British Preferential Tariff.

Extraordinary Feature

An extraordinary feature of the evidence regarding prices in the United Kingdom was that the f.o.b. prices charged for one make of battery—the "Pertrix"—was about 55 per cent. higher than the prices charged for another make—the "Lissen." Small trial shipments of both makes had been imported and while the wide disparity in prices was difficult to understand, the Board saw no reason for disbelieving that the "Lissen" prices were representative of normal United Kingdom prices.

The Board's recommendation was based largely on the fact that if the "Lissen" manufacturers could produce a representative group of batteries and sell them at an f.o.b. price of 157d. there was something wrong with an Australian industry that required 394d. for similar batteries, particularly as a large proportion of the raw materials used by local manufacturers was imported and purchased at prices similar to those paid by manufacturers in the United Kingdom; furthermore, the Board was aware that the principal local manufacturers were making very high profits.

It was obvious that much depended upon the genuineness or otherwise of the "Lissen" prices; if, for example, they represented job prices or specially cut export prices it would have been unfair to use them as normal prices for the purpose of showing up the excess costs of the Australian products. The Board, however, was satisfied from the evidence available that the "Lissen" prices represented prices ordinarily charged in the United Kingdom for the types of batteries under consideration.

From the tenor of the Board's report it was unmistakably clear to the local manufacturers that their claim for higher duties than those recommended must lie in a satisfactory explanation of the wide difference between the United Kingdom and Australian selling prices. In order to remove any possible doubts about the genuineness of the United Kingdom prices the Board before the last inquiry asked the local manufacturers to furnish any new information received by them regarding prices of United Kingdom batteries, and also detailed costs of production of a selected group of locally manufactured batteries.

TARIFF BOARD REPORTS—(Continued)

The general evidence tendered at the inquiry was virtually a reiteration of the case presented at the previous inquiries. One feature of interest was the entry into the industry of another manufacturer—The Century Storage Battery Company Limited, of Sydney—which has expended £20,000 in the erection of a factory, and the purchase of plant and materials to manufacture dry batteries. There are now six Australian manufacturers.

Another interesting fact regarding the local industry was the reduction of prices on the 3rd June, 1933—two days after the case had been referred back to the Tariff Board. This reduction took two forms: there was a lowering of the prices charged by the manufacturers and the re-sellers' margins were also reduced—the combined effect being a reduction of retail prices by about 22 per cent. Typical examples are as follow:—

Type of Battery.	—Factory Price—			—Wholesale Price—			—Retail Price—		
	Old	New	Reduction	Old	New	Reduction	Old	New	Reduction
	d.	d.	%	d.	d.	%	d.	d.	%
Heavy Duty Radio Battery 45v. C.	108	92.8	14	144	116	19	224	174	22
Radio Battery 4½ volt	16.31	14.4	12	21.75	18.00	17	34	27	21
orch Battery 1½ volt	3.8	3.3	13	5.1	4.1	19	8	6.5	19

Before dealing with the matter of United Kingdom prices, it is necessary to invite attention to some aspects of the industry in the United Kingdom. Mr. S. F. Ferguson, director of the Australian Association of British Manufacturers, who tendered evidence in support of a reduction of the existing duties, submitted evidence regarding the prices charged by the British General Electric Company Limited and by Siemens Brothers and Company Limited, both of which are members of the association. He also furnished particulars of prices charged by Lissen Limited, but pointed out that this manufacturer was not a member of the association. Subsequently, the Board received the following cable from Lissen Limited:—

Understand Australian Association of British Manufacturers have quoted our prices and business as if representing us stop They have no authority to represent us in any way.

The Board is aware of the fact that Lissen Limited is controlled by the Ever-Ready Company (Great Britain) Limited whose branch at Sydney is one of the principal Australian manufacturers, and one of the principal advocates for the maintenance of the existing duties. This explains why Lissen Limited did not desire to be associated with evidence supporting a reduction of the duty.

The Ever-Ready Company (Great Britain) Limited undoubtedly controls the bulk of the dry battery manufacturing industry in the United Kingdom. It has an issued capital of approximately £1,000,000, and steps were being taken early this year to increase the nominal capital by a further £500,000, and to purchase two other companies, viz., Grosvenor Electric Batteries Limited and Vince's Dry Batteries Limited.

In Australia there is very little information regarding the prices of batteries in the United Kingdom. This is not difficult to understand, firstly, because importations have been virtually prohibited by the high duties in operation in recent years, and secondly because the largest potential exporters from the United Kingdom—the Ever-Ready group—have had no interest in keeping their prices before Australian dealers as they would be unlikely to export to the detriment of the Ever-Ready branch in Australia.

The Board's inquiry was closed in February, 1934, but, as the result of representations made by the local branch of the Ever-Ready Company, it was re-opened in June, 1934, to admit the evidence of Mr. R. P. Walter (Attorney in Australia for the Ever-Ready Company (Great Britain) Limited), who had been abroad investigating matters connected with the manufacture of dry batteries in other countries. While in London Mr. Walter obtained particulars of prices of dry batteries of the types used in Australia, and had them confirmed by a representative of the Australian Customs at Australia House. The question

was raised at the inquiry as to whether the prices furnished by Mr. Walter represented domestic prices or f.o.b. export prices. The transcript reads:—

In your first answer to Mr. Kelly you said that these were the prices that Australia House had confirmed? . . . The Customs Department at Australia House had confirmed that these are f.o.b. prices obtaining in England at the moment.

Did they also confirm that they were equal with the domestic prices of the same batteries in England; is that what you mean? Did they put their approval on these prices as being the equivalent of the domestic prices in England? . . . No, they have not done so.

On this point the Board is satisfied that the prices quoted represent domestic prices. The report of the London officer who made the investigation shows that the prices were confirmed by inspection of invoices for domestic sales; the date of the sale and the name of the purchaser of each type of battery is shown in the report which it should be stated was furnished at the request of Mr. Walter.

In support of his contention that these prices were not representative of true domestic prices, Mr. Walter stated at the inquiry that it is the practice of some manufacturers seeking export markets to manufacture goods under certain brands for export and to sell them at low prices on the domestic market for a while in order to establish low domestic prices. The export invoices would then show similar domestic and export prices, but both would, in fact, be lower than the real domestic prices. Some of the transactions inspected by the Australian Customs representative were for sales of goods bearing the well known brand of the company, and were not, therefore, special brands being used to establish a domestic price; similar batteries with different labels were being sold at higher prices. The Board, therefore, has no hesitation in accepting the prices furnished by Mr. Walter as the prices at which sales are ordinarily made in the United Kingdom.

At the previous inquiry a comparison of United Kingdom f.o.b. prices with Australian factory selling prices of a group of representative batteries was as follows:

United Kingdom: F.O.B. prices of "Lissen" Batteries, pence (sterling), 157; Australia: Factory selling price of similar Australian batteries, pence (Austn.), 394; Difference, 150%.

Despite the reduction in Australian selling prices since that inquiry, the Board finds on the prices given by Mr. Walter that the difference is practically the same at present; the group of batteries selected for the comparison hereunder is representative of approximately 50 per cent. of the output of a leading Australian manufacturer:—

United Kingdom: F.O.B. prices as furnished by Mr. Walter pence (sterling), 246; Australia: Factory selling price, pence (Austn.), 623; Difference, 154%.

If both prices are expressed in the same currency the difference still exceeds 100 per cent.

No Satisfactory Explanation

The Board asserts definitely that there has been no satisfactory explanation of the wide difference between United Kingdom and Australian selling prices. An analysis of the costings of an Australian manufacturer summarised to prevent the disclosure of confidential figures is as follows:—

	Pence
Materials	260
Direct Labour	80
Factory Overhead	
Packing	
Distribution	
Selling	
Advertising	
Royalties	283
Taxation	
General Expenses	
Administration	
Profit	
Selling Price	623

The Board has full particulars of these costs, together with the proportions of Australian and imported materials, and the costs of importing the latter. With this information it has been

LIST OF BROADCASTING STATIONS

This list has been compiled in close collaboration with the P.M.G.'s Department, and represents the official titles of the licensees. The power of all stations is rated as that existing in the aerial. Stations not yet on the air, or those in which changes are likely, are marked with an asterisk.

WAVE LENGTH CHANGES on some stations will come into force on September 1st, 1935—stations affected are marked with asterisk. See Page 96 for new positions.

- | | | | |
|------------|--|--------------|---|
| 2CO | 536 metres, 560 k.c., 7500 watts. National Broadcasting Service (Relaying 3LO and 3AR), COROWA, N.S.W. | * 4WK | 333 metres, 900 k.c., 50 watts. Warwick Broadcasting Co. Pty. Ltd., Albion Street, WARWICK, Qld. |
| 7ZL | 517 metres, 580 k.c., 1000 watts. National Broadcasting Service. Studio, Elizabeth St., HOBART. | 4RK | 330 metres, 910 k.c., 2000 watts. National Broadcasting Service (Relaying 4QG), ROCKHAMPTON, Qld. |
| 3AR | 492 metres, 610 k.c., 4500 watts. National Broadcasting Service. Studio, 120a Russell St., MELBOURNE. | 3UZ | 323 metres, 930 k.c., 600 watts. Nilsen's Broadcasting Service Pty. Ltd., 45 Bourke St., MELBOURNE, Vic. |
| 5CK | 472 metres, 635 k.c., 7500 watts. National Broadcasting Service (Relaying 5CL), CRYSTAL BROOK, S.A. | * 5RM | 319 metres, 940 k.c., 1000 watts. River Murray Broadcasters Ltd. Studio, RENMARK, S.A. |
| 2FC | 451 metres, 665 k.c., 3500 watts. National Broadcasting Service. Studio, 96-8 Market St., SYDNEY. | 2GB | 316 metres, 950 k.c., 1000 watts. Theosophical Broadcasting Station Ltd., 29 Bligh St., SYDNEY. |
| 6WF | 435 metres, 690 k.c., 3500 watts. National Broadcasting Service. Studio, Hay Street, PERTH. | 5DN | 313 metres, 960 k.c., 300 watts. Hume Broadcasters Ltd., 29 Rundle St., ADELAIDE. |
| 5CL | 411 metres, 730 k.c., 2000 watts. National Broadcasting Service. Studio, Hindmarsh Square, ADELAIDE. | 3BO | 309 metres, 970 k.c., 200 watts. Amalgamated Wireless (A/sia) Ltd., Allen's Walk, BENDIGO, Vic. |
| 4QG | 395 metres, 760 k.c., 2500 watts. National Broadcasting Service. Studio, State Ins. Bldgs., BRISBANE. | 6BY | 306 metres, 980 k.c., 50 watts. Bunbury Broadcasters Ltd., Bedford Hall, BUNBURY, W.A. |
| 3LO | 375 metres, 800 k.c., 3500 watts. National Broadcasting Service. Studio, 120a Russell Street, MELBOURNE. | 4AY | 306 metres, 980 k.c., 50 watts. Ayr Broadcasters Pty. Ltd., Ardmillan Rd., AYR, Q. |
| 2BL | 351 metres, 855 k.c., 3000 watts. National Broadcasting Service. Studio, 96-8 Market Street, SYDNEY. | 4GR | 300 metres, 1000 k.c., 50 watts. Gold Radio Service Ltd., Ruthven St., TOOWOOMBA, Qld. |
| 6PR | 341 metres, 880 k.c., 500 watts. Nicholson's Ltd., 86-90 Barrack Street, PERTH. | 3HA | 297 metres, 1010 k.c., 300 watts. Western Province Radio Pty. Ltd., 37 Gray Street, HAMILTON, Vic. |
| 7HO | 337 metres, 890 k.c., 50 watts. Commercial Broadcasters Pty. Ltd., 82 Elizabeth Street, HOBART. | 2UE | 293 metres, 1025 k.c., 1000 watts. Radio 2UE Sydney Ltd., 296 Pitt Street, SYDNEY. |
| 3MA | 333 metres, 900 k.c., 50 watts. Sunraysia Broadcasters Pty. Ltd., 22 Deakin Avenue, MILDURA, Vic. | 5PI | 288 metres, 1040 k.c., 2000 watts. Midlands Broadcasting Services Ltd., Box 392, Adelaide, PORT PIRIE, S.A. |
| | | 2CA | 286 metres, 1050 k.c., 500 watts. A. J. Ryan Broadcasters Ltd., Symondston, CANBERRA, F.C.T. |

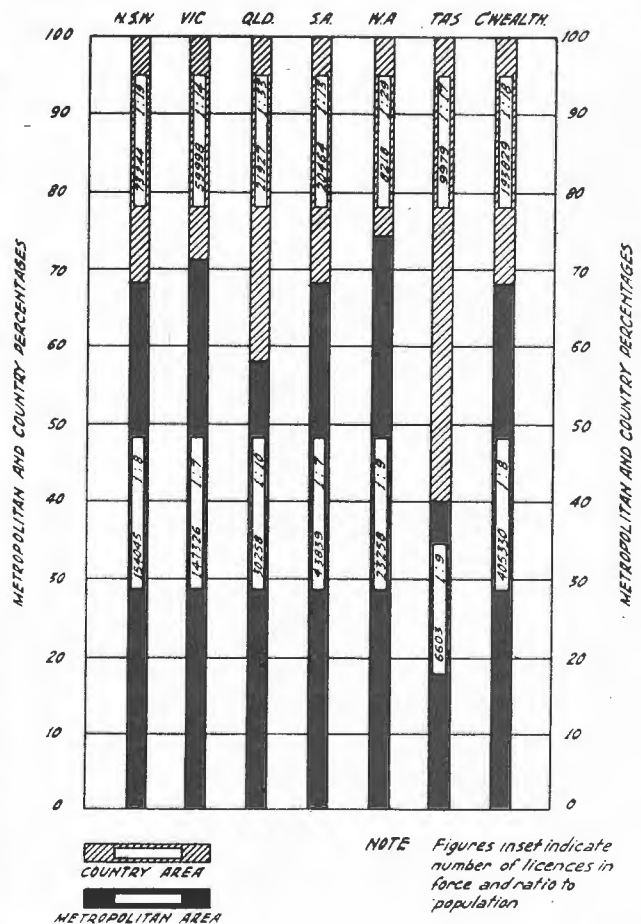
- 4MB** 283 metres, 1060 k.c., 50 watts. Maryborough Broadcasting Co. Ltd. Studio, Kent St., MARYBOROUGH, Qld.
- 2KY** 280 metres, 1070 k.c., 1000 watts. Trades & Labour Council, N.S.W. Studio, 424 George St., SYDNEY.
- 3SH** 278 metres, 1080 k.c., 50 watts. Swan Hill Broadcasting Co., Campbell St., SWAN HILL, Vic.
- 6AM** 275 metres, 1090 k.c., 500 watts. Northam Broadcasters Ltd. Studio, NORTHAM, W.A.
- 7LA** 273 metres, 1100 k.c., 300 watts. Findlay & Wills Broadcasters Pty. Ltd., 67 Brisbane Street, LAUNCESTON, Tas.
- 2HD** 270 metres, 1110 k.c., 500 watts. Airsales Broadcasting Co., Box 123, NEWCASTLE.
- 2UW** 267 metres, 1125 k.c., 750 watts. Commonwealth Broadcasting Corporation Ltd., 49 Market Street, SYDNEY.
- 6ML** 264 metres, 1135 k.c., 500 watts. W.A. Broadcasters Ltd., Lyric House, Murray St., PERTH.
- 4BC** 262 metres, 1145 k.c., 1000 watts. J. B. Chandler & Co., 43 Adelaide Street, BRISBANE.
- 3YB** 283 metres, 1060 k.c., 25 watts. Mobile Broadcasting Service Pty. Ltd., 430 Little Collins St., MELBOURNE.
- ***2WG** 260 metres, 1155 k.c., 500 watts. Riverina Radio Broadcasting Co. Ltd., 16 Fitzmaurice St., WAGGA, N.S.W.
- 4TO** 256 metres, 1170 k.c., 200 watts. Amalgamated Wireless (A/sia) Ltd. Studio, Flinders St., SOUTH TOWNSVILLE, Qld.
- 3DB** 254 metres, 1180 k.c., 600 watts. 3DB Broadcasting Station Pty Ltd., 36 Flinders St., MELBOURNE.
- 4MK** 252 metres, 1190 k.c., 100 watts. Mackay Broadcasting Service, 64 Nelson Street, MACKAY, Qld.
- 5KA** 250 metres, 1200 k.c., 300 watts. Sport Radio Broadcasting Co. Ltd., Richard's Building, Currie Street, ADELAIDE.
- 2CH** 248 metres, 1210 k.c., 1000 watts. N.S.W. Council of Churches Service. Studio, 77 York Street, SYDNEY.
- 2GF** 246 metres, 1220 k.c., 50 watts. Grafton Broadcasting Co. Ltd. Station, Turf Street, SOUTH GRAFTON, N.S.W.
- 6KG** 246 metres, 1220 k.c., 100 watts. Goldfields Broadcasters (1933) Ltd., 86 Palace Chambers, KALGOORLIE, W.A.
- 2NC** 241 metres, 1245 k.c., 2000 watts. National Broadcasting Service, Relaying 2FC and 2BL, NEWCASTLE, N.S.W.
- ***3WR** 238 metres, 1260 k.c., 500 watts. Goulburn Valley & N.E. Broadcasters Pty. Ltd., High Street, SHEPPARTON, VIC.
- 2SM** 236 metres, 1270 k.c., 1000 watts. Catholic Broadcasting Co., Australia House, Wynyard Square, SYDNEY.
- 3TR** 234 metres, 1280 k.c., 250 watts. Gippsland Publicity Pty. Ltd., Raymond Street, SALE, VIC.
- 4BK** 233 metres, 1290 k.c., 500 watts. Brisbane Broadcasting Pty. Ltd., 47 Charlotte Street, BRISBANE, Qld.
- ***3BA** 231 metres, 1300 k.c., 50 watts. Ballarat Broadcasters Pty. Ltd., Cnr. Armstrong & Dana Streets, BALLARAT, VIC.
- 5AD** 229 metres, 1310 k.c., 300 watts. Advertiser Newspapers Ltd., Weymouth Street P.O. Box 392, ADELAIDE.
- 2MO** 227 metres, 1320 k.c., 50 watts. M. J. Oliver, Marquis Street, GUNNEDAH, N.S.W.
- 4RO** 226 metres, 1330 k.c., 50 watts. Rockhampton Broadcasting Co. Pty. Ltd., Cnr. East & William Streets, ROCKHAMPTON, Qld.
- 2XN** 224 metres, 1340 k.c., 50 watts. G. W. Exton, 137 Molesworth Street, LISMORE, N.S.W.
- 3KZ** 222 metres, 1350 k.c., 600 watts. Industrial Printing & Publicity Co., 64 Elizabeth Street, MELBOURNE.
- ***4PM** 221 metres, 1360 k.c., 100 watts. Amalgamated Wireless (A/sia) Ltd. Studio, Musgrave Street, PORT MORESBY, Papua.
- 2BH** 221 metres, 1360 k.c., 100 watts. Radio Silver City Ltd., Cnr. Cummins & Zebiana Streets, BROKEN HILL, N.S.W.
- ***7BU** 221 metres, 1360 k.c., 50 watts. Findlays Pty. Ltd., BURNIE, Tas.
- 3HS** 219 metres, 1370 k.c., 50 watts. Wimmera Broadcasting Co. Pty. Ltd., 84 Wilson Street, HORSHAM, Vic.
- 4BH** 217.3 metres, 1380 k.c., 600 watts. Broadcasters (Aust.) Ltd., Parbury House, Eagle Street, BRISBANE, Qld.

- 2GN** 216 metres, 1390 k.c., 100 watts. Goulburn Broadcasting Co. Ltd., Auburn Street, GOULBURN, N.S.W.
- 3GL** 214 metres, 1400 k.c., 50 watts. Geelong Broadcasting Pty. Ltd., Moorabool Street, GEELONG, Vic.
- 2KO** 212 metres, 1415 k.c., 500 watts. Newcastle Broadcasting Co. Ltd., A.M.P. Chambers, 57 Hunter Street, NEWCASTLE, N.S.W.
- 3AW** 211 metres, 1425 k.c., 600 watts. The Vogue Broadcasting Co. Pty. Ltd., 382 Latrobe Street, MELBOURNE.
- *3XY** 211 metres, 1420 k.c. Station 3XY Pty. Ltd., C/- 5 Bank Place, MELBOURNE.
- 2WL** 209 metres, 1435 k.c., 50 watts. Wollongong Broadcasting Co., 149 Crown Street, WOLLONGONG, N.S.W.
- *4CA** 207 metres, 1450 k.c. Amalgamated Wireless (A/sia) Ltd., CAIRNS, Qld.

- 5MU** 207 metres, 1450 k.c., 100 watts. Murray Bridge Broadcasting Co. Ltd., Bridge Street, MURRAY BRIDGE, S.A.
- 7UV** 206 metres, 1460 k.c., 300 watts. Northern Tasmania Broadcasters Pty. Ltd. Studio, Reibey Street, ULVERSTONE, Tas.
- 6IX** 204 metres, 1470 k.c., 500 watts. W.A. Newspapers Ltd., St. Georges Terrace, PERTH, W.A.
- 2AY** 203 metres, 1480 k.c., 100 watts. Amalgamated Wireless (A/sia) Ltd. Studio, 610 Dean Street, ALBURY, N.S.W.
- *2TM** 201 metres, 1490 k.c., *50 watts. Tamworth Radio Development Co., Peel Street, TAMWORTH, N.S.W.
- 3AK** 200 metres, 1500 k.c., 200 watts. Melbourne Broadcasters Pty. Ltd., 116 Queen Street, MELBOURNE.

BROADCASTING

LISTENERS' LICENCES IN FORCE IN METROPOLITAN AND COUNTRY AREAS OF THE COMMONWEALTH AT 30TH JUNE 1934



UTILUX

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Wave Length Change of Broadcasting Stations in Australia

ON AND AFTER SEPTEMBER 1st, 1935

FRE- QUENCY IN KC	WAVE LENGTH IN METRES	NEW POSITION ON & AFTER 1 ST SEPT. 1935		PRESENT POSITION UNTIL 31 ST AUG. 1935	
		DIAL NO.	STATION	STATION	DIAL NO.
550	545		2CR CENTRAL REG. NSW.		
560	536		6WA S.W. REGIONAL W.A.	2CO COROWA	
580	517		3WV WEST REG. VIC.	7ZL HOBART	
590	508		7ZL HOBART		
600	500		4QN NORTH REG. QLD.		
610	492		2FC SYDNEY	3AR MELBOURNE	
630	476		3AR MELBOURNE		
635	472			5CK CRYSTAL BROOK	
640	469		5CK CRYSTAL BROOK		
665	451			2FC SYDNEY	
670	448		2CO COROWA		
690	435		6WF PERTH	6WF PERTH	
700	429		2NR N.RIVERS REG. NSW.		
720	417		6GF KALGOORLIE		
730	411		5CL ADELAIDE	5CL ADELAIDE	
740	405		2BL SYDNEY		
750	400		7NT NORTH REG. TAS.		
760	395			4QG BRISBANE	
770	390		3LO MELBOURNE		
800	375		4QG BRISBANE	3LO MELBOURNE	
820	366		7HO HOBART		
830	361		3GI GIPPSLAND REG. VIC.		
850	353		5RM RENMARK		
855	351			2BL SYDNEY	
870	345		2GB SYDNEY		
880	341		6PR PERTH	6PR PERTH	
890	337			7HO HOBART	
900	333		3MA MILDURA	3MA MILDURA	
			4WK WARRICK	4WK WARRICK	
910	330		4RK ROCKHAMPTON	4RK ROCKHAMPTON	
930	323		3UZ MELBOURNE	3UZ MELBOURNE	
940	319			5RM RENMARK	
950	316		2UE SYDNEY	2GB SYDNEY	
960	313		5DN ADELAIDE	5DN ADELAIDE	
970	309		3BO BENDIGO	3BO BENDIGO	
980	306		4AY AYR	4AY AYR	
			6BY NARRGIN	6BY BUNBURY	
990	303		... CENTRAL N.S.W.		
1000	300		4GR TOOWOOMBA	4GR TOOWOOMBA	
1010	297		3HA HAMILTON	3HA HAMILTON	
1020	294		2KY SYDNEY		
1025	292			2UE SYDNEY	
1030	291		3DB MELBOURNE		
1040	288		5PI CRYSTAL BROOK	5PI CRYSTAL BROOK	
1050	286		2CA CANBERRA	2CA CANBERRA	
			3YB MOBILE	3YB MOBILE	
1060	283		4MB MARYBOROUGH	4MB MARYBOROUGH	
			2KB KATOOMBA	2KY SYDNEY	
1070	280		6AM NORTHAM		
			3SH SWAN HILL	3SH SWAN HILL	
1080	278			6AM NORTHAM	
1090	275			7LA LAUNCESTON	
1100	273		7LA LAUNCESTON		
1110	270		2UW SYDNEY	2HD NEWCASTLE	
1120	268			4BC BRISBANE	
1125	266				2UW SYDNEY
1130	265			6ML PERTH	
1135	264				6ML PERTH
1140	263			2HD NEWCASTLE	
1145	262				4BC BRISBANE
1150	261			2WG WAGGA	
1155	260				2WG WAGGA
1160	259			4MK MACKAY	
1170	256			4TO TOWNSVILLE	4TO TOWNSVILLE
1180	254			3KZ MELBOURNE	3DB MELBOURNE
1190	252			2CH SYDNEY	4MK MACKAY
1200	250		5KA ADELAIDE	5KA ADELAIDE	
			2GF GRAFTON	2CH SYDNEY	
1210	248		6KG KALGOORLIE		
			... SOUTH QLD.	2GF GRAFTON	
1220	246			6KG KALGOORLIE	
				2NC NEWCASTLE	
1230	244				
1240	242			3TR SALE	
1245	241				2NC NEWCASTLE
1260	238			3WR SHEPPARTON	3WR SHEPPARTON
1270	236			2SM SYDNEY	2SM SYDNEY
1280	234			3AW MELBOURNE	3TR SALE
1290	233			4BK BRISBANE	4BK BRISBANE
1300	231			2TM TAMWORTH	3BA BALLARAT
1310	229			5AD ADELAIDE	5AD ADELAIDE
1320	227			3BA BALLARAT	2MO GUNNEDAH
1330	226			4RO ROCKHAMPTON	4RO ROCKHAMPTON
1340	224			2XN LISMORE	2XN LISMORE
1350	222		3GL GEELONG	3KZ MELBOURNE	
			2BH BROKEN HILL	2BH BROKEN HILL	
1360	221		4PM PORT MORESBY		
			7BU BURNIE	7BU BURNIE	
1370	219			3HS HORSHAM	3HS HORSHAM
1380	217			4BH BRISBANE	4BH BRISBANE
1390	216			2GN GOULBURN	2GN GOULBURN
1400	214			6IX PERTH	3GL GEELONG
1410	213			2KO NEWCASTLE	
1415	212				2KO NEWCASTLE
1420	211			3XY MELBOURNE	
1425	210.5				3AW MELBOURNE
1430	210			2WL WOLLONGONG	
1435	209				2WL WOLLONGONG
1440	208			2MO GUNNEDAH	
1450	207			5MU MURRAY BRIDGE	5MU MURRAY BRIDGE
				4CA CAIRNS	4CA CAIRNS
1460	205			7UV ULVERSTONE	7UV ULVERSTONE
1470	204			... BEGA	6IX PERTH
				4CA CAIRNS	
1480	203			2AY ALBURY	2AY ALBURY
1490	201			... SOUTH N.S.W.	2TM TAMWORTH
1500	200			... HOBART	
				3AK MELB. (NIGHT SERVICE STATION)	3AK MELB. (NIGHT SERVICE STATION)

New Zealand Broadcasting Stations

(As at February, 1935)

Sign Call	Licensee and Location of station	Power (out-put) (watts)	Wavelength		HOURS
			Kc/s	Metres	
2 YA	N.Z. Broadcasting Board, Featherston Street, Wellington	5000	570	526	Mon. to Sat., 7 a.m.—8.30 a.m., 10 a.m.—11 p.m.; Sun., 9 a.m.—Noon, 1—4.30 p.m., 6—10 p.m.
4 ZP	R. T. Parsons, 155 Layard Street North, Invercargill.	125	620	483.6	Mon to Fri, 12.30—1.30 p.m., 7—10 p.m.; Sat. 7—10 p.m.; Sun., 11 a.m.—Noon, 6.30—10 p.m.
1 YA	N.Z. Broadcasting Board, Karangahape Road, Auckland.	10 k.w.	650	461.3	Mon. to Sat., 7 a.m.—8.30 a.m., 10 a.m.—11 p.m.; Sun., 9 a.m.—Noon, 1—4.30 p.m., 6—10 p.m.
3 YA	N.Z. Broadcasting Board, Gloucester Street, Christchurch.	2500	720	416.4	Mon. to Sat., 7 a.m.—8.30 a.m., 10 a.m. to 11 p.m.; Sunday, 9—Noon, 1—4.30 p.m., 5.30—10 p.m.
2 YB	The North Taranaki Radio Society, Empire Building, King Street, New Plymouth.	100	750	399.8	Mon., 7—10 p.m.; Wed., 6.30—10 p.m.; Sat., 6.30 —10.30 p.m.; Sun., 6—10 p.m. (2.30—4.30 Satur- days during football season).
1 ZH	G. S. Anchor, 165 Victoria Street, Hamilton	45	770	389.4	Mon., 8—10 p.m.; Tues., noon—1 p.m., 7.30— 10 p.m.; Wed., noon—1 p.m.; Thurs., noon—1 p.m., 8—10 p.m.; Fri., 6—7, 8—10 p.m. (First Wed. each month 7 p.m.—11 p.m.)
4YA	N.Z. Broadcasting Board, Stuart Street, Dunedin	500	790	379.5	Mon. to Sat., 7 a.m. to 8.30 a.m., 10 a.m. to 11 p.m.; Sunday, 9—noon; 1—4.30 p.m.; 5.30 to 10 p.m.
2ZH	C. B. Hansen, Dalton Street, Napier	65	820	365.6	Mon., Tues., Fri., noon—2 p.m., 7 p.m.—10.30 p.m.; Wed., noon—2 p.m.; 6.30—10.30 p.m.; Thurs., noon—2 p.m.; Sat., 10 a.m.—5 p.m., 7—11 p.m.; Sun., noon—3 p.m., 6.30—10 p.m.
2 YC	N.Z. Broadcasting Board, Featherston Street, Wellington	200	840	356.9	5—6 p.m., 7—10 p.m. (daily except Sunday); Sun- day, 6—10 p.m.
1 YX	N.Z. Broadcasting Board, Karangahape Road, Auckland	75	880	340.7	5—6 p.m., 7—10 p.m. (daily except Sunday); Sun- day, 6—10 p.m.
2 ZP	E. A. Perry, 128 Queen Street, Wairoa	105	900	333.3	Tues., 6—10.30 p.m.; Sun., 7.30 a.m.—9.30 a.m.
3 ZR	West Coast Radio Society, Bright Street, Cobden, Greymouth	175	940	319	Mon. to Fri., 7.30 a.m.—8.30 a.m., 3 p.m.—5 p.m., 6 p.m.—7 p.m., 7.30 p.m.—10 p.m.; Sat., 7.30— 8.30 a.m., 1.30—5 p.m., 6—9 p.m.; Sun., noon— 1.30 p.m., 5.30—6.30 p.m., 7 p.m.—9 p.m.
2 ZF	The Manawatu Radio Club, King Street, Palmerston North	150	960	312.3	Mon., Thurs., Sat., 8—10 p.m.; Wed., 6.15 p.m.— 10 p.m.; Fri., 7—9.30 p.m.; Sun., 7—9.30 p.m.
2 ZJ	C. T. C. Hands. 229 Gladstone Road, Gisborne	250	980	303.9	Mon., Fri., Sat., 7—10 p.m.; Tues., Wed., noon— 1.30 p.m.; 7—10 p.m.; Thurs., 7—8 p.m.

N.Z. Broadcasting Stations—(Continued).

Call Sign	Licensee and location of station.	Power (output) (watts)	Wavelength		HOURS
			K/s'	Metres	
4 ZB	Otago Radio Association, 180 Rattray Street, Dunedin	20	1050	285.5	Wed., 6.30—11 p.m.; Thurs., 6—11 p.m.; Sun., 10 a.m.—noon.
4 ZM	McCracken and Walls, 17 George Street, Dunedin	30	1050	285.5	Mon., Wed., Thurs., Fri., 9 a.m.—11.45 a.m., 1 p.m.—2 p.m.; Tues., 9 a.m.—11.45 a.m., 1 p.m.—2 p.m., 6 p.m.—11 p.m.; Sat., 9 a.m.—noon, 5 p.m.—10 p.m.; Sun., 2 p.m.—10 p.m.
4 ZO	Barnett's Radio Supplies, The Octagon, Dunedin	25	1050	285.5	Mon. to Fri., noon—1 p.m., 2—3 p.m., 5—6 p.m., Mon., 8—11 p.m.; Fri., 7—11 p.m.; Sat., noon—1 p.m.
4 YO	The N.Z. Broadcasting Board, Stuart Street, Dunedin	200	1140	263.2	Week-days, 5 p.m.—6 p.m., 7—10 p.m.; Sun., 6 p.m.—10 p.m.
2 ZM	Atwater Kent Radio Service Ltd., 258 Gladstone Road, Gisborne	15	1150	260.9	Mon. to Sat., 7.30 a.m.—10 a.m.; Thurs., 8 p.m. to 10.30 p.m.; Sun., 7 p.m.—10 p.m.
2 ZD	W. D. Ansell, 7 Rimu Street, Masterton	5	1170	256.3	Mon. to Sat., 8—10 p.m.; Sunday, 9.30—11 a.m., 8—10 p.m.
1 ZB	The Fellowship of the Friendly Road (Inc.), Queen's Arcade, Auckland	90	1190	252	Tues., Wed., Thurs., Fri., 9 a.m.—9.30 a.m., 10.15 a.m.—11 a.m., 7 p.m.—10 p.m.; Sat., 9 a.m.—9.30 a.m., 10.15 a.m.—11 a.m.; Sun., 9 a.m.—noon, 6.30 p.m.—9.30 p.m.
3 YL	The N.Z. Broadcasting Board, Gloucester Street, Christchurch	250	1200	250	Week-days, 5 p.m.—6 p.m., 7—10 a.m.; Sun., 6 p.m.—10 p.m.
4 ZL	Radio Service Ltd., 243 Macandrew Road, Dunedin	100	1220	245.9	Mon. and Thurs., 7—9 a.m., 7.30—11 p.m.; Tues., Wed. and Fri., 7—9 a.m.; Sat., 7—9 a.m., 7—11 p.m.; Sun., 8—10 a.m.
2 ZL	John Holden, 609 Park Road, Hastings	20	1240	241.8	Thurs., 6.30—11 p.m.; Sun., 9.30 a.m. to noon.
1 ZM	W. W. Rodgers, Ltd., Massey Road, Manurewa	54	1260	238	Mon., Tues., Wed., Thurs., Fri., 5 p.m.—10 p.m.; Sat., 1 p.m.—4 p.m., 5 p.m.—midnight; Sun., 10 a.m.—6 p.m., 7—10 p.m.; Holidays, 8 p.m.—midnight.
4 ZC	John I. Bilton, Lowburn Ferry, Cromwell, Otago.	20	1280	234.2	Mon., noon—1 p.m., 7—9 p.m.; Tues., Wed., noon—1 p.m.; Thurs., noon—1 p.m., 7—10 p.m.; Fri., noon—1 p.m.; Sat., noon—1 p.m., 5.30—7 p.m.; Sun., 11 a.m.—12.30 p.m.
1 ZJ	Johns Ltd., Chancery Street, Auckland	65	1310	228.9	Tues. and Thurs., noon—2 p.m.; Wed., 7.30—9.30 p.m.
4 ZR	Renton and Clark, Clyde Street, Balclutha	5	1340	224	Mon., Tues., Wed., Sat., 9.30 a.m.—10 a.m.; Thurs., 9.30 a.m.—10 a.m., 7 p.m.—10.30 p.m.; Fri., 9.30 a.m.—10 a.m., 2 p.m.—3 p.m.; Sun., 10 a.m.—noon.

N.Z. Broadcasting Stations—(Continued).

Call Sign	Licensee and location of station.	Power (out-put) (watts)	Wavelength		HOURS
			Kc/s.	Metres	
2 ZR	2ZR Radio Club, Trafalgar Street, Nelson	30	1360	220.5	Mon., Wed., 5—10 p.m.; Tues., Thurs., Fri., 6—10 p.m.; Sat., 2.30—4.30 p.m., 6—10 p.m.; Sun., 10.45 a.m.—1 p.m., 6.15—9.30 p.m.
2 ZO	J. V. Kyle, 50 Waldegrave Street, Palmerston North	200	1400	214.2	Tues., 6.30—10 p.m.; Thurs., 6.30 p.m.—9 p.m.
4 ZW	The 4ZW Broadcast Service, Cnr. Manse and Stafford Streets, Dunedin	30	1450	206.8	Mon., to Fri., 8 a.m.—11 a.m., 3—5 p.m., 7—11 p.m.; Sat., 8 a.m.—11 a.m., 3—5 p.m., 7 p.m.—midnight; Sun., noon—2 p.m., 7 p.m.—11 p.m.
3 ZM	W. J. Green and J. Younger, 253 Brougham Street, Christchurch	100	1470	204.1	Mon., Tues., Thurs., 7.30—10 a.m., 5—6 p.m., 7—10 p.m.; Wed., 7.30—10 a.m., 5—6 p.m., 6.45—10 p.m.; Fri., 7.30—10 a.m.; Sat., 7.30 a.m.—2 p.m., 8 p.m. to midnight; Sun., 11 a.m.—2 p.m., 5—6 p.m., 7—10 p.m.



WETLESS

CONDENSERS

FOR ALL PURPOSES

Distributors:
 Sydney: Fox & MacGillycuddy Ltd.
 Lawrence & Hanson Elec. Co. Ltd.
 O. H. O'Brien (Sydney)
 Melbourne: O. H. O'Brien
 Brisbane: J. B. Chandler & Co.

When Radio was in its infancy "WETLESS" made fixed condensers for the experimenter. Now, when radio is no longer simply a pastime or a luxury but a necessity, and great broadcasting systems supply Australians with news and entertainment, WETLESS CONDENSERS are inextricable with its progress.

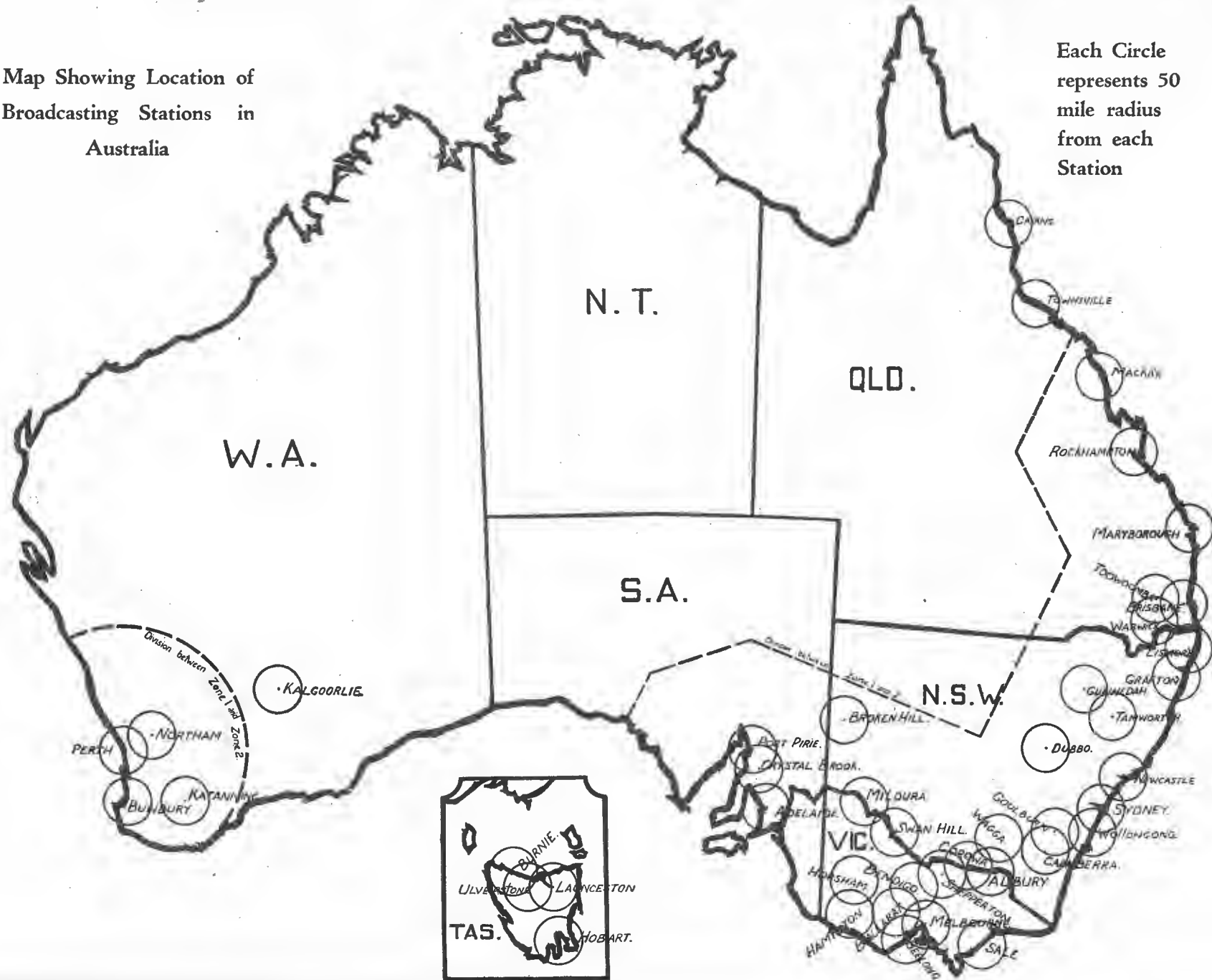
WETLESS transmitting condensers perform a multitude of various duties in Australian radio stations and WETLESS radio condensers predominate in their class.

WETLESS ELECTRIC MFG. CO. LIMITED

Distributors:
 Adelaide: Newton, McLaren Ltd.
 Perth: Atkins (W.A.) Ltd.
 Hobart: Lawrence & Hanson Elec. Co. Ltd.

Map Showing Location of
Broadcasting Stations in
Australia

Each Circle
represents 50
mile radius
from each
Station



Commercial ('B') Broadcasting Stations

General Particulars supplied by the Stations

[Due to changes being made from time to time, no responsibility can be accepted by the Editor.]

2AY

AMALGAMATED WIRELESS A/SIA LTD., Station and Studio, Pools Hill, Albury (one mile N. of Albury P.O.). Office, Kiowa Street, Albury. Commenced 17/12/30. 203m., 1480 k.c., 100 watts. Under the management of John Dower. Director, E. T. Fisk. Representative, Amalgamated Wireless (A/sia) Ltd., 167-169 Queen St., Melbourne, and 47 York Street, Sydney. Announcers: John Dower, Angus Campbell, Miss M. Schneider. Transmission time: Monday to Saturday, 5.30-10.30 p.m. Special sessions: Monday to Saturdays, 10.15 p.m., News Service; Tuesday, 8.30 p.m., "Jane Eyre"; Saturday, 8.30 p.m., dance programme; Monday to Saturday, 7.30 p.m., sporting session.

2BH

RADIO SILVER CITY LTD., Studio address Morgan St., Broken Hill. Station location, 1 mile N. of P.O. Commenced 30/6/34. 1360 k.c., 221m., 100 watts. Managing Director, R. G. Lamb. Directors, H. A. Bowden and R. Allen. Chief Engineer, R. E. Hipwell. Chief Announcer, V. J. Anderson. Studio Manager, F. A. Wallace. Secretary, J. M. Wilcox, B.Ec., F.A.A., A.C.I.S. Announcers Special Sessions: R. G. Lamb, "The Wanderer" talks and Old Time; V. J. Anderson, Poets' Corner. Special Sessions: Mondays to Saturday, News Service 7.15 a.m. to 7.45 a.m., Hospital Patients 8.45 a.m., Children's 8 a.m. to 8.10 a.m., 6 p.m. to 6.30 p.m., Stock and Share Market report 6.30; Fridays and Saturdays, Sporting Session 6.45 p.m.; Sunday, Sporting 10.45 a.m., Old Time 11.30 a.m. to 12 noon, Gems of Music 12 p.m. to 12.30, Record Releases 7 p.m. to 7.30, Poets Corner 7.45 to 8 p.m.; Wednesday, Old Time 8.30 to 9 p.m.; Saturday, Radio Dance Night 9 p.m. to 10.30 p.m.; Mondays to Saturdays, Slumber Music 10 p.m. to 10.30 p.m.; Sundays, Slumber Music 9.30-10 p.m. Transmission Time: Monday to Saturday, 7 a.m. to 9 a.m., 6 p.m. to 10.30 p.m.; Sunday, 10.30 a.m. to 1 p.m., 6 p.m. to 10 p.m.

2CA

A. J. RYAN BROADCASTERS LTD., Kingston, Canberra, F.C.T., Phone B 191. Station location, Symond Stn., 3½ miles S.E. of Canberra P.O. Commenced 14/11/31. Freq. 1050 k.c., 286 m., 500 watts aerial. Manager, A. J. Ryan, M.Inst. R.E. G. Barlin, Assistant Engineer. Announcers, G. Barlin and N. McGregor. Special Sessions: Children's, 5.30 to 6.30; football and all sports as per season. Station transmission times: Monday to Friday, 12.30 to 1.30 p.m., 5.30 to 6.30 p.m., 7.30 to 10 p.m.; Saturdays, 5.30 to 10 p.m.; Sundays, 8-10 p.m.

2CH

N.S.W. COUNCIL OF CHURCHES SERVICE, 77 York Street, Sydney; MA 6008. Station location, Dundas, 9¾ miles N.W. of G.P.O. Commenced 15/2/32. Freq., 1210 k.c., 248 m., 1000 watts. Under the management of Amalgamated Wireless (A/sia) Ltd., 47 York Street, Sydney. Interstate representatives, Amalgamated Wireless A/sia Ltd., 167-169 Queen St., Melbourne. Sessions: Early Morning, Stuart Beattie, 7 to 9.30 a.m.; Dion Wheeler, 7.30 to 9.30 a.m. Morning, Stuart Beattie, 10 to 10.30 a.m. Women's, Hope Suttor, 10.50 to 11.15 a.m. Morning, Keith Howard, 11.15 to 12 a.m.; Hope Suttor, 12 a.m. to 12.10 p.m.; Keith Howard, 12.10 to 1 p.m. Afternoon, Keith Howard, 3 to 3.30 p.m.; John Creighton, 3.30 to 4.15 p.m.; Keith Howard, 4.15 to 5 p.m. Children's, Miss Herd, 5 to 5.30 p.m.; A. S. Cochrane, 5.30 to 6.20 p.m. Dinner Music, A. S. Cochrane, Keith Howard, John Creighton, 7 to 10.30 p.m. Feature Artists: Radio First Nighter, Ken Fowles; 2CH Story Teller, Dion Wheeler; Teacup-time Topics, John Creighton; Pick o' the Week, Ken Fowles and John Creighton. Special Sessions: Beau Geste, 7.55 p.m., Mon., Tues. and Wed.; The Black Opal, 6.30 p.m., Mon., Tues. and Wed.; Tiger Bryce, 6.45 p.m., Wed. and Thurs. Station Transmission Times: 7 a.m. to 9.30 a.m., 10 a.m. to 1.30 p.m., 3 p.m. to 11 p.m.

2GB

THEOSOPHICAL BROADCASTING STATION LTD., 29 Bligh Street, Sydney; B 7876 (6 lines). Station location, Mosman, 3 miles N.E. of G.P.O. Commenced 23/8/26. Freq. 950 k.c., 316 m. (after 1/9/35, 870 k.c., 345 m.), 1000 watts. A. E. Bennett, A.C.A. (Aust.), Managing Director. Private Secretary, Miss Doris Gowlland. Advertising Sales Manager, Charles A. Fletcher. Sales Service Manager, John Armitage. Copywriting and Production Manager, E. Mason Wood. Chief Announcer, Eric Colman. Chief Engineer, Len Schultz. Accountant, W. Calley. Musical Director, Gil Dech. Transcription Agencies, Grace Gibson. Interstate Representative, V. L. H. Coghlan, Melbourne.

Announcers and Their Sessions

Eric Colman—Chief Announcer: Charles Cousens. Special Sessions: George Saunders, Arthur Hahn, Jack Lumsdaine and Cyril James. Children's Session: Jack Lumsdaine and Cyril James. Breakfast Session, 7 a.m. daily: Jack Davey. Dance Sessions: Richard Hughes and Oscar Lawson. Sports and Motor Sessions: H. Dearth, E. Mason Wild and C. J. Dease. Special Programmes: Dorothy Jordon, 9 to 10 a.m. daily; Dorothy Vautier, 11.45 a.m. and 3.30 p.m. daily; Kathleen Jordon, 3.45 p.m. daily, and Etta Field. Women's Sessions: Mrs. D. State, B.A., domestic science, daily 2.45 p.m.; Mrs. W. J. Stelzer, daily 1 p.m., Happiness Club; Frank Grose Radio Sunday School and Cheer-up Sessions; Muriel Valli, daily 8.15 a.m., Tiny Tots Bluebird Club.

Feature Artists

George Edwards, Nell Stirling and Players; Ellis Price, Mabs Mayhew and Company; Bands, Abe Romaine and his Ginger Jar Band, Harry Bloom and Hillier's Tango Orchestra; Vocalist, Jack Davey; Gil Dech, Cyril James, Jack Lumsdaine, Reg Morgan, Albert Russell (exclusive to 2GB), Gladys Moncrieff, Clement Q. Williams, Walter Kingsley, Senia Chostiakoff, Lance Jeffree, Wilson Ewart, Barend Harris, Heather Kinnaird, Raymond Beatty, Eileen Boyd, Ethel Daw, Paul Kain.

Astrology, "The Original Astrologer of the Air," Sat., 7.30 p.m. Cheer-up Sessions, Uncle Frank, Sat., 9 a.m. Community Singing from the Savoy Theatre, 12 to 2 p.m. each Wednesday. Darby and Joan, George Edwards Players, daily at 7.40 and Saturday 7.45. International Affairs, A. M. Pooley, Friday at 9.30 and Sunday at 9.45. N.R.M.A. Session, Mr. Mitchell, Friday at 10.15 p.m. Parents and Citizens Sessions, Sunday at 6.15 p.m. Psychology, A. E. Bennett and Richard Want, B.A. Political Commentator, Lloyd Ross M.A. LL.B., Monday, 10.15 p.m. Sport, Oscar Lawson on Thursdays at 6.45 p.m. and Saturday at 6.40 p.m.

Transmission Times

Mon. to Sat., 7 a.m. to 12.30 a.m., 1 to 11.30 p.m.; Sunday, 8 a.m. to 12 noon, 12.45 p.m. to 10.30 p.m.

2GF

GRAFTON BROADCASTING CO. LTD. Head office, c/o A.W.A., 47 York Street, Sydney. Station location, Turf St., Grafton, 2½ miles N. South Grafton P.O., on outskirts of town. Commenced 15/12/33. 246 m., 1220 k.c., 50 watts. Manager, C. E. Coldwell-Smith. Directors, E. T. Fisk and L. A. Hooke. Interstate representatives, Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne. Announcers: C. E. Coldwell-Smith, Manager and Chief Announcer, Miss M. Noonan, John Proust, Gordon Wingfield (Sporting), Mr. Murray (Turf). Special Sessions: Saturday, 7.30 p.m., General Sporting Topics; Wednesday and Saturday, 7.15 p.m., Turf Notes. Transmission Time of Station: Monday, 12-1, 6-10 p.m.; Tuesday to Saturday (inc.), 1-2, 6-10 p.m.

THE SERVICE **2GB** RENDERS ITS ADVERTISERS

WHEN towards the end of 1934, Station 2GB decided to reorganise its staff into departments and strengthen its staff by the addition of picked men, it was found necessary to take over the entire sixth floor as well as the seventh floor of Adyar House, Bligh Street. As a result of those extensions 2GB offers a more complete and more efficient service to Australian advertisers than any other station in the Australian radio world. Let us then look at the layout of 2GB's new offices as an indication of what these services are.

At the lift exit you will find the new reception room. This is in charge of the reception secretary whose duty it is to welcome all visitors to 2GB and direct them to whatever department they require.

Inside the swing doors you will find the Accounts Department, the Announcers' Departments, the Programme Department, in fact all those departments usually associated with a broadcasting station. All these are waiting to render you their particular service.

Direct Personal Supervision

ALMOST facing you as you enter the inner office of 2GB is the office of Mr. A. E. Bennett, Managing Director. This is the heart of the whole station's life, and from here circulates all the business of the station. In the fullest sense of the words it is true that whatever your business with 2GB may be, it comes sooner or later under the personal supervision of Mr. Bennett, whose organising ability has made 2GB the station it is to-day.

Sales and Service

ON the opposite side of the corridor you will find the Advertising Sales Department and in close touch with it, the Sales Service Department. The purpose of the first is to sell you time on the air, and it is directed by Mr. C. A. Fletcher as departmental manager. Mr. Fletcher is one of the men who first put radio advertising on the map of Australia. And he did that by offering his clients Service. In pursuance of this policy, 2GB has now formed a separate Service Department under the guidance of Mr. John Armitage.

The duty of this department is to follow up sales and see that you, the advertisers, are fully satisfied with the programme you are sponsoring, with the manner of its presentation, and with the results you are obtaining. If the results are not satisfactory, the Service Department sets about discovering why broadcast advertising is not pulling results for you in the same way it does for others. Where the advertiser's campaign is handled by an agency, the

2GB Service Department co-operates with the agency in every way possible, supplementing their knowledge of advertising with its specialised knowledge of radio advertising. In its thoroughness, it renders a service unique in Australian radio advertising.

That Sales Message

CROSSING the corridor once more, we come to the Copywriting Department. In the old days of broadcasting nearly all advertisers over the air used spot advertising, and the copy was written by the advertiser to suit his own tastes. As radio advertising grew, it became necessary to supervise the announcements put over the air, to see that they were suitable for the new medium. There came a time when nearly all copy was written by men who had made a special study of spoken advertising as against written or illustrated advertising. To-day Copywriting is a department on its own, and 2GB has placed it under the supervision of Mr. E. Mason Wood, who not only o.k.'s all copy written, but incorporates the latest ideas from abroad wherever possible. Records of ace advertisements from America have been obtained, and the latest advertising periodicals are studied.

Making Your Programme Known

NEXT door to the Copywriting Department and in close touch with the Sales Service Department is the Publicity Department. This is a newer development in radio, but born of the growing realisation that it is not sufficient for a programme to be put on the air and left to do its work. The programme must be sold to the public and linked up with whatever press advertising campaign the advertiser is carrying on at the moment in order to obtain the maximum results from both. The Publicity Department is there to utilise the press to the fullest extent in creating interest in your programme. It makes known through the medium of the newspapers the activities and personalities of 2GB and helps create a public for every important programme put on the air by Station 2GB.

In brief, 2GB is not satisfied for its Advertising Sales Department to sell you a session and leave it to take care of itself. From the moment the contract is signed, the Service Department is in constant contact with you, analysing results and adjusting any misunderstandings, the Copywriting Department writes or supervises your advertising copy for you, and the Publicity Department co-operates with you in making your programme known. Thus 2GB guarantees you success with your radio advertising.

2GB—THE NATION'S STATION—2GB

COMMERCIAL BROADCASTING STATIONS IN AUSTRALIA—(Continued)

2GN

GOULBURN BROADCASTING CO. LTD. Studio, Auburn St., Goulburn. Station location, River Road, Goulburn, 2 miles S.W. Goulburn P.O. Commenced operations, 17/12/31. Officially opened 25/1/32. 216 m., 1390 k.c., 100 watts. Manager, F. R. Pearce. Directors, E. T. Fisk and L. A. Hooke. Advertising representatives, Amalgamated Wireless (A/sia) Ltd., 47 York St., Sydney, and 167 Queen St., Melbourne. Announcers: F. R. Pearce, Miss E. McGladery, Miss J. McNaught. Transmission Times: Monday to Friday, 12.15 to 1.45 p.m., 5.30 to 10.30 p.m.; Saturdays, 12 noon to 3 p.m.; Sundays, 7.30 to 10.30 p.m. Special Sessions: 12.15 p.m., Weather and News; Saturday, 7.15 p.m., Sporting Comments; Saturday, 9.45 p.m., Dance Music; Sunday, 8.30 p.m., Band Recital.

2HD

AIRSALES BROADCASTING CO. Station and studio location, 6 miles N.W. Newcastle P.O. Box 123, Newcastle. Phone Waratah 487. Commenced 7/1/25. 270 m., 1110 k.c. (after 1/9/35, 261 metres, 1140 k.c.), 500 watts. Under the management of E. A. Wood. Directors, E. A. Wood and R. C. Sparkes. Advertising Manager, R. C. Sparkes. Production Dept., E. W. Rowe. Merchandising Dept., H. H. Heath. Chief Engineer, T. C. Kitto. Interstate representatives: Sydney Advertising Office, E. A. Wood, c/o Broadcasting Dept. Amalgamated Wireless (A/sia) Ltd., 47 York Street, Sydney; Victoria, F. Wood, 20 Charles St., Elsternwick. Announcers: Mesdames Sparke and Johnston and Miss Hartwig, Reg Hudson and Jim Craigo, A. Auchterlonie and H. H. Heath. Special Sessions: Children's Joy Club, 8 a.m. to 8.15, and 5 to 5.15 p.m.; Ladies, 9.30 to 11.30 a.m. and 3 to 4 p.m.; Country Man's, 6 to 6.45 a.m., market reports, etc.; Race Session every Wednesday and Saturday afternoons; Motor Session, 9.15 p.m. every Friday; Sporting Notes by Jimmy O'Ryan, 8.45 to 9 p.m. every Friday. Transmission Times: Weekdays, 6 a.m. till 10.30 p.m.; Saturdays, 6 a.m. till midnight; Sundays, 9 a.m. till 12 noon, 3 p.m. to 4 p.m. and 5 p.m. till midnight.

2KO

NEWCASTLE BROADCASTING CO. LTD., Hunter and Wolfe Sts., Newcastle. Phone NC 932. Station location, Sandgate, 6½ miles N.W. Newcastle P.O. Commenced 1/8/31. 1415 k.c., 212 m. (after 1/79/35, 213 m., 1410 k.c.), 500 watts aerial. Manager, Harold Pickover. Managing Director, Allen Fairhall. Interstate representatives, V. H. Coghlan, Melbourne; Wm. Thompson, Assembly Bldg., Margaret St., Sydney, B5370. Announcers: Harold Pickover, Allen Webber, Tom King, Lawrence Gordon, Elma Gibbs, Ann Arnold. Transmission Times: 7 a.m. to 4 p.m., 5 p.m. to 10.30 p.m., Monday to Saturdays inclusive; Sunday, 9 a.m. to 10 a.m., 6 p.m. to 10.30 p.m.

2KY

TRADES AND LABOUR COUNCIL OF N.S.W., 424 George St., Sydney; M6291. Station location, 8 miles E. of G.P.O. Commenced 31/10/25. Freq. 1070 k.c., 280 m. (after 1/9/35, 294 metres, 1020 k.c.), 1000 watts aerial. General Manager, E. R. Voigt. Secretary, R. A. King. Studio Manager, H. E. Beaver. Asst. Studio Manager, Harcourt Garden. Chief Engineer, J. Brown. Advertising Manager, H. T. Hungerford.

Announcers: Mrs. Grey, Esme Williams (Women's Session), Messrs. H. E. Beaver, Harcourt Garden, John Harper, Donald Day, J. Farelly, E. Walker, Ian Garden, Captain Bairnsfather, Rion Voigt, Eric Gordon, Andy Flanagan.

Sessions: Women's Session, Mrs. Gray and Miss Esme Williams. Children's Session, Uncle Don and Rion. Community Concerts, H. E. Beaver. Musical Session, Harcourt Garden. Sporting Interviews and Travel Talks, Rion. General Sporting Commentaries, Andy Flanagan. Turf Racing Broadcast and Commentary, Eric Gordon and Ian Garden. Wrestling and Boxing Ringside Descriptions, E. R. Voigt. Social and Economic Talks, J. S. Garden, M.H.R. Daily News Session and Commentary, E. R. Voigt. Old Comrades' Session, Captain Bairnsfather. Radio Plays, Miss Esme Williams and Captain Bairnsfather.

Transmission Time

Monday, Tuesday, Thursday and Friday, 7 a.m. to 12 noon, 1 p.m. to 3.30 p.m., and 4.30 p.m. to 11 p.m.; Wednesdays, 7 a.m. to 11 p.m.; Saturdays, 7 a.m. to 11.30 a.m., 12.30 to 5 p.m., and 5.30 to 11 p.m.; Sundays, 7.30 a.m. to 11 p.m.

2MO

M. J. OLIVER, Marquis St., Gunnedah. Station location, ¾ mile W. of P.O. Commenced 16/1/31. Freq. 1320 k.c., 227 m. (after 1/9/35, 208 m., 1440 k.c.), 50 watts. Under the management of M. J. Oliver. Directors, M. J. Oliver, L. M. Oliver, H. W. Goddard. Advertising representatives, Amalgamated Wireless (Aust.) Ltd. Announcers: H. W. Goddard, Advertising Session; M. J. Oliver, News Sessions, 8-8.30 a.m., 8.15-8.30 p.m.; Mrs. L. M. Oliver, Morning Session; N. McNaughton, Early morning session, 7-8 a.m.; C. Hardman, Sporting, 7.40 p.m. Special Sessions: Breakfast Music, 8.30-9 a.m.; Luncheon, 12-2 p.m.; Children's, 6-6.30 p.m.; Slumber Music, 9.30-10 p.m.; Stock Reports and Sales, 7.30 p.m. Transmission Times of Station: Weekdays, 7 a.m. to 9 a.m., 12 p.m. to 2 p.m., 6.30 to 10 p.m.; Sunday, 8 a.m. to 10 a.m., 6 p.m. to 10 p.m.

2SM

CATHOLIC BROADCASTING CO., Australia House, Wynyard Square, Sydney; phone B7294. Station location, Pennington Hills, 11¼ miles N.W. of G.P.O. Commenced 24/12/31. Freq. 1270 k.c., 236 m., 1000 watts aerial, half wave signal, vertical mast 450ft. high, top of mast 825 feet above sea level. General Manager, Monsignor Meaney. Studio Director, John Dunne. Announcers: John Dunne, John Tuttle, Dominic Harnett, Marshall Crosby, Claude Healy, Stan Nagle, Harry Millard, Frank Lee, Reg McKenzie, Ron Smith, Robt. McColl, Camden Morrisby, B. A. McMichan, H. L. Tonkin, Miss Doreen Mackay, Miss Daisy Tetley, Miss Ahern. Engineers, Amalgamated Wireless (Aust.) Ltd. Advertising, Lance P. Quirk. Publicity, Eric A. Shaw. Secretary, Olive Malone. Accountancy, J. Joyner. Transmission Times: Monday to Saturday, 7 a.m. to 9 a.m., 1 p.m. to 10.30 p.m. On race days (usually Wednesdays) station reopens about noon half hour prior to first race; Sunday, 11 a.m. to 2 p.m. and 5 p.m. to 10.30 p.m.

2TM

TAMWORTH RADIO DEVELOPMENT CO., Peel St., Tamworth. Station location, 1½ miles N.W. of Tamworth. Commenced, 27/2/35. 1490 k.c., 201 m. (after 1/9/35, 1300 k.c., 231 m.), 50 watts aerial. Under the management of E. Higginbotham. Directors, E. Higginbotham, T. Whitcomb, C. L. Southwell, M. Sheffer, A. E. Norton. Executives, T. Whitcomb (Engineer), W. L. Penny (Sales Manager). Advertising Representatives, V. L. H. Coghlan, 44 Margaret Street, Sydney. Announcers, R. James and Dorothy Ward. Sessions: News, 7 a.m. to 8 a.m.; Lunch Hour, 12 noon to 2 p.m.; Children's, 5.30 to 6.15 p.m.; Dinner Music, 6.15 to 7 p.m.

Transmission Times

7-9 a.m., 12 noon to 2 p.m., 3.30 to 4.30 p.m., 5.30 to 10 p.m.

2UE

RADIO 2UE SYDNEY LTD. 296 Pitt St., Sydney. Station location, Lilli Pilli, 14 miles S.S.W. of G.P.O. Commenced, 26/1/25. Wavelength 293 m., 1025 k.c. (after 1/9/35 316m., 950 k.c.), 1000 watts aerial. Phone M4577. Manager and Managing Director, C. V. Stevenson. Interstate Representative, David Duff, 3AW Latrobe St., Melbourne. Executives: Murray Stevenson, Chief Engineer; W. Robinson, Asst. Engineer; R. H. Wolff, Secretary and Accountant; S. E. Baume, Advertising Manager; F. Harty, Asst. Advertising Manager; F. Daniell, Programme Manager; Norman Stevenson, Studio Manager; R. A. Shaw, Musical Director; Isabelle Grace, Publicity Officer.

Announcers: Captain A. C. Stevens (The Story Teller), Si Meredith (Community Singing Leader, Australian Hall, Thursdays 12 noon to 2 p.m., M.C. Old Time Dance, fortnightly at Wentworth, Uncle Si of the Children's Session), C. Agassiz (Wake Up and Hospital Cheerio Sessions), C. Honeyfield (Agricultural Commissioner 2UE).

(Continued on Page 116)

COMPLETE COVERAGE BY

2UE

THE PIONEER
COMMERCIAL RADIO
BROADCASTING
STATION IN
AUSTRALIA

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COMMERCIAL BROADCASTING STATIONS IN AUSTRALIA—(Continued)

General Announcers: Ronald Morse, John Murray, Ken Layton, Brian Molloy, Frank Sturge Harty (The Radio Adviser on Life's Problems), Harry Solomons (Racing Commentator) and Mrs. Filmer and Miss Shaw (Women's Sessions).

Special Sessions: The Wake Up Session, 6 a.m. to 8 a.m.; Women's, 9 a.m. to 12 noon; The Home and Garden, 12.30 p.m. to 1.30 p.m., Mon., Tuesday and Friday; The Radio Adviser Session, 3.15 p.m. to 3.45 p.m., Mon., Tues., Thurs., Friday; Racing, Wednesday and Saturday afternoons; Children's, 4.45 to 5.45 p.m., Mon. to Sat.; Tranquillity Music, 11.15 to 11.30 p.m.

Transmission Times

Monday to Friday, 6 a.m. to 11.30 p.m.; 6 a.m. Saturday to 1 a.m. Sunday; 8 a.m. Sunday to 11 p.m.

2UW

COMMONWEALTH BROADCASTING CORPORATION LTD. Station and offices, located in 7th Floor State Theatre Building, 49 Market Street, Sydney. Phone M6686 (6 lines). Cable address, TWOUW. Commenced 13/2/25. Wavelength 267 m., 1125 k.c. (altered from September 1st, 1935, to 270 metres, 1110 k.c.), 750 watts. General Manager, Oswald Anderson. Directors, Stuart F. Doyle, Frank Albert, Alexis Albert, Edwin Geach, Frank Marden (Directors' Representative) and Frank Sayle (Secretary). The only Station in the British Empire giving a continuous 24 hours service. Names and Positions of Executives: F. R. Thompson, Sales Manager; F. E. Levey, Service Manager; Norman Lyons, Supervisor; Clifford Arnold, Programme and Station Accompanist; George Davis, Continuities and Copy; M. Whitfield, Publicity; Charles Lawrence, Racing Commissioner; Arthur Marshall, Chief Engineer; Keith Blakeney, Librarian. Interstate representatives, 3DB Melbourne, 5AD Adelaide, 4BC Brisbane and 6ML Perth.

Announcers and Their Sessions: J. M. Prentice, Foreign Affairs, Wednesday and Sunday nights; Grand Opera; New Zealand Session, Friday, 9.15 p.m.; Children's, 5 p.m. daily, Jack Win; Piebald Philosophy and Humorous Sketches, 9 p.m., Vernon Sellars; Diggers, daily 9 a.m., Miniature Musicale Monday and Wednesday, Myra Dempsey; Women's, Norman Lyons; Model Aeroplane Sessions, Monday, Wed., and Fri., at 5.40 p.m., and Boy Scouts on Tuesday at 5.40 p.m., J. A. Crawcour, Country Man's Session, 4.45 to 5 a.m. daily, dairy man's, 5 to 5.30 a.m. daily, and General Farming 5.30 to 6 a.m. daily; Ernest Collibee, Dinner Sessions, and also Pilot in charge of 2UW Surf Patrol Planes; Charles Lawrence, Racing Commentator, Saturday afternoons; Cyril Angles, Racing Commentator, Wed. and Sat.; Wm. Hardy, Dogs and Poultry, Mon., Wed. and Friday; K. Blakeney, Professor of Music, Sunday mornin.

General Announcers: Len Maurice, J. S. Wheeler and George Bills-Thompson.

Feature Artists: Ellis Price, Mayne Lynton, Vernon Sellars, Amy Ostinga, Clifford Arnold, Jack Win "Win and Windle," Athol Tier and Charles Lawrence.

Transmission Times: 24 hours per day, 7 days per week, 365 days per year.

2WG

RIVERINA RADIO BROADCASTING CO. LTD., 16 Fitzmaurice St., Wagga. Station located $6\frac{1}{2}$ miles from Wagga P.O. Commenced 29/6/32. 260 m., 1155 k.c. (after 1/9/35, 1150 k.c., 261 m.), 500 watts.

2WL

WOLLONGONG BROADCASTING CO., c/o Edward and Church Sts., Wollongong. Station location, $\frac{3}{4}$ mile N.N.W. of P.O. Commenced, 18/7/31. Freq. 1435 k.c., 209 m. (after 1/9/35, 210 m., 1430 k.c.), 50 watts aerial. Manager, Russell A. Yeldon. Transmission Times: 10.30 a.m. to 12 noon, 6 p.m. to 10 p.m.

2XN

G. W. EXTON, 173 Molesworth St., Lismore. Station location, 3.8 mile S.W. of P.O. Commenced 1/5/30. 224 m., 1340 k.c., 50 watts. Manager, Walter G. Exton. Advertising Representatives, Amalgamated Wireless (A/sia) Ltd. Announcers, Walter G. Exton and Fred L. Swift. Special Sessions. Transmission Times: Monday to Friday, 7 to 8 a.m., 2 to 3 p.m., 6 to 10 p.m.; Saturday, 7 to 8 a.m., 6 to 10 p.m.

3AK

MELBOURNE BROADCASTERS PTY. LTD., 116 Queen Street, Melbourne, C.I. Central 1900. Station location, 8 Yerin St., Balwyn, E.8, $6\frac{1}{2}$ miles N. of G.P.O., Melbourne. Commenced 19/11/31. Freq. 1500 k.c., 200 metres, 200 watts. Manager, G. F. Palmer. Directors, G. F. Palmer and W. Harrison. Announcers, F. C. Bibby, T. L'Elliott. Advt. Dept., W. H. Elsum, P. A. McCaul-Smyth. Interstate Rep., K. G. Stephens, Wingello House, Sydney, and F. J. Valentine, 1 Shoobridge St., Glebe, Hobart. Transmission Times: Monday to Friday, 5 a.m. to 7 a.m., 11.30 p.m. to 2 a.m.; Saturday, 5 a.m. to 7 a.m., 1 p.m. to 2 p.m., 11.30 p.m. to 3 a.m.; Sunday, 12.30 p.m. to 2.30 p.m., 10 p.m. to 12 midnight.

3AW

THE VOGUE BROADCASTING COMPANY PTY. LTD., owned and operated by David Syme & Co. ("The Age"), J. C. Williamson Ltd. and Allan & Co. Pty. Ltd., controlling the Feature Station, 382 Latrobe St., Melbourne. Commenced 22/2/32. Freq. 1425 k.c., 211 m. (after 1/9/35, 1280 k.c., 234 m.), 600 watts. Manager, Stuart Bridgman. Directors, John H. Tait, F. H. Tait, J. H. Syme, Geoffrey Syme, George Sutherland. Executives, Hector Harris, Secretary; Gordon Massey, Studio Manager; John Ryan, Chief Engineer. Interstate Representative, V. L. H. Coghlan, Room 320, 44 Margaret St., Sydney. Rodway Gainford, Chief Night Announcer. Lloyd Lamble, Night Announcer.

Special Sessions and Announcers: Breakfast, Nicky and Tuppy, 6.30-9.15 a.m.; Racing and Sporting, Fred Tupper; Children's, Kath Lindgren, Cliff Nicholls, Ron Sullivan, Rod Gainford, 4.45-6.10 p.m.; Women's, Geraldine Bright, 2-4 p.m.; Women's Sports and General Activities, Mon., Wed. and Fri., 1.15 p.m., Gwen Varley; Friday night, 7.45 p.m., Gwen Varley, Saturday night, 6.15 p.m., Gwen Varley; Travel Series, George Matthews, 4 p.m., Mon., Tues.; Lee Murray Players, Wednesdays, 8.30 to 9.15 p.m.;

Transmission Times: 6.30 to 10 a.m., 11 to 11.30 p.m. daily; Sundays, 10.15 a.m. to 12.30 p.m., 4.30 p.m. to 10.30 p.m.

3BA

BALLARAT BROADCASTERS PTY. LTD., cnr. Armstrong and Dana Sts., Ballarat, Vic. Phone 568. Station location, opposite P.O., Sturt St., Ballarat. Commenced 31/7/30. Freq. 1300 k.c., 231 m. (after 1/9/35, 1320 k.c., 227 m.), 50 watts aerial. Change of site to Lydiard Street pending. Managing Director, James H. Davey. Station Manager and Engineer, Warne A. Wilson, Engineer, Alfred D. Kerr. Interstate representative, Amalgamated Wireless (A/sia) Ltd., 47 York Street, Sydney.

Announcers: Stephen C. McDonald, Children's and night; Miss Lela Lake, Children's and night; Mr. Pat Corby, Early bird, breakfast, children's and sporting.

Special Sessions: Early Bird Breakfast, 7.30 a.m.; News Service, 7.50 a.m.; Children's, 7 p.m. every night; Eric Welsh Race Transmission, 1.30 Saturday afternoon; Sporting news, 8 p.m. Saturday; Dance Hour, 10 p.m.; Children's, with Aunt Lucy Juvenile, 6.30 p.m.

Transmission Times: Week days, 7.30 a.m. to 10 a.m., 7 p.m. to 10.30 p.m.; Saturdays, 7.30 a.m. to 10 a.m., 1.30 p.m. to 5 p.m., 7 p.m. to 11 p.m.; Sundays, 12.45 p.m. to 3 p.m., 6.30 p.m. to 10 p.m.

3BO

AMALGAMATED WIRELESS A/SIA LTD., Bendigo. Station and Studio location, Kangaroo Flat, 3 miles south of Bendigo. Commenced, 4/6/31. 309 m., 970 k.c., 200 watts. Manager, A. L. Shepherd. Director, E. T. Fisk. Interstate representative, Amalgamated Wireless (A/sia) Ltd., 47 York St., Sydney. Announcers: M. A. L. Shepherd, A. E. Hoad, Miss M. Shipp, Miss Amy Huxtable, Miss K. Major, S. Griffiths. Special Sessions: Saturday Dance Programme, 9.35 p.m.; Monday to Saturday, Market Quotations and News, 9 p.m.

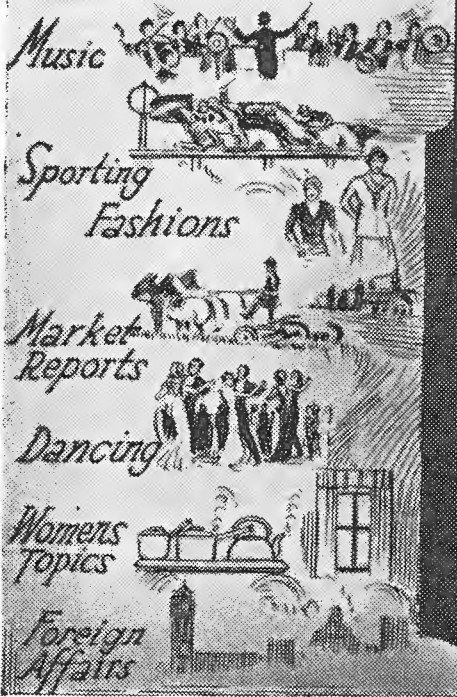
Transmission Times: Monday to Friday, 11 a.m. to 1.30 p.m., 5.30 to 10.30 p.m.; Saturday, 11 a.m. to 10.30 p.m.; Sunday, 7 p.m. to 10 p.m.

(Continued on Page 118)

2UW.
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TRADE DEMONSTRATIONS
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2UW cordially invites the Radio trade of Sydney to use its programmes when demonstrating.

2UW's broadcasting service is both continuous and consistently good.

2UW Service is never off the air, day or night.

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2UW's two transmitters ensure uninterrupted service—the change-over is effected in 5 seconds.

2UW's aerial power is the maximum allowed commercial stations within the metropolitan area.

2UW's Programmes are always bright, entertaining, and appealing.

2UW is on the air
24 hours per day,
7 days per week,
365 days per year.

Controlled and operated by the Commonwealth Broadcasting Corporation, 49 Market Street, Sydney

COMMERCIAL BROADCASTING STATIONS IN AUSTRALIA—(Continued)

3DB

HERALD BROADCASTING STATION (3DB Broadcasting Station Pty. Ltd.), 36 Flinders St., Melbourne. Commenced, 21/2/27. 1180 k.c., 254 m. (after 1/9/35, 1030 k.c., 291 m.), 600 watts aerial. Manager, David Worrall. Directors, Thorold Fink (chairman), Duncan Macpherson, George Taylor, E. A. Price, S. E. Deamer and S. A. Whyte. Executives: Programme Director, Charles Taylor; Advertising Service Manager, R. McCowan Russell; Engineer, E. Ashwin; Interstate Representatives, Fred Thompson, Warwick Building, Sydney; Chief Announcer, Ren Miller; Day Announcer, Alan Cooper; Sunday Night Announcer, Geoff Palmer; Early Morning, "Daybreak Dan" (John Stuart). Feature Artists: Charlie Vaude, Comedian; John Stuart and "Sally Ann," Lady Announcers, Iris Turnbull and Mrs. Ben Richards, Marjorie Troy, Pianist Reg. Brown.

Transmission Time: 6.30 a.m. to 11.30 p.m. week days, 6.30 a.m. to midnight, Saturdays; 10 to 12 noon and 2.30 to 9.30 p.m., Sundays.

3GL

GEELONG BROADCASTERS PTY. LTD., Lt. Malop St., Geelong. Phone 1516. Station location, $\frac{1}{4}$ mile south of Geelong P.O. Commenced, 3/12/30. 1400 k.c., 214 m. (after 1/9/35, 1350 k.c., 222 m.), 50 watts aerial. Manager, J. A. McKenzie. Managing Director, Ramsay B. Cook. Executives: Advertising Manager, H. Varley; Studio Manager, Mr. W. W. Gray; Chief Engineer, Mr. M. I. Israel. Representatives: Victoria, Robt. D. Fisher, Newspaper House, Collins St., Melbourne; N.S.W., F. L. Wilson, Lisgar House, Carrington St., Sydney. Announcers: Messrs. W. W. Gray, I. N. Dickson, C. McLennan, N. T. O'Dea and Mesdames D. Dungan and V. Cartwright. Special Sessions: Football, 2.45-5.30 p.m., Saturday; Weekdays, Old King Cole's Court, 5.30 to 6 p.m.; Monday, 7.30 p.m., "Road and Touring Notes"; Friday, 6.45 p.m., "Golf"; Friday, 7 p.m., "Football"; Monday and Wednesday, 7.15 p.m.

Transmission Times: Monday, 7 a.m. to 9.15 a.m., 1 to 2 p.m., 5.30 to 10.30 p.m.; Tues., Wed., Thurs., 7.30 to 9.15 a.m., 1 to 2 p.m.; 5.30 to 10.30 p.m.; Friday, 7.15 to 9.15 a.m., 1 to 2 p.m., 5.30 to 10.30 p.m.; Saturday, 7.30 to 9.15 a.m., 6 to 11 p.m.; Sunday, 7 to 10.15 p.m.

3HA

WESTERN PROVINCE RADIO PTY. LTD., 37 Gray St., Hamilton. Phone 316. Station location, 4 miles N. of P.O. Commenced 24/10/31. Freq. 1010 k.c., 297 m., 300 watts aerial. Manager, J. F. Ridley. Directors, D. F. Syme, G. S. Featonby, G. S. Sutherland, and E. T. Fisk. Interstate Representative, J. M. Mundle, 43 Hunter Street, Sydney. Announcers: Richard Burrows, Feature Programme Announcer; George Wells, Breakfast Session; Donald James, Midday and Children's; Miss Wilson, Women's Session. Special Sessions: The "Age" News, Weather Forecast, 8 a.m. daily (K. Campbell); Farmers' Session, 7 to 7.15 daily except Saturdays; Community Singing, 9 o'clock Fridays; Sporting (S. Murphy), Saturday afternoons, Eric Welch.

Transmission Time: 7 to 9 a.m., 12 to 1.45, 1.45 to 4.15, 5.45 to 6.30 and 6.30 to 10.30 p.m., 11 to 4.30 and 7 to 11 Sundays.

3HS

WIMMERA BROADCASTING CO. PTY. LTD., 84 Wilson St., Horsham. Studio location, 100 yards N. of P.O. Commenced 11/9/33. 219 m., 1370 k.c., 50 watts. Manager, A. T. Hopton. Directors, R. D. Elliott and J. V. S. Ward. Interstate Representatives, F. L. Wilson, Sydney. Announcers: Hopton, M. Hinneberg and Miss N. Orloff. Special Features: Diggers Session, Dance Session, Judge Rutherford's Lectures, News, sporting and market reports. Transmission times: 12 to 1 daily, Monday 6.30 p.m. to 10.30 p.m., Tuesday 6 p.m. to 10.30 p.m., Wednesday 6 to 10.30 p.m., Thursday 6.30 to 10.30 p.m., Friday 6 to 10.30 p.m., Saturday 6.30 to 11 p.m., Sunday 7 to 10 p.m.



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on the Air"*



R. A. KING
Secretary



E. R. VOIGT
General Manager

COMMERCIAL BROADCASTING STATIONS IN AUSTRALIA—(Continued)

3KZ

INDUSTRIAL PRINTING PUBLICITY CO., 64 Elizabeth St., Melbourne. Central 318-319. Station location, 40 Victoria St., Carlton, 1½ miles N. Elizabeth St. P.O. Freq. 1350 k.c., 222 m. (after 1/9/35, 1180 k.c., 254 m.), 600 watts. Commenced 8/12/30. Managing Director: S. Morgan. Directors, W. V. Morgan and M. G. Sloman. Interstate Rep., A. M. Ross-Smith, 117 Pitt St., Sydney. Announcers: Norman Banks, Norman Balmer, Alex Dear, Kenrick Hudson, Charles Hawthorne, Naomi Melwit, Dorothy Bush. Announcers and Sessions: Miss Jeanne Smiley, Women's, Monday to Friday, 11 to 11.15 a.m.; P. W. Pearce, of Pearce Physical Culture Institute, Friday, 7.45 p.m.; George Edwards, Half hour Plays, Sunday, 8.45 p.m.; "Jolly Joey," Children's, 5.30 to 5.45 daily.

Transmission Times

Monday to Thursday, 6.30 a.m. to 2 p.m., 2.30 p.m. to 4.30 p.m., 5.15 p.m. to 11.30 p.m.; Friday, 6.30 a.m. to 4.30 p.m., 5.15 p.m. to 11.30 p.m.; Saturday, 6.30 a.m. to 10.45 a.m., 12.15 p.m. to 1 a.m.; Sunday, 2.30 p.m. to 4.30 p.m., 6 p.m. to 10 p.m.

3MA

SUNRAYSIA BROADCASTERS PTY. LTD., Langtree Av., Mildura, Vic. Phone 25. 333 m., 900 k.c., 50 watts. Located N.N.W. of P.O. Commenced, 25/5/33. Manager, J. A. Young. Directors, Senator R. D. Elliott, G. S. Baxter, and C. D. Lanyon. Secretary, C. D. Lanyon. Interstate Representatives, Amalgamated Wireless (A/sia) Ltd., Melbourne and Sydney. Announcers: J. A. Young and Miss E. J. Hurrey. Special Sessions and Time: Camera Club, A. J. Jenkins, Monday, 8.30 to 8.45; Gardening, A. Gugger, Tuesdays, 8.15 to 8.30; Motoring, T. C. Bell, Thursdays, 8.30 to 8.45; Children's, P. Lamb, Sundays 6.30 to 7, Wednesdays 6 to 6.30.

Transmission Times: 12.15 to 1.30 p.m. daily except Sunday; 11 a.m. to 2 p.m., 6.30 to 10.30 p.m. nightly except Wednesday; commence 6 p.m. Tuesday and Saturday, close down at 11 p.m.; Sunday close down at 10 p.m.

3SH

SWAN HILL BROADCASTING CO., Campbell St., Swan Hill, Vic. Phone 226 and 247. Station location, half mile S. of P.O. Commenced 27/8/31. 1080 k.c., 278 m., 50 watts aerial. Manager, E. Wendel. Directors, E. Wendel, and W. Cornish. Chief Announcer and Programme Director, Norman J. Blee. Station Engineer, J. E. Mair. Publicity Controller, E. Wendel. Technical Supervisor, W. Cornish. Interstate Representatives: Victoria, Amalgamated Wireless (A/sia) Ltd., Melbourne and Sydney; R. J. D. McCallum and Son Ltd., 15 Hamilton St., Sydney.

Transmission Times: Weekdays, 12.30 to 1.30 p.m., 7 to 10.30 p.m.; Saturdays, 12.30 to 1.30 p.m., 7 to 11 p.m.; Sundays, 12.15 to 2.15 p.m., 4.15 to 6 p.m., 7.15.

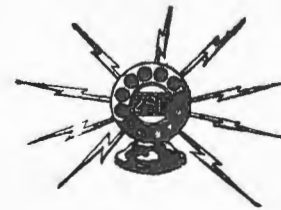
3TR

GIPPSLAND PUBLICITY PTY. LTD. Studio, Raymond St., Sale. Phone 107. Station, Myrtlebank, 4 miles N.W. of Sale P.O. Commenced, 25/5/33. 1280 k.c., 234 m. (after 1/9/35, 1240 k.c., 242 m.), 250 watts. Managing Director, Archibald Gilchrist. Studio Manager, Gwenyth Gilchrist. Advertising Rep., S. R. McLaren. Chief Announcer, George Jaeger. Transmission Times: Daily, 10.30 to 1.30 p.m., 6 to 10.30 p.m.; Saturdays, 10.30 to 1 p.m., 6 to 10.30 p.m.; Sundays, 6.30 p.m. to 10.30 p.m.

3UZ

NILSEN'S BROADCASTING SERVICE PTY. LTD., 45 Bourke St., Melbourne C.1. Central 572, M3529. Station location, half-mile N.E. Elizabeth St. P.O. Commenced 8/3/25. 930 k.c., 323 m., 600 watts. Manager, A. N. Kemsley. Directors, O. J. Nilsen, C. T. Cromie, Vic. Nilsen. Advertising Manager, J. S. Larkin. Studio Manager, Hal Percy. Programme Director, Geo. English. Chief Engineer, Les Glew. Accountant, Eric Cottrell.

Transmission Time: Week days, 7 a.m. to 11.30 p.m.; Saturdays, 7 a.m. to midnight; Sundays, 10 a.m. to 12.30 and 5.45 p.m. to 10 p.m.



Music

... sweet and melodious, places 2BH Broken Hill among the most popular stations in Australia. NATIONAL ADVERTISERS are invited to avail themselves of the broadcasting medium which serves the greatest area of New South Wales.

2BH Broken Hill

Owned and Operated by

RADIO SILVER CITY LTD.

Power 100 watts (in the aerial) Wave Length 220.6 metres

HOURS OF TRANSMISSION

Morning Session 7 a.m. to 9 a.m.
 Evening Session 6 p.m. to 10.30 p.m.
 Sundays 10.30 a.m. to 1 p.m.; 6 p.m. to 10 p.m.

COMMERCIAL BROADCASTING STATIONS IN AUSTRALIA—(Continued)

3WR

GOULBURN VALLEY & NORTHEASTERN BROADCASTERS PTY. LTD., High Street, Shepparton, Vic. Station location, 6 miles N. of P.O., Shepparton. Commenced 5/1/31. Freq. 1260 k.c., 238 m., 500 watts.

3XY

STATION 3XY PTY. LTD., 3-5 Bank Place, Melbourne. 211 m., 1420 k.c. (not in operation).

3YB

MOBILE BROADCASTING SERVICE PTY. LTD., Head Office, 430 Lt. Collins St., Melbourne, Central 7759. Commenced 13/10/31. Freq. 1060 k.c., 283 m., 25 watts. Studio and station is mobile in a railway carriage. Manager, V. M. Dinneny. Directors, L. G. Callaway, A. N. Rennie, G. I. Purbrick and V. M. Dinneny. Engineer, A. J. Glover. Announcer, F. A. Hood. Transmission times of station (every day), 6.30 to 10.30 p.m., Sundays 7 to 10 p.m.

4AY

AYR BROADCASTERS PTY. LTD., Airdmillan Rd., Ayr, N.Q. Phone 219. Station location 3 miles N.E. of P.O. Commenced 1/10/34. 306 m., 980 k.c., 50 watts. Managing Director, Norman L. Dahl. Director, R. D. Low and J. L. Humphry. Announcers, Norman L. Dahl, A. L. Llewellyn, V. Bohm. Special Sessions: Complete Grand Opera recording first Sunday in every month commencing at 8 p.m.; Pat, Frank and the Boys (Dance Orchestra), every Tuesday evening from 8 till 9. Transmission Times: 6 to 10.30 p.m., Mondays to Saturdays; 8 till 10 p.m. Sundays. About to commence an afternoon session, 2 to 5 p.m.

4BC

J. B. CHANDLER & CO., 43 Adelaide St., Brisbane. B5493. Station location: Ipswich Rd., Oxley, 7½ miles S.W. of G.P.O., Brisbane. Commenced 16/8/30. Freq. 1145 k.c., 262 m. (after 1/9/35, 1120 k.c., 268 m.), 1000 watts. Manager, Russell F. Roberts. Advertising Manager, J. A. Radford. Howard Sleath, Musical Director; Edward Howell, Producer; G. Suther-

land, Chief Engineer. Interstate Representatives: D. Duff, c/o 3AW Melbourne; A. D. Bourke (Country Press), Sydney; Overseas, Pat Lindsay, London. Announcers and Sessions: Ruth Rutherford, Women's; Uncle Charles, General Aviation; Uncle Terence, General; Jim Anderson, Queensland Racing; Barney Cook, Cricket; Stan Philips, Sailing, Golf and Football. Feature Artists: Maurie Gilman and his Australians and Molly, Ned Tyrrell and his Orchestra, Leslie Richmond, Regent Theatre Organist, Mrs. Norman Bell (soprano), Miss Edna Rose (contralto), Mrs. Max Deacon (contralto), The Radiola Players.

Transmission Times: Monday to Friday inclusive, 6.30 a.m. to 9 a.m., 10 a.m. to 12 noon, 12 noon to 2 p.m., 2 p.m. to 4 p.m., 5.30 p.m. to 6 p.m., 6 p.m. to 11 p.m.; Saturday, 6.30 a.m.; Sunday, 10 a.m., 12 noon, 3 p.m. to 5.30 p.m., 5.30 p.m. to 10.30 p.m.

4BH

BROADCASTERS (AUST.) LTD., Parbury House, Eagle St., Brisbane. B3810, B3935. Station location, Bald Hills, 9½ miles N.N.W. Brisbane G.P.O. Commenced 2/1/32. 1380 k.c., 217 m., 600 watts. Manager, Arthur L. Prince. Directors, J. B. Chandler, V. F. Mitchell, R. D. Kennedy, Neil F. O'Sullivan. Announcers and Special Sessions: Geo. C. Hardman, Sunday, 9-10 p.m., Stadium Broadcast Wednesday and Saturday 9 p.m., Feature presentation each night 8 p.m.; Arch Graham, Early Morning 7 to 9 a.m., Community Singing 12.30 each Thursday, Children's Party 10.30 a.m. each Saturday; Charles Dearden, Asst. Evening Announcer. Musical Comedy Presentations each Tuesday 8 p.m.; Women's, Daily 11 a.m. to 1 p.m. Feature Artists: Carlton Cabaret Band, Thursday, 9.30 p.m., and Sunday, 8 to 9 p.m.; Bellevue Hotel Orchestra, Tuesday, 9.30 p.m.; Miss Ninie Hennessy, soubrette, Sundays, 2 to 3 p.m.; Theatre Serenaders, nightly at 7 p.m., Sundays 2 to 3 p.m.

Transmission Times: Mondays to Fridays 7 to 9 a.m., 11 a.m. to 1 p.m., 5.30 to 11 p.m.; Saturdays, 7 to 9 a.m., 5.30 to 11 p.m.; Sundays, noon to 3 p.m., 6.30 to 10.30 p.m.

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COMMERCIAL BROADCASTING STATIONS IN AUSTRALIA—(Continued)

4BK

BRISBANE BROADCASTING PTY. LTD., 47 Charlotte St., Brisbane. Station and Studio location, King House, Queen St., Brisbane. B6610, B4871. $\frac{1}{4}$ mile W. P.O. Commenced, 29/9/30. 233m., 1290 k.c., 500 watts. Manager, Alec Robertson. Directors, Sir Edward McCartney (chairman), Norman White, R. T. Foster. Interstate Rep., Robert Jackson, Colonial Chambers, Pitt St., Sydney; R. D. Fisher, Newspaper House, Melbourne. Announcers: G. W. Marsh, Royston Marcus, Bert Brown, Harry Humphreys, Miss Hilda Hastie (Betty), and Mrs. R. M. Stokes (Margot). Sporting Commentator, Harry Sunderland. Transmission Times: Daily, 7 a.m. to 11 p.m.; Saturday, 7 a.m. to midnight; Sunday, 11.30 a.m. to 2 p.m. and 6.30 p.m. to 10.30 p.m. Licenses have been granted to 4BK, the Courier-Mail Station, for relay stations at Oakey (4AK) with wavelength 246 metres and aerial power 1000 watts, to operate from September 1st, 1935, and also at Gympie, wavelength 210 metres.

4CA

AMALGAMATED WIRELESS (A/SIA) LTD., 47 York St., Sydney. Station at Cairns. 207 m., 1450 k.c. (not completed in May).

4GR

GOLD RADIO SERVICE LTD., 43 Adelaide St., Brisbane. Station location, 380 Ruthven St., Toowoomba. Phone 88. 200 yards N.W. of Toowoomba P.O. Commenced, 9/8/25. 1000 k.c., 300 m., 50 watts aerial. Managing Director, E. Gold. Announcers, Norman Carter, Ron Beattie. Feature Artist, Willie Evergrow. Transmission Time: Every day, 6.30-9.30 a.m., 12 noon-2 p.m., 5.30 to 10.30 p.m.

4MB

MARYBOROUGH BROADCASTING CO. LTD., 43 Adelaide St., Brisbane. Station location, Kent St., Maryborough, 1 mile W. of Maryborough P.O. Commenced, 16/8/32. 1060 k.c., 283 m., 50 watts. Phone Nos. 424 and 452. Manager, A. P. Wynne. Directors, A. P. Wynne, J. B. Chandler, F. V. Mitchell. Interstate Reps.: A. D. Bourke, Barrack St., Sydney;

J. V. Duff, c/o 3AW Melbourne.. Announcers: Miss M. Power and W. G. Diamond. Special Sessions: Children's, 6.30-7 p.m. Transmission time (daily): 8.30 a.m. to 10 a.m., 12 noon to 2 p.m., and 6.30 p.m. to 10 p.m.

4MK

MACKAY BROADCASTING SERVICE, 64 Nelson Street, Mackay Station location, $\frac{1}{2}$ mile W. of P.O., cnr. Nelson and Shakespeare Sts., Mackay. Commenced, 12/1/31. 1190 k.c., 252 m. (after 1/9/35, 1160 k.c., 259 m.), 100 watts aerial. Manager, J. H. Williams. Transmission time (every day): 9.30 to 11 a.m., 1.30 to 5.30 p.m. and 6.30 to 11 p.m.

4PM

AMALGAMATED WIRELESS (A/SIA) LTD., 47 York St., Sydney. Station location, Musgrave St., Port Moresby, Papua. 1360 k.c., 221 m., 100 watts (not in operation in May).

4RO

ROCKHAMPTON BROADCASTING CO. PTY. LTD., 43 Adelaide St., Brisbane. Station location, cnr. East and William Sts., Rockhampton. Phone 9. Commenced, 2/7/32. Freq. 1330 k.c., 226 m., 50 watts aerial. This is an associate station of 4BC. Manager, E. J. Rheuben. Engineer, W. A. Minchin. Announcer, M. R. Ballance. Asst. Announcer, K. Godfrey. Transmission times: Monday to Saturdays inclusive, 6 p.m. to 10 p.m.; alternate Wednesdays, 6 p.m. to 10.15 p.m.; Sunday, 7 p.m. to 10 p.m.

4TO

AMALGAMATED WIRELESS A/SIA LTD., Bell Street, South Townsville. Station location, Flinders St., Townsville, 1 mile S. of G.P.O. Commenced, 5/10/31. 256 m., 1170 k.c., 200 watts. Manager, H. E. Cox. Director, E. T. Fisk. Interstate Representative, Amalgamated Wireless (A/sia) Ltd., Sydney and Melbourne. Announcers: H. E. Cox, B. Derriman, H. R. Huntley, Miss J. Gray. Special Sessions: Saturday and Wednesday, 1 p.m., Brisbane Races; Thursday evening, "Kay Seven." Transmission times: Monday to Friday, 12.2 p.m., 3.30-4.30 p.m., 6 to 6.30 p.m., 7 to 10.15 p.m.; Saturdays, 12.5 p.m., 6-6.30 p.m., 7 to 10.15 p.m.



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COMMERCIAL BROADCASTING STATIONS IN AUSTRALIA—(Continued)

4WK

WARWICK BROADCASTING CO. PTY. LTD., King St., Warwick. Station location, Albion St., Warwick. 900 k.c., 333 m., 50 watts. Opened, 6/5/35.

5AD

ADVERTISER NEWSPAPER LTD., Weymouth St., Adelaide. Central 5772. Station location, 6½ chains N. of G.P.O. Commenced, 2/8/30. 1310 k.c., 229 m., 300 watts. Manager, A. L. Holtze. Advertising Manager, W. F. Denby. Production Manager, M. G. Chapman. Controller of Schedules, Miss D. Edwards. Chief Engineer, D. M. Gooding. Deputy Chief Engineer, L. G. Porter. Operators, T. Welling and D. Tostevin. Maintenance Engineers, H. Wilson and B. Forgan. Chief Announcer, Jack Burgess. Interstate Reps.: N.S.W., Fred Thompson, Warwick Bldg., 15 Hamilton St., Sydney; Victoria, W. E. Davey, Newspaper House, 247 Collins St., Melbourne; London, A. J. Chard, 92 Fleet Street, London, EC.4. Announcers: K. Crossman, J. Young, Miss D. Edwards. News Bulletins at 6.30 a.m., 7 a.m., 10 a.m., 12.30 p.m., 3 p.m., 7.50 p.m., 9 p.m., 10 p.m.

Transmission Times: Week days, 6 a.m. to 9 a.m., 10 a.m. to 2 p.m., 3 p.m. to 11 p.m.; Sundays, 5.30 p.m. to 10 p.m.

5DN

HUME BROADCASTERS LTD., c/o Savery's Pianos Ltd., 29 Rundle St., Adelaide, ¼ mile N.E. G.P.O., Commenced 24/2/25. 313 m., 960 k.c., 300 watts.

5KA

SPORT RADIO BROADCASTING CO. LTD., Richard's Buildings, Currie Street, Adelaide: Central 2721. ¼-mile N.W. G.P.O. Commenced 25/3/27. Freq., 1200 k.c., 250 m., 300 watts. Manager, R. Lincoln. Advertising Manager, J. K. Jameson. Sales Manager, M. O'Halloran. 1st Engineer, J. P. Jack. N.S.W. Representative, E. A. Wood, Box 2516 BB, G.P.O., Sydney.

Announcers and Sessions: C. A. Freeman, Early Morning; Cousin Dora, Ladies'; Arthur Thorn, Evening.

Feature Artists: Cyril Freeman, S. Edwards, Miss Elsa Linke, Miss Iris Freeman.

Transmission Times: Week-days, 6.30 a.m. to 11 p.m.; Saturdays, 6.30 a.m. to midnight; Sundays, 10 a.m. to 12 noon; 3 p.m. to 4 p.m., 4.45 p.m. to 11 p.m.

5MU

MURRAY BRIDGE BROADCASTING CO. LTD., Bridge St., Murray Bridge. Station located Cr. Eleanor and Thomas Sts., Murray Bridge, 1 mile W. of P.O. Commenced 16/9/34. 1450 k.c., 207 m., 100 watts. Manager, A. L. Holtze. Operator-in-charge, F. G. Miller. Studio Manager, W. F. Nicholas. Controlled by "The Advertiser" Broadcasting Services, Adelaide, and acts as Eastern regional station for 5AD.

5PI

MIDLANDS BROADCASTING SERVICES LTD., Weymouth St., Adelaide. Station location, 5½ miles E. of Crystalbrook P.O. Commenced 7/1/32. Freq., 1040 k.c., 288.5 m., 2000 watts aerial. Operator-in-charge, Mr. H. M. Brown. Manager, A. L. Holtze. Operates as Northern regional relay station of 5AD under direction of "The Advertiser" Broadcasting Services.

5RM

RIVER MURRAY BROADCASTERS LTD., 29 Rundle St., Adelaide. Station and studio, Renmark. 940 k.c., 319 m. (after 1/9/35, 850 k.c., 353 m.), 1000 watts.

6AM

NORTHAM BROADCASTERS LTD., Studio at Princes Chambers, 23 William St., Perth: B 4921, B 8484. Station on Perth-Northam Road, 4 miles W. of P.O. Commenced 1/6/34. 1090 k.c., 275 m. (after 1/9/35, 1070 k.c., 280 m.), 500 watts. Manager, W. E. Coxon. Directors: Archer Whitford and F. R. Whitford. Secretary, David White. Supervising Engineer, W. E. Coxon. Interstate Representatives: A. D. Bourke, 5-7 Barrack Street, Sydney; and A. Siebert Dye, 499 Little Collins Street, Melbourne.

Announcers and Sessions: M. Joynsen-Powell, Early Morning, "The Breezy Bird"; Miss Pat Walker and M. Joynsen-Powell, Children's, "Three Little Pigs"; Miss Pat Walker, Women's; H. R. Wells, Evening; Alex Higgins, Sporting.

Transmission Times: Monday to Friday, 6.30 to 8.30 a.m.—12 to 2 p.m.—5.30 to 10.30 p.m.; Saturday, 6.30 to 8.30 a.m.—12 to 2 p.m.—6-10.30 p.m.; Sunday, 10 a.m. to 2 p.m.—3 to 5 p.m.—6 to 10 p.m.

6BY

BUNBURY BROADCASTERS LTD., Bedford Hall, Bunbury. Station, 220 yards N.E. of P.O. Commenced 5/5/33. 980 k.c., 306 m., 50 watts.

6IX

WEST AUSTRALIA NEWSPAPERS LTD., St. George's Terrace, Perth. Station location, 30 chains S.W. of G.P.O. Commenced 27/11/33. 1470 k.c., 204 m. (after 1/9/35, 1400 k.c., 214 m.), 500 watts. Phone: B 9321 (2 lines). Manager, B. Samuel. Directors: H. B. Jackson (Chairman), C. P. Smith, M. D'O. Musgrove, H. Greig, F. C. Kingston. E. C. Churchward, Advertising Manager. Interstate Representatives: B. Rieusset, 247 Collins Street, Melbourne; D. W. Virtue, Carrington Street, Sydney. Announcers: Paul Daly, Ron Gledhill, B. F. Saunders.

Special Sessions: News Services, Sunday to Friday, 7.50, 8.50 and 9.50 each evening. Tuesday, Thursday and Saturday, 10 to 11 p.m., Special Dance Programmes. 2-3 p.m. Monday to Friday, Tzigane Orchestra. Sundays, Church Services.

Transmission Times: Monday to Saturday, 8.30-11 a.m., and 6 to 11 p.m. Sunday, 1.30-3 p.m., and 6 to 10.30 p.m.

6KG

GOLDFIELDS BROADCASTERS (1933) LTD., Hannan St., Kalgoorlie. Station location, ¾-mile S.W. of P.O., Kalgoorlie. Commenced 16/9/31. 1220 k.c., 246 m. (after 1/9/35, 1210 k.c., 248 m.), 100 watts. Manager, N. W. Simmons. Directors: Frederic Beach Hicks, Norman W. Simmons, John McCarthy. Victor Beams, Secretary. Chester Bond, Advertising Executive. Percy Perry, Advertising Representative. Haydn Freeman, Musical Director. J. J. Baker, Sporting Commentator. Interstate Representative, V.L.H. Coghlan, Sydney.

Announcers: N. W. Simmons, W. Loneragan, Archer Norwood.

Feature Artists: Studio Orchestra, Colin Smith's Dance Band. Special Sessions: Mining, 12.30, 7.0 and 10 p.m. daily; Cycling, each Thursday, 7.30 p.m., J. J. Baker; Trotting, each Tuesday night, 6.50; Books and Authors, Tuesday night at 8.15.

6ML

WEST AUSTRALIAN BROADCASTERS LTD., Lyric House, Murray St., Perth. Station located 100 yards S. of G.P.O. Commenced 19/3/30. 1135 k.c., 264 m. (after 1/9/35, 1130 k.c., 265 m.), 500 watts. Phone: B 9321 (2 lines). Manager, B. Samuel. Directors: H. B. Jackson, K.C. (Chairman), C. P. Smith, M. D'O. Musgrove, H. Greig, F. C. Kingston. E. C. Churchward, Advertising Manager. Interstate Representatives: B. Rieusset, 247 Collins Street, Melbourne; D. W. Virtue, Carrington Street, Sydney.

Announcers and their Sessions: Eric Donald, Children's and Evening, 5.30 to 6 p.m., Monday to Friday; Byrn Samuel, Sporting Anticipations and Results, Friday, 7.30 p.m., and Saturday, 6.45 p.m.—Wrestling Descriptions, Friday, 8 p.m.; Ned Donald, Early Morning Session, 7 to 8.30 a.m.; Misses E. Dunn and L. Berryman, Women's—State Lottery Drawings every fourth Tuesday, 12 noon; 6ML Cheerio Club, 7 p.m. nightly; Weekly Dance, each Wednesday.

Transmission Time: Monday to Friday, 7 to 8.30 a.m., 11 a.m.-12.30 p.m., 5.30 p.m. to 10.30 p.m.; Saturdays, 7 to 8.30 a.m., 11 a.m. to 12.30 p.m., and 6-10.30 p.m.; Sunday, 7 to 10 p.m.

6PR

NICHOLSONS LTD., 86-90 Barrack St., Perth. Station location: Applecross 4½ miles S.W. of G.P.O. Commenced 14/10/31. 880 k.c., 341 m., 500 watts.

7BU

FINDLAYS PTY. LTD., Burnie. 1360 k.c., 221 m., 50 watts.

7HO

COMMERCIAL BROADCASTERS PTY. LTD., 82 Elizabeth St., Hobart. Station location: ¼-mile W. of G.P.O. Commenced 13/8/30. Freq., 890 k.c., 337 m. (after 1/9/35, 820 k.c., 366 m.), 50 watts.

(Continued on Page 124)

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7LA

FINDLAY & WILLS BROADCASTERS PTY. LTD., 67 Brisbane St., Launceston: Phone, 1486. Station location: Prospect Hill, 2½ miles S. of P.O. Commenced 13/12/30. Freq., 1100 k.c., 273 m., 300 watts. Manager, John T. Gough. Directors: Senator J. D. Millen (Chairman), A. P. Findlay, N. M. Findlay. A. E. Garrott, Secretary. Chief Engineer, Val Sydes. G. Holland, Assistant. Interstate Representatives: Amalgamated Wireless (A/sia) Ltd., Sydney and Melbourne.

Chief Announcer, John T. Gough. Announcers: E. W. Davies, Miss M. Bonser, Miss L. Nicholls, Miss I. Wright, Miss B. Jebb, Geoff. Martin.

Transmission Times: Monday to Friday, 12 to 2 p.m., 5.30 to 10.30 p.m.; Saturday, 2 p.m. to 4 p.m., 5.30 to 10.30 p.m.; Sunday, 5.45 p.m. to 10 p.m.

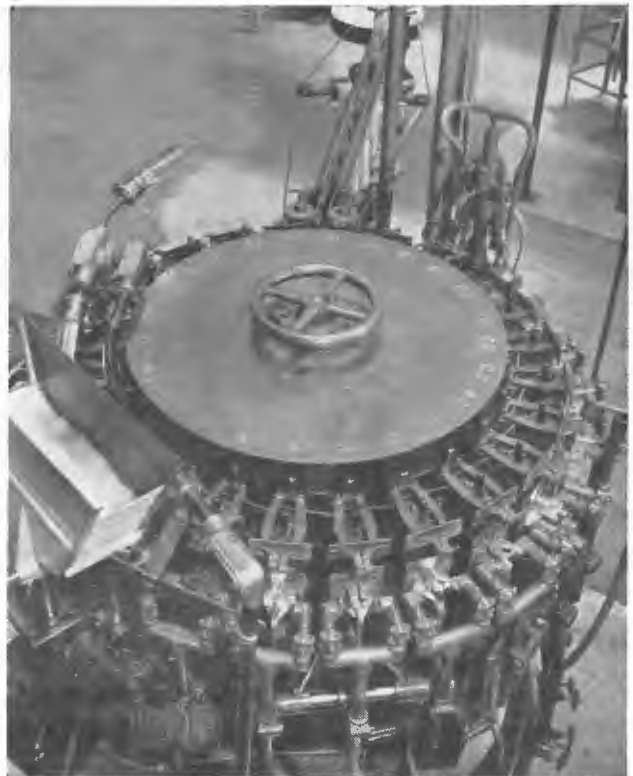
7UV

NORTHERN TASMANIA BROADCASTERS PTY. LTD., Ulverstone, Tas.: Phone, 48. Victorian Office, 116 Queen St., Melbourne: Cent. 1900. Station location: Rielly St., 2½ miles W. of S. from P.O., Ulverstone. Commenced 6/8/32. Freq., 1460 k.c., 205 m., 300 watts. Manager, C. A. Cullinan. Managing Director, G. F. Palmer. H. L. Bilton, Secretary. E. E. Cooper, Operator. Announcers: Ralph Bonney, Miss K. Andrews. Representative: V. L. H. Coghlan, Sydney.

Special Sessions: Children's, each evening except Saturdays and Sundays, 5.30 to 6 p.m.; Races, Melbourne Metropolitan Races re-broadcast from 3DB, Saturday afternoons.

Transmission Times: 7.30 to 9 a.m., 5.30 to 6 p.m., 6 to 7.30, 7.30 to 10.30 p.m.; Monday to Friday, 7.30 a.m. to 9 a.m., 5.30 p.m. to 10.30 p.m.; Saturday, 7.30 a.m. to 9 a.m., 12 noon to 11 p.m.; Sundays, 12 noon to 2 p.m., 5.30 p.m. to 10 p.m.

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WHO'S WHO

In Commercial Broadcasting

AGASSIZ, Cecil T.: Known on 2UE as "Aggie." Educated Fort Street School. Popular with the "diggers" as he was one of the original 600 who, in August, 1914, camped in Randwick Racecourse. Joined 2UE as early morning man (6 a.m.) and still controls the 6 to 9 breakfast session. Recreations: hiking, gymnasium. Hobbies visiting and cheering the sick in Hospitals.

ANDERSON, Oswald: General Manager Station 2UW. Born Sydney. Educated in Victoria. Joined Palings Ltd. 1919. First actual participation in Radio Broadcasting 1923. First commercial association with broadcasting, December 1923, as



Manager (2FC) Broadcasting Service. Manager 2FC Ltd. 14/8/28 when 2FC and 2BL were merged into the N. S. Wales Broadcasting Company. When the Australian Broadcasting Co. was formed 1929, to provide National programmes, he was appointed Manager, from which he resigned in March 1930, to take over general management of Station 2UW. Is an executive of Federation of Broadcasting Stations, an advisory councillor of Teachers' Conference, and an associate of N.S.W. Musical Association.

ARMITAGE, John: Sales Service Manager and Publicity Editor of 2GB. Australian by birth, he has had much experience in the newspaper and advertising field here, in America and in the East. Was Advertising Manager and Company Secretary of "Cairns Daily Times," Night Editor of "Hongkong Daily Press," Staff

correspondent in Mexico of "Japan Chronicle," Staff feature writer of "MacLean's Magazine" and "Winnipeg Free Press," Canada. Broadcast considerably in Canada and U.S.A. Has written learnedly on "The Chinese Constitution," published a novel of Chinese life, "Wing Po" (Macmillan), and writes on economics. Was on his way to the East again, when he joined 2GB.

BAEYERTZ, Charles N.: Founded the "Triad" magazine, 1901, and edited it for 26 years.



Has judged elocution, singing and choral work at over forty Eistedfods in Australia and New Zealand. Author of course in "English, voice production and public speaking." Public speaker, writer and critic. Connected with 2UW for several years prior to joining advertising staff of 2UE in 1934.

BAIRNSFATHER, Tom Duncan, M.C., Order of the Crown of Italy. Educated at Oundle, Northants, England, Royal Military College, Sandhurst; served throughout Great War in France; Armistice Commission, Russia, Afghanistan and China. Invalided from Regular Army with rank of Captain. Commenced broadcasting 1928 2LO, and since arrival in Australia has broadcast from 3LO, 3AR, 3GL, 2FC, 2BL, 2CH, 2UE. Recreations: swimming, boxing, golf and motoring. Hobbies: work.

BAUME, Sidney Erne, LL.D., M.I.S.B. (Aust.) Advertising Manager Station 2UE, 296 Pitt Street, Sydney. Educated Waitaki (N.Z.) Boys High School and Victoria University College. Many years U.S.A., Canada, Mexico. Joined 2CH in 1933, joined 2UW as announcer and advertising executive late 1933,

S. E. BAUME—(Cont.)



joined 2UE as Advertising Manager 1934. Recreations: motoring, boxing swimming.

A. E. BENNETT, A.C.A. (Aust.), Managing Director 2GB. Was public accountant by profession before he entered the field of radio entertainment in 1926, since when all his energies have gone to making station 2GB the station it is to-day and building up Australian Commercial broadcasting. Realising that Australian B-class stations have much to learn from similar broadcasting systems in U.S.A. has twice visited that country in search of new ideas.



Introduced American Radio Transcriptions and on his 1934 trip obtained exclusive Australasian rights to the World Broadcasting Wide Range recordings which mark a great step forward towards realism in recorded reproduction. His hobby is psychology. He finds time to talk regularly from 2GB on Applied Psychology and Personal Problems. Is President of the Australian Federation of Commercial Broadcasting Stations for 1935.

BLEE, Norman James: Chief Announcer 3SH.

BRIDGMAN, Stuart: Manager Broadcasting Station 3AW, 382 Latrobe Street, Melbourne. A prominent personality in Mel-



bourne Broadcasting circles. Previous experience in newspaper work. Private address: Alexandra Ave., South Yarra, Vic.

CHANDLER, J. B.: Managing Director (4BC Brisbane). Controls the "Chandler Chain of Broadcasting Stations in



Queensland (4BC and 4BH, Brisbane, 4GR Toowoomba, 4MB Maryborough, 4RO Rockhampton, 4MK Mackay). At present on world tour investigating broadcasting. Proprietor of J. B. Chandler & Co., well-known wholesale and retail electrical dealers and radio distributors.

COCHRANE, Arthur Stanley: Senior Announcer, Council of Churches Broadcasting Station 2CH, 77 York Street, Sydney. The greater part of his life was spent in Melbourne. Came to Sydney in 1914, and joined Farmer & Co. Ltd., with whom he spent several years. When radio burst upon the astounded world, the company

WHO'S WHO IN COMMERCIAL BROADCASTING—(Continued)

secured the first "A" class broadcasting licence. Was the first A class announcer, and in 1934 completed 11 years broadcasting. Private address: 59 King's Cross Road, Darlinghurst.

COLMAN, Eric: Chief Announcer of 2GB. Is of course brother to Ronald Colman, the famous talkie star. Made his debut last year in talkies with considerable success in the Australian production, "Splendid Fellows." Was born in London, served in the Air Force during the war, and in 1928 came to Australia to live. Later joined the staff of 2GB as announcer, in which capacity his pleasing voice has won him much success.

COXON, W. E.: Station Manager and Supervising Engineer 6AM. In 1907 conducted wireless experiments and maintained experimental station in Perth, until outbreak of War. During which was engaged in electrical work in England, with A. C. Reyrolle. He also conducted experimental work on radio for Royal Air Force and Navy supplies. Mr. Coxon gained Certificate of proficiency in Radio with North Eastern Schools of Wireless, and continued as instructor. Returning to Western Australia after the War he was, for a time, instructor in Electrical Trade Classes of Repatriation Department. He then commenced business on his own account in Perth as an electrical and radio engineer. Conducted the first public demonstration of radio telephony in Western Australia, built and installed the first receiver at the Observatory for the reception of time signals from Europe and America; transmitted the first two way Morse communications between Australia and South Africa, and between Europe and Western Australia. 1924 was appointed engineer and Manager of 6WF and in 1925 became engineer, manager and programme director. During that year he supervised the manufacture of over 1,000 broadcast receivers.

1927 he built first crystal controlled broadcast station in Australia, and installed the first water-cooled transmitting tube imported to this country. 1929 saw him on talkie installation and service, in addition to which he still conducted experiments on short waves, and conducted the first duplex telephony between Australia and Java, and Australia and Singapore.

He has been on several occasions the president of the Wireless Institute of Australia (W. A. Division) and is a member

of the committee for investigation of interference between experimental transmitters and broadcast receivers, also an associate of the Institute of Radio Engineers, U.S.A.

DECH, Gil: Musical Director of 2GB. Brilliant solo pianist and accompanist. Made his debut in his native city Birmingham at age of ten, playing Mendelssohn Concerto. Was a pupil of Tobias Matthay and Irene Scharrer. Associate of Royal Academy Music. Figured in gramophone records as accompanist, conductor and soloist and as one half of "The Two Octaves" well known piano duettists. His "Maori Selection," is one of the most successful records made in this country.

DINNENY, V. M.: Manager 3YB. For many years associated with Electrical and Automobile business in N.S.W. and Victoria as sales executive, served three years with A.I.F. in France. Responsible for launching 3YB in 1931, was Station Manager and Announcer until May, 1934.

FITTS, R. H.: Chief Engineer and Local Manager 3HA Hamilton. 23 years associated with radio. Was with 3LO and 3AR for seven years. Resigned to superintend erection of station 3HA with which he has been associated as chief engineer ever since. Sport-fishing.

FLETCHER, C. A.: Advertising Sales Manager of 2GB. Born in Devonshire, England, was Advertising Manager of Chivers and Sons. Came to Australia in search of opportunity and health. Found both. Can claim to be the only advertising manager of a broadcasting station who has spent his entire life in the advertising game. His ability to see the advertiser's point of view did much to orientate the Australian business man to radio as an advertising medium. His motto



is service, his hobby is work, i.e., radio, and his contacts with men in all walks of life might be described as socialistic. Probably the best known advertising man in Australia.

FREEMAN, Haydn: Directs 6KG's musical programme. He is a well-known identity in musical circles and is a musician of exceptional ability, being a capable organist, cellist, conductor, etc.

GILCHRIST, Archibald, of 3TR Sale: Born Melbourne. Educated Sydney High School. Public Library and journalistic experience. Member of Western Australian Parliament 1914 to 1917. General Secretary New Settlers League, Victoria, 1922 to 1927. Issued pamphlet on "Outback Wireless," 1925. Broadcast weekly for Pioneer tours 1929 to 1932. Manager and afterwards proprietor of 3TR, 1932 to date.

HARTY, Frank Sturge, 2UE: Educated Jamaica College, B.W.1—served with Imperial Forces (1914 to 1919) France, Greece, Serbia, Egypt, Palestine. Lecturer in Industrial Organisation, New Zealand, United States, Great Britain, Australia. Edited a weekly journal 1930-33. Established the "Radio Adviser," and "In the Haunts of the Buccaneers," series. Recreations: Tennis and walking.

Hobbies: Industrial organisation and Travel.

HIGGINBOTHAM, E.: Manager 2TM, arrived Australia 1920, joined B.G.E. Radio Department 1924, left as Radio Department Manager 1927, joined A.G.E. as country representative, occupied that position



for three years, four years as assistant Radio Department Manager, resigned 14th February, 1935, to open up Station 2TM. Permanent Director and Manager.

KEMSLEY, A. N.: General Manager 3UZ (Nilsen's Broadcasting Service), Melbourne. After serving four years with A.I.F., returned to Australia and joined head office of Broken Hill Co. Pty. Ltd. Three years



later was appointed secretary to Melbourne Town Planning Commission. Left Commission in January, 1930, to become Secretary to Mr. J. J. Liston, a former member of the Commission. Appointed 3UZ 1934.

KITTO, Tom: Chief En-



gineer 2HD Newcastle. Born at Launceston where he became Engineering Instructor at Launceston Technical School. Originally Engineer at 5KA.

LAMB, Roy George: Born Sydney 1899. Managing Director 2BH Broken Hill. After a course in Economics at Sydney University made four trips abroad including two complete world tours covering an intensive study of Broadcasting in relation to business efficiency in every important country.

LEVY, Francis E.: Service Manager 2UW. Well known in Service Agency field, joined 2UW in 1934, coming from the Directorate of the Goldberg Advertising Agency with whom he had been since 1920. Mr. Levy has made a complete study of radio advertising presentation.

WHO'S WHO IN COMMERCIAL BROADCASTING—(Continued)

LEVY, F. E.—(Cont.)



LYONS, Norman, of 2UW is well known in connection with his activities over a period of



three years with the National Service on external broadcasts and matters of particular interest to youth listeners.

As Supervisor and special announcer in charge of outside relays at Station 2UW he has done much to further the special recording work of race descriptions, etc., which play so important a part in 2UW's programmes.

MARSHALL, Herbert A.:



Chief Engineer of 2UW Broadcasting Station. Company address: State Shopping Block, Market Street, Sydney. Member of the I.R.E. (Aust.), also Member of the R.A.A.F. Reserve. Born in Punjab, India, 1888. Received Primary education in India and Secondary education in England. Trained as Power Electrical Engineer. Arrived in Australia 1907.

Built and installed $\frac{1}{2}$ K.W. Broadcasting Transmitter, 2XC

Broken Hill. Private address: 94 Francis Street, Bondi. Recreation: Radio.

McCOWAN, Russell R.: Acting-Manager of 3DB Melbourne. Spent eleven years in Advertising agency field, being senior executive with firm of Price-Berry Pty. Ltd., an association which began immediately on his return from the war. Is now advertising service manager with "The Herald," and is managing 3DB during Mr. Worrall's absence.

McNEILL, Thomas Albert Edward: Chief Engineer, Council of Churches Broadcasting Co., 2CH, 77 York Street, Sydney. 1st Class P.M.G. Certificate, 1918. Appointed Chief Engineer 2CH Oct., 1931. Private address: 80 Glenayr Ave., Bondi. Born Feb., 1901. Recreations: Tennis, cricket.

MILLAR, Renn: Chief Announcer 3DB Melbourne. Is the possessor of a fine baritone voice which found him a job with various travelling companies. He was for 7 years with the Scarlet Troubadours, during which time he travelled New Zealand. His radio debut was made as announcer of 3LO from which he transferred to 3DB. Soon after, the "Herald" bought out the station and he has been there ever since.

MOLLOY, William Brian, B.A., LL.B.: Announcer and contracts officer Station 2UE, 296 Pitt Street, Sydney. Educated Mowbray House and Sydney Church of England Grammar School. State Exhibition 1926. Bachelor of Arts, 1930. Bachelor of Laws 1933. Spent six months in Hollywood, U.S.A. in 1933, under contract to Paramount Pictures.

Member N.S.W. Bar. Clubs: Harlequin and University.

MORGAN, Sydney: Manag-



ing Director 3KZ Broadcasting Co. Pty. Ltd., 64 Elizabeth St., Melbourne. Member Victorian Institute of Advertising. Principal in firm of Val Morgan & Sons Pty. Ltd. Associated with advertising activities in Melbourne since 1917. Dec., 1930, one of founders and Director of 3KZ station. Appointed Managing Director June, 1932. Private address: 19 Nirvana Avenue, East Malvern. Born, 1900. Recreations: Tennis, swimming.

PALMER, George F.: Manag-



ing Director, Melbourne Broadcasters Pty. Ltd., owners of 3AK, and Northern Tasmania Broadcasters Pty. Ltd., owners of 7UV Ulverstone. Born at Melbourne in 1909, and is probably the youngest man to own and control two B Class Stations. Four years ago he inaugurated a late night and early morning broadcasting service in Melbourne through the medium of 3AK, which was then the only one of its kind in Australia. He launched further into commercial life in 1933 by acquiring Station 7UV at Ulverstone, Tasmania.

PETTERS, Harry Danvers, 2UE: Graduated in Arts at Edinburgh University. Served in Great War with the Royal Scots and 101st Grenadiers (Indian Army) leaving with the rank of Captain (Brevet Major). Entered the advertising field in Australia with the Weston Company, Sydney and Bulletin Newspaper Co.

Transferred to Radio Advertising with Station 2UW, and now on the executive advertising staff of Station 2UE.

RADFORD, J.: Arundel: Advertising Manager 4BC. Joined 4BC at inception of station in 1930. Previously connected with 2GB and 3DB. Past nine years in commercial broadcasting. Served as Captain in Imperial forces during War.

RIDLEY, J.: Manager and Secretary 3HA Hamilton. Was manager for Cooks Ltd., wholesale radio, Melbourne. Joined 3HA at inception four years ago. Sport: tennis.

ROBERTS, Russell F.: Manager 4BC Brisbane. Gained Musical Training at Trinity College of Music, London, and at TOBIAS MATTHAY Piano-forte School, London. Appointed present position 1930.

ROBINSON, W. H. R.: Assistant Engineer 2UE Broadcasting Station, A.Inst.R.E. (Aust.) commenced radio in R.A.N.R., 1920. Joined Electrical Engineers Branch, P.M.G.'s Dept. in 1921. In 1929 transferred to the Broadcasting section (Station 2BL) being the first P.M.G.'s officer to go to the "A" class stations. In 1930 transferred to the 1st National Regional Station 2NC Newcastle, as officer-in-charge, of its installation and subsequently to June 1934, of its operating staff. In 1934 qualified for transfer to the Radio Research section of the P.M.G.'s Research Laboratories, Melbourne. Joined 2UE June 1934. Born March 1st, 1905 at Parkes, N.S.W.

ROWE, E. W.: Musical



Director 2HD Newcastle, known as "Uncle Pete" and very popular. Native of London and received musical education at Bournemouth.

RYAN, Albert John. — En-



gineer and Manager, A. J. Ryan

WHO'S WHO IN COMMERCIAL BROADCASTING—(Continued)

TAYLOR, C.—(Contd.)

Broadcasters Ltd., Lawson St., Kingston, Canberra, F.C.T. Proprietor Commercial Broadcasting Station 2CA. Educated at public school, Chiltern, Victoria. 1928-32, Radio Engineer on own account at Canberra. 1931, designed and constructed 2CA Broadcasting Station. M.Inst.R.E., Aust. Born 30/5/1897.

SCHULTZ, L. N.: Chief En-



gineer of 2GB, M.Inst.R.E.Aust. First took up radio as a hobby at school. Went to America, England and Germany, and came back to Sydney. Joined 2GB, and was appointed Chief Engineer. During 1934 supervised the building of a complete new transmitter for 2GB, capable of transmission in line with High Fidelity Standard. Has carried out many improvements throughout the system to make extended range reproduction possible both as regards audition facilities and actual transmission. Hobby: flying. Won N.S.W. Aero Club Championship, 1934. Born 24/9/1906.

SIMMONS, N. W.: Station Manager 6KG. Has been actively connected with Radio since its inception in Australia. Was connected with the construction of broadcasting transmitters at the commencement of broadcasting in Australia. After being with the national station 7ZL Hobart for a number of years as engineer, announcer "Uncle Cuthbert," etc. was brought to Western Australia to take over present position.

SPARKES, R. C.: Assistant Manager 2HD Newcastle, well known in Sydney and Brisbane.



STEVENS, Alfred Charles, Cornwallis, widely known as "Uncle Steve." Educated at English Public School (Bath) and Aberdeen University. In 1899 saw service in the Boer War. Received a commission in



the R.F.A. Five years in Northern Nigeria, as a Political Resident, followed by five years soldiery in India. Then an appointment to the N.Z. Staff Corps. Captain Stevens became a journalist, serving on the Sydney "Sunday Times" and "Daily Telegraph." Was editor and Publicity Officer to the N.R.M.A., then organised the memorable £100,000 Cancer Research and Treatment appeal. In broadcasting he has been associated for the past eight years with 2FC, A.B.C. and Broadcasting Commission, and at present with Radio 2UE.

STEVENSON, Cecil Vincent: Electrical engineer. Founder and Managing Director of Radio 2UE Sydney Limited. Has been actively experimenting in radio transmission of signals since before the War, and took out one of the first commercial radio licences in Australia (7/11/23) prior to which he held experimental licences. Opened the first all radio store (Electrical Utilities Ltd., Radio House), now carried on by his sons, was also one of the founders of the first Australian



Station (2BS now 2BL) the transmitter for which was built by staff under his supervision. **STEVENSON, Murray H.:** Chief Engineer, Broadcasting



Station 2UE, 296 Pitt Street, Sydney. Educated Sydney Technical High School. Construction and maintenance of original 2UE. Appointed present position 1/1/32. Private address: 12, "Elgin," 89 Mount Street, Coogee. Born 17/4/1905.

SUTHERLAND, G.: Chief Engineer 4BC. Previously connected with 6WF and later in radio business in Perth. Served during war on radio in Submarine decoy ships. Commenced in radio 1908 in Royal Navy.

TAYLOR, Charles: Programme Director and Publicity Manager of 3DB Melbourne. Well known journalist. Edited Sydney "Sun" for seven years and Melbourne "Sun Pictorial" for two years. Held newspaper jobs all over Australia. Federal Director of Publicity for National Party in 1925. Sports: golf, tennis.

TAYLOR, John T.: General Manager 2CH Broadcasting Co., 77 York Street, Sydney. Vice President, Australian Federation of Broadcasting Stations. Joined present Company at inception (Feb. - 1932) as Advertising Manager; appointed General



Manager October 1932. Private address: 18 Kulgoa Road, Bellevue Hill. Born 1904. Recreations: golf and surfing.

THOMPSON, F. R.: Has



been associated with Station 2UW as Advertising Manager for the past six years. He is one of the few men in Australia who can be regarded as an expert in radio advertising.

VOIGT, Emil Robert: General Manager Station 2KY, Trades Hall, Sydney. Born



Manchester, England. Trained as mechanical engineer. Founded engineering firm of Voigt & King, Melbourne, 1911. In 1929

WHO'S WHO IN COMMERCIAL BROADCASTING—(Continued from page 128)

became associated with radio manufacture and development. Returned to Sydney and founded Station 2KY, the world's first Labour Broadcasting Station, being elected Chairman of the Board of Management, a position he has held ever since. In 1929 took over the position of general manager of the station. Founded the Australian Radio Manufacturers' Association and officiated as President for several years. Became first President of the Australian Federation of Broadcasting Stations, and to-day is executive member. Presents the news service and daily commentary each morning over Station 2KY, and also gives ringside running descriptions of the heavyweight wrestling and boxing contests each week. Recreations: Held world's amateur five mile running championship, for Great Britain, Olympic Games, 1908. Interested in swimming, athletics, fishing, and most forms of sport.

A.G.E. as Country Representative. During the last four years with that Company was in Technical Department resigning on the 1st February to construct 2TMs' transmitter and is a permanent director and engineer.

WOOD, E. A.: General Man-



ager 2HD, Newcastle. Owned and controlled by Airsales Broadcasting Co. Born and educated in Victoria. Commenced broadcasting as manager 5KA, Adelaide, and later appointed to 2HD, which has progressed very successfully.

WOOD, E. Mason: Copywriting and Productions expert with 2GB. Born in England, attained rank of major at the War, was twice decorated and mentioned in dispatches. Came to Australia with Oscar Asche to play "The Cobbler" in "Chu Chin Chow." Appeared with many J.C.W. shows, and then before the mike with 3LO in the early days. Became in turn, Studio Manager for 3UZ, Melbourne, Publicity Agent and Announcer for 3BA, Ballarat, and Studio Manager and Feature Producer for 3AW, Melbourne. Joined 2GB early this year.

WORRALL, David: Manager 3DB, Melbourne since it was purchased by the "Herald" 6 years ago. Was a newspaper man in various country and city newspapers including the "Herald," where he was responsible for much stunt work, including the "Herald" "Learn to Swim" campaign. Was in New York for three or four years with an advertising firm representing a group of foreign newspapers. Went on world tour recently to survey broadcasting in America, England and the Continent. Recreations: Golf and squash racket.

WELCH, Eric: Sporting commentator 3DB, Melbourne. Was school teacher until he enlisted with the A.I.F. After two years service, returned to take up science course at the University following which he went to New Guinea with the Commonwealth Service Department for two years. Newspaper work occupied his attention for the next five years, then he was special turf writer for the "Argus." From this position he became sporting commentator for 3LO which position he held for six years prior to becoming sporting and special commentator for 3DB. Hobbies: Racing and tennis.

WHITCOMB, T.: Originally



with B.G.E. joining Radio Department in 1925, toured New Zealand as Radio Instructor to B.G.E. Branches and left that organisation in 1928 to join the

FROM THE NORTH TO THE SOUTH POLE- NEWS

is gathered and presented to the trade each week in the "Radio & Electrical Merchant," the only weekly National trade newspaper in Australia devoted entirely to the Radio and Electrical Industry.

Overseas Trade happenings very often have an important bearing upon the course to be pursued by the trade in Australia.

Realising this important fact, the "Merchant" records this vital news each week with the same speed and fidelity as it does the news of the trade within Australia.

News of new valve releases — new types of components — new receiver models released — reduced or increased prices — new sales promotion ideas, etc.

All this is vital news to the wide-awake Trader and he finds it all in the "Radio & Electrical Merchant" along with discussions on, and technical descriptions of, the subjects.

EVERY TRADER who is keen to get ahead and make a better showing in this industry should—if he has not already done so—send along his subscription* to the "Merchant" **NOW** and then read it thoroughly because the news it contains is vital to his business. He will thus keep himself abreast of the happenings at his own front door and overseas.

EVERY MANUFACTURER AND DISTRIBUTOR should advertise his goods in the "Merchant" and advertise regularly, because an advertisement in this widely read medium is treated as **NEWS** by the readers. The Traders want to know of your lines—you want them to know all about them. Well—then—what better way is there to accomplish all this than by advertising in the "RADIO & ELECTRICAL MERCHANT."

* Subscription to the "Radio & Electrical Merchant" is 10/- per annum (52 issues) post free.

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Specialist RADIO RETAILER

Published Every Friday by

AUSTRALIAN RADIO PUBLICATIONS LTD.

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15 Castlereagh St.
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Melbourne Branch:
422 Little Collins St.
MELBOURNE
Cent. 2805

Institution of Radio Engineers (Aust.)

Patron: His Excellency The Governor-General (The Right Honorable Sir Isaac A. Isaacs, P.C., G.C.M.G.)



Objects

The objects for which the Institution is founded are subject to Section 53 of the N.S.W. Companies Act, 1899, and are as follows: To promote the science and practice of radio telegraphy and radio telephony in all its branches and the usefulness and efficiency of persons engaged therein. To raise the character and status and advance the interests of the profession of radio telegraphy and radio telephony and those engaged therein. To increase the confidence of the mercantile and general community in the employment of recognised engineers and technical advisers by admitting to the Institution such persons only as shall have satisfied the Council of the Institution that they have a satisfactory knowledge of both the theory and practice of radio-telegraphy and radio telephony. To promote honourable practice, to repress malpractice and to settle disputed points of practice and to decide all questions of professional usage and etiquette among the persons engaged in the profession of radio telegraphy and radio telephony. To collect and circulate statistics and other information relative to radio telegraphy and radio telephony in all its branches. To provide for the delivery and holding of lectures, exhibitions, etc. To encourage the study of radio in all its branches and to improve and elevate the general and technical knowledge of persons engaged or about to be engaged in the profession of radio. To conduct examinations, to award prizes, distinctions, certificates, establish scholarships, etc. In general to do all such other lawful things that the Institution may think incidental or conducive to the attainment of the objects of the Institution.

Officers and Council, 1935-1936.

President: E. T. Fisk.
Deputy President: N. S. Gilmour
Vice-Presidents: L. P. R. Bean and D. G. Wyles
Hon. Treasurer: C. H. Norville.
Hon. Assistant Treasurer: C. Tyrrell
Hon. Secretary: O. F. Mingay.
Hon. Assistant Secretary: K. H. M. Denny
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Qualifications Board: A. S. McDonald (Chairman), D. G. Wyles, F. W. P. Thom, and W. T. S. Crawford.
Examinations Board: L. N. Schultz (Chairman).
Lectures & Papers Board: J. N. Briton (Chairman).
Standards Board: T. P. Court (Chairman).
Social Committee: L. A. Hooke (Chairman)

Victorian Division Committee

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Vice-Chairman: S. H. Witt, F. J. Henderson.
Hon. Secretary: R. R. Mackay.
Hon. Assistant Secretary: J. Dobbyn.
Hon. Treasurer: C. W. Evans.
Welfare Officer: R. K. Crow.
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Qualifications Board: Convenor, S. H. Witt; N. Hayes, G. F. Williams.
Lectures and Papers Board: F. G. Cresswell, J. Dobbyn, F. J. Henderson, R. Kendall, J. Johnson, W. Conry.

Annual Report for Period April 1934--March 1935

DURING the past year material progress has been made by the Institution of Radio Engineers (Aust.) such progress being indicated by the fact that 50 new members of all grades were admitted to the Institution throughout Australia.

Of these, the Melbourne Division showed very satisfactory activity, in that 5 full members, 19 associates and 5 juniors were accepted as members of the Institution.

The Headquarters of this Institution looks after rest of Australia, outside of Victoria and Tasmania, and during the last period 6 full members, 9 associates and 6 juniors were accepted from other States into the Institution. During the year resignations included 3 juniors, 1 associate and 1 full member.

Admissions to the Radio Society were 12 new members in N.S.W. Headquarters, and 1 in Victoria.

Elevation from Associate to Full Membership were carried out in three in-

stances, and from Junior to Associate Membership in two instances.

Victorian Division

The Victorian Division is playing its part in radio affairs in a most satisfactory manner. Interest is evidenced by the number of applications considered, and the type and standing of persons applying for membership.

INSTITUTION OF RADIO ENGINEERS (Australia).— (Continued).

Standard of Membership

The Council has given much consideration to the important question of technical standing of applicants for membership of various grades, and it has been found necessary to impose definite limitations and require definite standards of technical knowledge and experience from all applicants.

In many cases applications for Associate and even Full Membership have had to be held over pending successful qualification by the applicant at the annual examination. The Council views with all seriousness its responsibility in maintaining a high standard of membership, at the same time taking into consideration the difficulties under which many possible members have been placed in past years. Due to lack of education facilities at technical colleges and universities until just recently, it has not been an easy task to assess the technical standard of every applicant. This involved the special consideration of Council in respect to the interpretation of Articles dealing with the requirements for various membership grades, and it is now the rule that the Qualifications Board may substitute an oral examination to test the applicant's qualifications for Associate Membership. It has also been necessary to lay down that where an applicant cannot produce evidence of having passed other examinations or carried out work to the satisfaction of the Qualifications Board, such applicant must have had three years' experience in a technical (not a process) capacity upon such work as design, testing, repair, servicing and supervision, or such other work as, in the opinion of the Qualifications Committee, is equivalent thereto.

It has been recognised by the Council that the formation of Divisions in other States makes it necessary to meet peculiar conditions existing in any State, and therefore the by-laws and interpretations of Council upon this important matter have been framed with due regard to the responsibility in connection therewith.

Annual Examination

Arrangements are made for the holding of an examination every year, and during the period under review, the examination was carried out in July 1934. These examinations are based on the Admiralty Handbook of Wireless Telegraphy, as it is the policy of the Institution to examine candidates in their knowledge of fundamentals, both electrical and radio, and not in respect to present day practice of any particular apparatus.

It is believed that if an applicant has sound fundamental knowledge, he will acquire other essentials as experience permits. It is also necessary that members of the Institution have a thorough fundamental knowledge of electricity and also radio.

The results of these examinations indicate that there is still considerable room



E. T. FISK, F.Inst.R.E.Aust.
President, I.R.E., Aust.

for improvement in the standard of technical education of the average applicant. This institution and the individual members thereof must appreciate their responsibilities in this particular direction. It is very clearly laid down in our Memorandum of Association, Clause 3 of which states:—

"3 (a) To promote the science and practice of radio in all its branches and the usefulness and efficiency of persons engaged therein. (b) To raise the character and status and advance the interests of the profession of radio and those engaged therein. (g) To encourage the study of radio and to improve and elevate the general technical knowledge of persons engaged or about to be engaged in the profession of radio, and for that purpose to test, by examination or otherwise, the competence of such persons.

The holding of meetings, delivery of papers and lectures and the printing and circulating of same, is one of the important activities of this institution, and as such should receive the fullest co-operation of each and every member throughout Australia.

Proceedings of the Institution

During the year satisfactory arrangements were made for the incorporation of the Proceedings of this Institution in the monthly technical journal, "Radio Re-

view," a copy of which is posted to each member every month. The cost of this is met out of the subscription paid by each member.

Technical Apparatus

During the year the Council arranged to hand over to the Navy League Sea Cadets, certain wireless transmitting apparatus which was not being used by this institution. This apparatus is now being used at Snapper Island for the education of Navy League Sea Cadets in wireless matters.

Lectures and Papers

The institution was favoured, during the year, with lectures by the following gentlemen:—

Mr. T. E. D. Marks, B.E., A.M.I.E. Aust., subject: "Copper Oxide Rectifiers."

Mr. J. Katzman, B.Sc., E.E., P.E., subject: "Mica—Paper and Electrolytic Condensers and Their Properties."

Mr. H. M. Dowsett, M.I.E.E., F.Inst.P., M.Inst.R.E. (U.S.A.), subject: "Television and Its Possibilities in Australia."

Dr. G. Builder, M.Sc., Ph.D., subject: "Radio Investigations In The Polar Regions."

Mr. J. G. Reed, A.M.I.E.Aust., subject: "Rectifier and Filter Problems and Design."

Mr. R. J. W. Kennell, M.Inst.R.E. Aust., delivered an address on his observations during his recent visit to America.

Mr. A. E. Bennett (Man. Director, 2GB) delivered an address on "New Developments in Broadcasting."

Mr. E. T. Fisk, F.Inst.R.E.Aust., subject: "Beam Wireless Picture Service."

Mr. E. G. Beard, M.Inst.R.E.Aust., subject: "Coupled Circuits for High Fidelity Receivers."

Mr. R. M. Huey, B.Sc., B.E., A.Inst.R.E.Aust., subject: "Some Applications of Cathode Ray Oscillographs."

Arrangements were also made for members to visit the telegraph and telephone equipment in the Sydney G.P.O., in special relation to the overseas and long distance radiophone apparatus.

Another visit was also arranged to the City South Telephone Automatic Exchange.

For both of these visits we are indebted to Mr. J. W. Kitto, Deputy Director, Posts & Telegraphs, Sydney.

Radio Inductive Interference

This institution is in contact with various authorities in Australia, Great Britain and America, where investigations are being carried out and International conferences are being held. It is anticipated that some concrete information will be available during the coming year.

Finances

As will be seen by the balance sheet, the institution is financially sound. Although there are a number of members who are not up-to-date with their subscriptions etc., this matter is well in hand, and is most satisfactory.

International Relations

During this last year messages of goodwill were exchanged between this institution in Australia and the Institute of Radio Engineers in America. A 16 m.m.

film was sent with a message of greetings from Mr. Fisk, President of this institution, to the President of the American Institute, and recently we received back from America another film with a reciprocal greeting from Professor Jansky, President of the I.R.E. in U.S.A., which we very much appreciated.

In conclusion, I am happy to say that the institution is well founded and strong-

ly entrenched, and will continue to prosper and progress providing every member co-operates and plays his part in assisting to promote the aims and objects of this institution, to encourage worthy members, and also to deliver papers and lectures before the various divisions of the institution as often as circumstances permit.

Sgd. O. F. MINGAY,
Hon. Secretary.

Statement of Receipts and Expenditure
RECEIPTS

	£	s.	d.
To Subscription Fees	159	4	9
„ Sale of Badges	1	5	0
	<u>£160</u>	<u>9</u>	<u>9</u>

EXPENDITURE

	£	s.	d.
By Radio Reviews	22	0	0
„ Office Equipment	22	11	3
„ Stationery & Printing	13	9	0
„ Travelling Expenses	2	8	8
„ Catering	7	10	0
„ Advertising	2	9	0
„ Postage	8	13	1
„ Membership Badges	3	15	0
„ Cheque Book	10	0	0
Balance on Hand—			
Cash	£3	3	0
Bank	74	0	9
	<u>77</u>	<u>3</u>	<u>9</u>
	<u>£160</u>	<u>9</u>	<u>9</u>

I.R.E. Balance Sheet as at 31st March, 1935

LIABILITIES

Sundry Creditor	4	19	9
Excess of Assets over Liabilities	240	11	5
	<u>£245</u>	<u>11</u>	<u>2</u>

ASSETS

	£	s.	d.	£	s.	d.
Apparatus				39	10	0
Furniture & Fittings (less Depreciation)				46	14	0
Subscriptions Outstanding				60	0	3
Owing on Sale of R. Review Copies in Victoria				6	5	10
Certificates on Hand				13	15	0
Badges on Hand				6	15	6
Stationery on Hand				7	1	1
Common Seal				3	19	6
Cash—						
On Hand	4	14	1			
At Bank	47	3	9			
Stamps	0	12	2			
				<u>52</u>	<u>10</u>	<u>0</u>
	<u>£245</u>	<u>11</u>	<u>2</u>			

RECEIPTS

	£	s.	d.	£	s.	d.
To Balance as at 31/3/34—						
Commonwealth Bank A/c	63	9	9			
Cash on Hand	1	1	1			
Stamps on Hand	0	2	5			
				<u>64</u>	<u>13</u>	<u>3</u>
Subscriptions at 31/3/35	346	18	7			
Less Refunds	10	10	0			
				<u>336</u>	<u>8</u>	<u>7</u>
Social Functions				47	8	0
Sale Badges				0	17	6
Static Club Funds taken over				7	7	6
				<u>£456</u>	<u>14</u>	<u>10</u>

PAYMENTS

	£	s.	d.	£	s.	d.
As at 31/3/35—						
By Entertaining & Social Functions	67	4	3			
Office Rent and Expenses	49	0	0			
Rent of Hall for Lectures & Meetings	27	0	0			
Printing, Typing, Duplicating, etc.	29	4	11			

Telephone	11	10	0
Postage and Telegrams	38	3	0
Registration Expenses	3	3	0
General Expenses	28	0	0
Stationery	14	17	4
Typewriter	8	0	0
Transmitting Apparatus	9	6	2
Cost of "Radio Review" Magazines issued to members	134	10	4
Less Receipts from Victorian Division on account sales	15	14	2
	<u>118</u>	<u>16</u>	<u>2</u>
Balance—			
Commonwealth Bank	47	3	9
Cash on Hand	4	14	1
Stamps on Hand	0	12	2
	<u>52</u>	<u>10</u>	<u>0</u>
	<u>£456</u>	<u>14</u>	<u>10</u>

Melbourne Division I. R. E.

Financial Statement For Year Ending March 31st, 1935

LIABILITIES

	£	s.	d.
Liabilities	Nil		
Excess of Assets over Liabilities	114	13	10
	<u>£114</u>	<u>13</u>	<u>10</u>

ASSETS

	£	s.	d.
Fees outstanding	14	14	0
Membership Badges on Hand	2	10	0
Office equipment	£22	11	3
Less Depreciation 10%	2	5	2
	<u>20</u>	<u>6</u>	<u>1</u>
Cash on Hand	3	3	0
Bank Balance	74	0	9
	<u>£114</u>	<u>13</u>	<u>10</u>

VICTORIAN DIVISION INSTITUTION OF RADIO ENGINEERS (AUSTRALIA) ANNUAL MEETING— APRIL 1935.—

Chairman's Address. —

Gentlemen:

The Committee of the Victorian Division of the Institution of Radio Engineers (Aust.) has much pleasure in presenting the Annual Report and Balance Sheet covering the first year's activities of the Division which ended on the 31st March, 1935.

The Victorian Division of the Institution of Radio Engineers (Aust.) was inaugurated with a membership of nineteen in November 1933, but it was not until March 1934, that the Institution ground work by the Committee in forming the branch was completed. Eight members of the N.S.W. Division transferred to the Victorian Division, bringing the membership up to 27.

During the Institution year which commenced on the 1st April, 1934, the strength of the Victorian Division has been increased by 25 Associate members and 6 Junior members, 2 members also joined the Radio Society section. The total membership of the Victorian Division therefore now numbers 60, including the 41 new members who have joined the Victorian Division during the past year. The total receipts for the year were £160, and the total expenditure £86. The Financial Statement shows a bank balance of £74 standing to the credit of the Victorian Division, which is highly satisfactory. The Committee desires to express its appreciation of the services of our Hon. Treasurer, Mr. Evans.

ANNUAL REPORT VICTORIAN DIVISION I.R.E.—(Cont.)

During the proceedings of the past year a number of very interesting and instructive lectures and papers were given. The details are as follow:—

	1934
Dr. Katzman—Electrolytic Condensers.	
Commander Cresswell—	
Inaugural address on Ether	
Vibrations	17th May
H. M. Dowsett—	
Radio Applied to Aircraft	14th June
T. E. D. Marks—	
Copper Oxide Rectifiers	12th July
A. Lorimer & L. Harris—	
Audio Frequency Phenomena	30th Aug.
Prof. Laby—	
Uses of Long and Medium	
Waves	4th Oct.
S. H. Witt—	
Transmission Problems	22nd Nov.
M. Johnson—	1935
Picturegram Service	24th Jan.

A very interesting and instructive day was spent on February 3rd at the high frequency Beam Transmitting Station, Ballan, to which the members were invited by the courtesy of the Amalgamated Wireless Co. The station staff went to considerable trouble to make the visit a very enjoyable one, and we greatly appreciate their hospitality.

The formation of the Victorian Division of the Institution of Radio Engineers, like all newly-formed Institutions, has had its difficulties, which exist to be over-

come, and there are still several matters outstanding which require adjustment. These are of a constitutional and administrative nature, and need not hinder the work of the Division. With a little patience and forbearance your committee feel sure that such matters are capable of satisfactory adjustment.

Your committee decided that we should follow a practice which has been adopted by the Institution of Electrical Engineers, England, which provides for certain meetings being reserved for general discussions on some interesting subjects of Radio Science and Engineering. It is considered these discussions will provide an avenue by which all members will be encouraged to come forward and take part. By this means it is hoped that many will gradually overcome that state of nervousness, which is particularly noticeable in new as well as some of the older members. Your committee hopes that these discussions will produce that desired result.

The Committee desires to express its thanks and appreciation of the work of the Qualifications and Lectures and Papers Sub-committees, who have contributed towards the successful year, and particularly to our Hon. Secretary for his enthusiasm and devotion to the welfare of the Victorian Division. Mr. Mackay has been untiring in his efforts and determination, and has devoted a

very great amount of his valuable time to the working of the division. The success of our inaugural year is mainly due to his, and Mr. Dobbyn, the Assistant Hon. Secretary's excellent work.

The committee finally desires to express great appreciation and thanks to the President and Council of the Melbourne Technical College for the use of the College accommodation for holding the meetings of the Victorian Division of the Institution of Radio Engineers (Aust.)

The following papers have been suggested for the approval of the incoming Committee, and it is felt that the selection ensures that all members will be catered for. The results should be a benefit to our profession.

The retiring Committee hopes that the activities of the Institution will continue to grow and that members will make it their business to attend all meetings and help to make the new year a very successful one.

The first lecture, which will be delivered on 16th May, will be entitled "Audio Oscillators, Their Theory, Design, Calibrations and Use." The lecture, apart from being illustrated by slides, will be assisted by suitable demonstrations.

The succeeding lectures will probably be entitled:—

"Radio Inductive Interference and its Suppression."

"Loud Speakers."

"Modern Sound Film Reproduction."

"Design and Field Performance of Superheterodynes."

"The Mechanism of Fading."

Radio Society of Australia

RECOGNISING the need for the fullest development of radio and all its associated arts and sciences; also to encourage the intercourse of those persons interested in such development, the Institution of Radio Engineers (Aust.), being an institution established by radio engineers for the development of all branches of the science, art and industry of radio-electricity and radio communication, decided to form the Radio Society of Australia.

It is appreciated by the radio engineers that there are many persons interested in the development of radio and its associated arts and sciences in all or many phases, and yet who would not necessarily come within the scope of membership of such a technical body as the Institution of Radio Engineers. There are several thousands of people engaged in radio merchandising and broadcasting. There are also thousands of private citizens keenly interested in the National development of radio and allied arts and sciences. The medical profession is beginning to analyse the radio arts. In fact,

the possibilities of the associated radio arts are so widespread and of National importance, to warrant the formation of such a Society.

The organisation and management of the Radio Society will be under the direction of the Institution of Radio Engineers, whose President, Treasurer and Secretary will occupy similar position in the Society.

There shall be two grades of membership: Fellows, and Members. The former shall, as a general principle, be leaders in the art, and the latter, all people interested in the development of radio and associated arts and sciences. The annual subscription for Fellows shall be £2/2/- and Members 21/-.

Society members shall have the right to attend all lectures, demonstrations, etc., conducted by the I.R.E., and to receive copies of paper, but shall have no voice or vote in the conduct of the affairs of the I.R.E. Membership of the I.R.E. automatically carries membership of the Radio Society.

A.R.M.P.A.L.

Australian Radio Manufacturers Patents Association Ltd., 3rd Floor, Assembly Hall, Margaret Street, Sydney. 'Phone B 3388. Cables & Telegrams, "ARMPAL" Sydney.

Officers

President: L. P. R. Bean. **Vice-Presidents:** W. J. O'Brien and L. C. Hargreaves. **Councillors:** L. P. R. Bean, W. J. O'Brien, L. C. Hargreaves, A. L. C. Webb. **Secretary-Accountant:** Frank F. Kraegen (Chartered Accountant (Aust.)). **Special Accountant:** H. T. Woods (Chartered Accountant (Aust.)). **Deputy Special Accountant:** R. B. Woods (Chartered Accountant (Aust.)) **Auditors:** G. A. Blackett & N. B. Lewis (Chartered Accountants (Aust.)).



L. P. R. BEAN,
President

Technical Committee

C. H. Norville (Chairman), W. A. Syme, N. H. Buchanan, J. N. Briton, C. Slade, H. A. Warby.
Patent Attorneys: Messrs. T. C. Allen & Goddard.

Aims and Objects

The objects of this Association are to promote the manufacturing interests of its members and to mould the general body of Radio Manufacturers into a cohesive and single-minded Association.

Particularly to render a service to its members by giving them a complete knowledge of all patents, and to form a Buying Pool for the securing of overseas Patents direct.

ARMPAL is a co-operative Association and not a profit making concern, formed to protect its members against patent attacks.



L. C. HARGREAVES,
Vice-President



FRANK F. KRAEGEN,
Secretary-Accountant

SUBSCRIPTION FORM

THE CIRCULATION MANAGER,

**Radio & Electrical
Merchant**
GENUINE RADIO RETAILER

Box 3765, G.P.O., Sydney.

Please send me your Weekly Business Paper for 52 issues, post free, commencing with the next issue. Remittance for sum of 10/- is enclosed.

TRADING NAME.....

ADDRESS 'Phone.....

The Electrical and Radio Association of New South Wales

The Grace Building,
King, York and Clarence Streets,
Sydney. M2531. MA5976

Officers, 1935

PRESIDENT: Mr. Roy P. Godfrey (Godfrey Ltd.).

SENIOR VICE-PRESIDENT: Mr. J. Russell Greenwood (Anthony Hordern and Sons Ltd.).

JUNIOR VICE-PRESIDENT: Mr. Leighton Lord (Philips Lamps, A/asia, Ltd.).

HONORARY TREASURER: Mr. A. E. Pepper (Kempsey Electric Light and Power Supply Co. Ltd.).

EXECUTIVE: Messrs. P. L. Boswell (Boswell & Co.), J. A. Bull (Noyes Bros., Sydney, Ltd.), G. K. Dunbar (Associated General Electric Industries Ltd.), E. Hirst (British General Electric Co. Ltd.), C. H. Jensen (Westcott, Hazell & Co. Ltd.), A. E. Kaleski (Lawrence & Hanson Electrical Co. Ltd.), F. T. S. O'Donnell (F. T. S. O'Donnell, Griffin & Co. Ltd.), W. D. S. Taylor (Hazell & Moore Ltd.), A. Waddell (Coupland and Waddell).

Sectional Chairmen

- Section 1.** Electrical and Radio Development Association (E.R.D.A.): Mr. J. R. Greenwood.
Section 2. Electricity Supply Undertakings: Mr. A. E. Pepper.
Section 3. Overseas Manufacturers: Mr. C. Crome.
Section 4. Australian Manufacturers: Mr. R. P. Godfrey.
Section 5. Direct Representatives: Mr. A. E. Kaleski.
Section 6. Indentors: Mr. P. L. Boswell.
Section 7. Merchants: Mr. J. A. Bull.
Section 8. Retailers: Mr. J. R. Greenwood.
Section 9. Contractors: Mr. T. P. Johnson.
Section 10. Radio Manufacturers: Mr. F. T. S. O'Donnell.
Section 11. Radio Direct Representatives: Mr. G. K. Dunbar.
Section 12. Radio Wholesale Houses: Mr. C. H. Jensen.
Section 13. Radio Retailers: Mr. A. Grundy.
Secretary: Mr. Andrew F. O. Brown.

Aims and Objects

1. To promote the trade interests of the members of the Association.
2. To assist and further the interests of producers, suppliers and consumers of electrical energy and of manufacturers, distributors, contractors, purchasers and users of electrical commodities and appliances, etc.
3. To encourage the use of standardised electrical material.

4. To secure for the persons, firms, companies, or corporations engaged in the manufacture or sale of electrical appliances, or employing electrical workmen, the benefits of the Industrial Arbitration Act, 1912, or any Act or Acts now passed or hereafter to be passed by the Legislature of the State of New South Wales or by the Parliament of the Commonwealth of Australia relating to industrial matters in connection with electrical workmen.
5. To originate and promote improvements in the laws connected with the electrical industry and to support or oppose alterations therein, and to effect improvements in administration in matters connected therewith.
6. To inaugurate and carry out publicity for the popularisation of electricity and electrical appliances and methods by the collection and distribution among members data relating to the electrical industry, and by advertising in approved directions the benefits of the use of electricity and to adopt such other means of publicity as may seem expedient for promoting the objects of the association and/or educating the public to a better knowledge of the advantages and use of electric energy and appliances.
7. To provide for and be a central medium of useful and/or confidential information available for members of the Association, and generally for the furtherance and promotion of their business interests.
8. To further the objects herein contained or any of them by action directly, indirectly or in co-operation with any other organised body or bodies having objects similar to those of the Association.

Date of Formation, etc.

THE Association was formed nearly 25 years ago with the principal object of contesting wage claims then lodged by the Electrical Trades Union of Australia. These claims became the basis of an award which was probably the first electrical award made in the world. In those days and up to within three or four years ago the Association was known as the Electrical Employers' Association of New South Wales.

With the expansion of its services, however, this name was considered too restrictive and it was changed by omitting the word "employers." Although the Association retains more than an active interest in industrial matters, its sphere of usefulness has been so widened that it caters now for every section of both the electrical and radio industries.

Some of Its Services and Activities

The ordinary services and activities of the Association include:

1. Free advice to members as to their liabilities under Industrial Awards, Federal and State legislation, or any other matter affecting their interests individually or collectively.
2. Representation on the S.A.A. Wiring Rules Committees, the Electricians, etc. (State) Conciliation Committee, the Municipal etc. Councils (Electricians) Conciliation Com-

ELECTRICAL & RADIO ASSOCIATION.— (Continued).

- mittee, Electrical Apparatus Safety Board, and other public bodies legislating in the Electrical Industry.
3. The encouragement of amicable relations between the many sections of the Electrical and Radio interests and also between employer and employee.
 4. Use of accommodation exclusively set apart for members at the rooms of the Association containing telephone, writing equipment, reference library, local and overseas trade press, daily press and other conveniences.
 5. A copy of the official journal, "ERDA," containing authentic and informative articles from reliable sources, posted free, each month.
 6. Special and continuous activity towards stabilising and bettering conditions of the Electrical Trade, especially contracting.
 7. A better service to the public—at least an implied warranty of standard in the work done by Association members, the maintenance of a high ethical standard in all business and trade relations.

The Association is divided into Sections, and each Section looks after its own interests. The Executive, that is, the principal Committee, comprises one representative from each section, so that it can be said to be truly representative.

The subscription rates vary according to the section, and it is possible for an electrical contractor or radio trader to be a member of the Association for as little as two guineas per annum, or roughly 10d. per week.

THE ELECTRICAL AND RADIO DEVELOPMENT ASSOCIATION The Grace Building, King, York and Clarence Streets, Sydney. M2531. MA5976.

THE Electrical and Radio Development Association, or, as it is usually known by its initials, ERDA, is the Development Section of the Electrical and Radio Association of New South Wales and its sole function is the dissemination of publicity and propaganda as to the advantages of electricity and radio.

The annual Electrical and Radio Exhibition, the Red Seal Plan, various trade social functions, etc., are examples of its work.

Chairman: Mr. J. Russell Greenwood (Anthony Hornern & Sons Ltd.).

Committee: Messrs S. G. Cook (David Jones Ltd.), G. K. Dunbar (Associated General Electric Industries Ltd.), R. P. Godfrey (Godfrey Ltd.), J. F. Guthrie (British General Electric Co. Ltd.), L. Lord (Philips Lamps, A/asia, Ltd.), W. J. Wing (Amalgamated Wireless, A/asia, Ltd.), and W. Wright (Standard Telephones and Cables, A/asia, Ltd.).

Secretary: Mr. Andrew F. O. Brown.

Radio Retailers' Association of N.S.W.

Registered Office: Sixth Floor, Australia House,
Carrington Street, Sydney.

'Phone: BW 6673

Office Bearers:

President: E. E. Tree.

Vice-Presidents: E. D. Huckell and G. L. Oswin.

Hon. Secretary: E. Einsiedel.

Hon. Treasurer: T. F. Webb.

Councillors: Messrs. R. W. Grills, R. C. Wright, M. G. Clay, J. A. Garey, W. M. Ferris, M. Cutts, O. Sandel, J. T. Goldsmith, J. H. Ross, J. Quirke, J. Manning, J. B. Charlton.

Social Committee: E. Einsiedel, J. A. Sessions, A. W. Lutton, T. F. Webb, A. F. Norcliffe.

Subscription: 10/6 per annum. Entrance fee 5/-.

Objects of the Association

TO promote the welfare of members of the Association, and to further their interest by modern scientific methods of co-operation and organisation. To inaugurate and carry out publicity for the popularising of radio by advertising in approved directions and to adopt such other means of publicity as may seem expedient for educating the public to a better knowledge of the advantages, etc., of radio.

To provide a centre of information, instruction and advice on all matters pertaining to the business of members.

To establish, promote or assist in establishing or promoting, and to subscribe to, amalgamate with, or become a member of, any other Company, Association or Club, whose objects are similar or in part similar to the objects of this Association, or the establishment or promotion of which may be beneficial to this Association,

provided that no subscription be paid to any other such company, association, or club out of the funds of this Association except bona fide in furtherance of the objects of this Association.

To consider, originate, and promote reform improvements in the law; to consider proposed alterations and oppose or support the same.

To effect improvements in the administration of the law, and for the said purposes to petition parliament or take such other proceedings as may be deemed expedient.

To print or publish any newspapers, periodicals, books, programmes or leaflets that the Association may think desirable for the promotion of its objects.

Certificates and Badges: The Association reserves the right to grant, issue, authorise, modify, cancel or revoke certificates and badges of the Association.

The Association was formed in 1928 mainly for the purpose of eliminating undesirable trade practices and stabilising discounts. It is now endeavouring to secure the registration of qualified technicians and mechanics by legislation.

Both suburban and country membership has greatly increased during the past two years, among the benefits accruing have been the interchange of credit information, technical assistance, and advice, exchange of practical experience, co-operative advertising, the dissemination of up-to-date business practices and ideas, reciprocal servicing by members in adjacent districts, assistance in purchasing and visits to modern radio assembly plants and factories.

Monthly social gatherings are held at Australia House, also auto-picnics, fishing excursions, cricket matches, tennis tourneys, etc.

Radio Traders' Association of W.A.

(14 Weld Chambers, St. George's Terrace,
Perth, W.A.)

The Radio Traders' Association of Western Australia is a section of the W.A. Wholesale Electrical Traders' Association. Headquarters: 14 Weld Chambers, St. George's Terrace, Perth. Tel. B 9201.

Chairman: Mr. Alan Thomson, c/o Thomsons Ltd., Murray Street, Perth.

Committee: Messrs. J. G. Pritchard, F. Beames, C. S. Southcott, H. E. Pead, A. Case, and S. J. Madden.

Secretary: Mr. J. O. Smith, L.I.C.A., No. 14 Weld Chambers, Perth.

Obviously the Association is to undertake such work which may be deemed to the mutual interest of members and to the radio trade generally. A summary of the operations of the Association is as follows:—

Annual Radio-Electrical Exhibitions have been held since 1932, and arrangements are at present being made

for holding the next Exhibition in Government House Ballroom, commencing on Monday, 29th April, and concluding on Saturday, 4th May. These Exhibitions have been increasingly successful.

Some months ago, the Association was mainly instrumental in the formation of "The Fifty Thousand Club," an organisation comprising the various radio interests in Western Australia, with the object of further stimulating the advancement of the industry, the immediate objective being to obtain an increase in radio licences in W.A. from approximately 35,000 to 50,000.

The matter of "service" has recently also been the subject of much consideration by members, and conditions in this regard have been effectively stabilised by the adoption by the Association of a Form Letter for issue to purchasers of sets, for use by all members, and a scale of charges on a mileage basis for travelling expenses incurred during the period of warranty, and in addition, to cover "service" rendered after the period of warranty expires.

The Association is still an active one, and remains of undoubted benefit to members particularly, and also the radio industry in general.

Metal Trade Employees' Association

Head Office: Fourth Floor, 7 Wynyard Street,
Sydney. Telephone: B 4052—B 2376.

This Association is formed to encourage and develop metal working, manufacturing and allied industries, and to safeguard the interests of Australian producers. Formed in 1901 by a few of the leading engineering establishments. Covers such industries as the Automotive, Engineering, Electrical Manufacturing, Foundry, Sheet Metal, Stove Making, Structural, Ship Building, Wire-Working, etc., and is now the largest association of its type in Australasia. Constitutionally it is a voluntary association of manufacturers and workers of metal and producers of metal and allied products, the promotion of their several and mutual interests, governed by

an annually elected Council, which consists of 16 members, elected by ballot among the whole of the membership, and a number up to 4 appointive Councillors, all of whom are actively engaged in the industry.

President: J. Heine, Esq. (John Heine & Son, Ltd.)

Vice-Presidents: L. Napier Thomson, Esq. (Andrew Thomson & Scougall Ltd.), and G. E. Griffin, Esq. (Motor Parts Ltd.).

Hon. Treasurer: R. J. Burns, Esq. (Australian Iron & Steel Ltd.).

Councillors: Messrs. W. Courtney (Courtney & Bohlson Ltd.), A. Duly (Duly & Hansford), E. H. Dunnett (J. Gadsden Pty. Ltd.), E. A. Horner (Amalgamated Wireless A/sia Ltd.), P. T. Kavanagh (Kavanagh & English Ltd.), J. H. Meiklejohn (Austral Bronze Co. Ltd.), T. Malcolm Ritchie (S. & M. Engineers Ltd.), R. J. Saunders (B. & S. Electrical Co. Ltd.), H. L. Spring (Metters Ltd.), C. W. Squires (Malleable Castings Ltd.), E. J. Summons (Rega Products Ltd.), T. W. Thornley (W. Thornley & Sons Ltd.).

The Radio and Telephone Manufacturers' Association

Section of the Chamber of Manufacturers of
N.S.W., 12 O'Connell Street, Sydney
BW 1844. Formed 11th November, 1927.

President: S. M. Grime.

Vice-Presidents: L. P. R. Bean and C. Plowman.

Secretary: P. S. Edwards.

MR. S. M. GRIME

President, Radio & Telephone Manufacturers' Assn.

AIMS AND OBJECTS of the Association are:—

(a) To render the maximum possible service to the trade in which its members are engaged.

- (b) To assist the trade in its efforts to secure Tariff protection by co-ordinated effort.
- (c) To promote closer relations and cordial co-operation in all branches of the industry.
- (d) To advocate knowledge and learning in the science of business.
- (e) To co-operate with other organisations in efforts towards economic advancement, standardisation and other activities.
- (f) By any means of committees of skilled and experienced men to investigate solutions of the innumerable financial, technical, and commercial problems that confront us.
- (g) To focus the general and sectional activities of the Association on the essential problems of the industry.

Victorian Radio Association

The Victorian Radio Association is a body representative of the Melbourne radio trade. The Head Office and Place of Meeting is at Law Court Chambers, 191-195 Queen Street, Melbourne, where the Secretary, Mr. A. D. Broad, is located.



MR. A. BRASH,
President of Victorian Radio
Association, and Chairman, Mel-
bourne Radio Exhibition
Committee

AMONG other objects of the Association are:—
(a) To promote the welfare of members of the Association and to further their interests by modern scientific methods of co-operation and organisation.

(b) To inaugurate and carry out publicly for the popularisation of radio by advertising in approved directions and to adopt such other means of publicity as may seem expedient for educating the public to a better knowledge of the advantages of radio.

(c) To encourage the standardisation of radio material.

(d) To secure for members the benefits of any Act or Acts now passed or hereafter to be passed by the Legislature of the State of Victoria or by the Parliament of the Commonwealth of Australia relating to industrial or such other matters as may from time to time be determined by the Association in connection with the Radio Industry and in general do all such other lawful things as are incidental or conducive to the attainment of the objects for the benefit of members generally.

The activities of the Victorian Radio Association are divided up into several sections being:—

- (1) Merchants' Section
- (2) Manufacturers' Section
- (3) Retailers Section
- (4) Broadcasting Stations
- (5) Associate Members

Radio interests in Victoria were originally served by the Electrical Federation of Victoria, the constitution of which then provided for a radio section. In 1928 Radio interests were entirely divorced from Electrical interests and the Federation from that date has operated wholly as an electrical organisation. At the beginning of that year the Wholesale Radio Association (Victoria) was formed and functioned until 1931, when it evolved into the present Victorian Radio Association.

Since that date, the Association has fully justified its existence. Representing the principal radio houses in Victoria, it takes a lively interest in the problems that from time to time confront the industry. The Association is now the accepted channel through which the Victorian radio trade makes its voice heard. Seeking not to control the policies of individual members, it guides the industry along paths of established trade custom and brings about a recognition among radio traders of a high standard of business ethics as the essential foundation of a successful industry.

The Association has to its credit many notable achievements and has been successful in having beneficial legislation introduced and harmful legislation removed from the statute.

Radio Shows.—The Council of the Victorian Radio Association conducts the Annual Radio Exhibition held in Melbourne. The eleventh of these annual shows is being held in May of this year (1935). These functions have proved most successful and are popular with trade and public alike.

The Association has proved its worth at all times in acting as the "watch-dog" of the trade and protects its members interests either by direct or indirect action as circumstances may require. General meetings are dispensed with and the Council meets only as occasion demands. In this way the valuable time of its members is saved.

The Council of the Association comprises: The President, Mr. A. F. Brash; the Vice-President, Mr. K. Nicholls; the Treasurer, Mr. A. S. Duke; and the following representatives of the various sections of the association:—**Manufacturers' Section:** K. G. Healing (Chairman), and D. E. Williams (Vice-Chairman). **Merchants' Section:** H. V. Prior (Chairman), and K. Nicholls (Vice-Chairman), and R. Begg. **Retailers' Section:** A. F. Brash (Chairman), and G. Sharwood (Vice-Chairman), and E. Williams. **Broadcasting Stations:** T. W. Bearup (Chairman), and S. Morgan (Vice-Chairman). Secretary: A. D. Broad, 191 Queen Street, Melbourne, telephone Central 6926-7.

SUBSCRIPTION FORM

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Herewith please find Postal Note for 10/- being my subscription to "Radio Review" for the next 12 issues, post free.

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The Society of Radio Technicians, Aust.

Officers and Council.



MR. J. W. ROBINS,
Secretary-Treasurer

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MR. T. P. COURT,
President

Objects of the Society.

THE Society has been established to do all or any of the following things for the purpose of attaining the Objects of the Society and observing and performing whatever may be required by law in order legally to carry out such objects:—

- (a) To promote and develop the Science of Radio Technique with respect to Radio Service and set and maintain standards of efficiency for those professionally occupied in the Service and Maintenance of Radio Broadcast Equipment.
- (b) To procure the recognition of the Status of the Society by Government, Public, Local and other authorities.
- (c) To provide for the regular delivery of Lectures, and for the reading and discussing of communications and papers bearing on Radio Technology or upon subjects relating thereto.
- (d to m) Other objects generally applicable to such a Society.

Membership.

Membership of the Society consists of 4 grades:—
(1) HONORARY MEMBERS. (2) MEMBERS.—Minimum 25 years of age and able to satisfy the Council of the Society that he is regularly educated as a Radio Technician, and professionally engaged for not less than 5 years in radio technical service, etc. (3) ASSOCIATE MEMBERS.—Not less than 21 years of age, and shall satisfy the Council that he is professionally engaged in radio service for not less than two years, etc. (4) GRADUATES.—Between 16 and 21 years of age and employed in the radio industry, and shall satisfy the Council on several points.

Fees and Subscriptions.

(a) Members, £3/3/-; Associate Members, £2/2/-; Graduates, 10/6.

Application for entrance to the Society should be made with the Hon. Secretary, Box 1716, G.P.O., Sydney.

General Report.

The Secretary of the Society reports that since the formation in July, 1933, the membership has steadily grown and to-day represents all States of the Common-

wealth. From the beginning it was set out to create a body of qualified Radio Technicians particularly engaged in the service field and to establish a status by which membership in the Society would be accepted as an indication of knowledge, experience and ability.

Valuable work has been performed in providing lectures at each monthly meeting, and during the past year five lectures were devoted to service and laboratory procedure in the design and maintenance of broadcast receivers, including practical demonstrations covering the design and use of precision test equipment.

Meetings are held in the Conference Hall, Chamber of Manufacturers, 2nd Floor, 12 O'Connell Street, Sydney, on the first Thursday in each month unless otherwise advised.

THE SOUTHERN TASMANIAN RADIO TRADERS' ASSOCIATION Tregears' Buildings, Corner of Collins and Argyle Streets, Hobart

Established October 1932 which the object of stabilising trade in Hobart and Southern Tasmania, particularly by limiting discounts and by creating a friendly feeling amongst those engaged in the Radio Trade.

For a considerable time members met for luncheon weekly and discussed matters of mutual interest and, should complaints be lodged, they were considered by all present and invariably a satisfactory understanding was arrived at. Later it was considered unnecessary to meet so frequently and the meetings resolved themselves into fortnightly luncheons and lately the meetings have not been so regular.

The benefits accruing have been apparent, as a better understanding has been brought about between the Traders without in any way exploiting the public and the result of the elimination of excess discounts has proved entirely satisfactory from every point of view.

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Secretary: F. A. Allen.

Australian Federation of Broadcasting Stations

Head Office:

Kembla Building, Margaret Street, Sydney.

'Phone B 3835.

Branch Office:

360 Collins Street, Melbourne. 'Phone F 2143.

Office Bearers for 1935:

President: Mr. A. E. Bennett.

Vice-Presidents: Messrs. M. B. Duffy, and J. T. Taylor.

Secretary: Mr. G. L. Chilvers.

Federal Council:

N.S.W. Members: President (Mr. A. E. Bennett), Vice-President (Mr. J. T. Taylor). Representatives of Stations 2UE and 2AY.

Victorian Members: Messrs. S. Morgan (3KZ), A. W. Kemsley (3UZ), D. Worrall (3DB), and A. Warne Wilson (3BA).

New South Wales Executive Committee: Representatives of Stations 2CH, 2GB, 2KY, 2SM, 2UE, 2UW, 2CA and 2AY.

commercial stations affecting such matters as copyright, use of gramophone records, patents covering transmitters, etc., have been conducted by the Federation, with the object of securing the most favourable terms for the commercial stations. The appointment of the Royal Commission on Performing Right in 1932-33 was largely due to the activities of the Federation; and following on the report of the Royal Commissioner (the late Justice Sir Langer Owen), the Commonwealth Government amended the Copyright Act to provide for the settlement by voluntary arbitration of disputes which might arise as between the owners and users of copyright.

In other matters, too, the Federation has been able to carry on negotiations, and to make arrangements on behalf of all of the commercial stations, or a large majority of them, throughout Australia. The broadcast, through the whole chain of commercial stations in Australia, of the arrival of H.R.H. the Duke of Gloucester, and broadcasts of subsequent events of importance in



A. E. BENNETT, President



M. B. DUFFY, Vice-President



G. L. CHILVERS, Secretary

The objects of the Federation are:

1. To stimulate popular interest in and support of broadcasting in Australia and to promote and defend the interests of licensed broadcasting stations individually and collectively.

2. To confer with and bring before the proper authorities any matters affecting broadcasting with a view to amelioration or improvement of the conditions thereof.

3. To provide for and be a central medium of useful information available for all members and those associated or affiliated with the Federation and generally for the furtherance and promotion of their interests.

General Progress.

The membership of the Federation has steadily grown until, at the present time, more than forty commercial stations throughout Australia are members. During the past four years, all negotiations on behalf of the com-

mercial stations affecting such matters as copyright, use of gramophone records, patents covering transmitters, etc., have been conducted by the Federation, with the object of securing the most favourable terms for the commercial stations. The appointment of the Royal Commission on Performing Right in 1932-33 was largely due to the activities of the Federation; and following on the report of the Royal Commissioner (the late Justice Sir Langer Owen), the Commonwealth Government amended the Copyright Act to provide for the settlement by voluntary arbitration of disputes which might arise as between the owners and users of copyright.

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Radio Traders, Manufacturers and Wholesalers who are desirous of keeping themselves well informed on both the trade news and technical development can do so by subscribing to (1) "Radio & Electrical Merchant" and (2) "Radio Review" at a combined cost of only £1 (One Pound) per annum. Send postal note to Box 3765 G.P.O., Sydney.

Annual Report - Ending June - 1934

Radio Research Board

The Radio Research Board of the Council is constituted as follows:—Professor J. P. Madsen (University of Sydney), Chairman; Mr. H. P. Brown (Director-General, Postmaster-General's Department); Electrical-Commander F. G. Cresswell (Department of Defence); and Professor T. H. Laby (University of Melbourne).

1. General.

THE work of the Board has continued on its former lines, the main activities concerning (i) the behaviour of the ionosphere from the point of view of its reflection of radio waves, and (ii) atmospheric. The last year's operations constitute the first year's activities of the three-year period, towards the cost of which, as mentioned in the last report, the Postmaster-General's Department and the Council for Scientific and Industrial Research have agreed to contribute on a 3 : 1 basis.

The staff of the Board now consists of five investigators. Of these Drs. A. L. Green, D. F. Martyn, and G. Builder are located at the Sydney University where their work is supervised by Professor J. P. Madsen. Mr. G. H. Munro and Dr. H. C. Webster are located at the University of Melbourne, where their work is supervised by Professor T. H. Laby. In addition, from time to time both Universities allocate one or more research scholars to assist in the Board's investigations.

2. Work on Fading and the Ionosphere.

Work of this nature is still centred in New South Wales. Many of the observations involved are made with receiving equipment located at Liverpool some 20 miles away from the experimental transmitter in the Electrical Engineering Department of the University of Sydney. The past year's work has been particularly fruitful of results, several lines of investigation having been brought to a successful issue, while other lines have become apparent.

The technique of examining the lateral deviation, polarization, and angles of incidence of downcoming waves has been perfected, and measurement of these quantities obtained. A marked degree of lateral deviation has been found at Liverpool, and the point of reflection at the Kennelly-Heaviside layer has been observed to sweep through distances of as much as 50 kilometres in a few seconds. The inconsistent values previously obtained in England, India, and Australia for the angle of incidence of the downcoming waves have been shown to be due to the consequences of lateral deviations in these waves.

The results of the experiments made between Sydney and Melbourne using the frequency-change method of path measurement have now been analyzed. It is found that several waves are normally received in transmission between these cities. The strongest of these waves is that which has been reflected once from the Kennelly-Heaviside or E layer. Other waves frequently present were those singly and doubly reflected from the upper Appleton or F layer, while doubly and triply reflected

waves from the E layer were sometimes apparent. It is found that the ionosphere is normally relatively constant in characteristics over the 700 kilometres between Sydney and Melbourne. The height of the ionized layers was ascertained to vary but little with the angle of incidence of the waves—a circumstance which shows that the gradient of ionization in the layers, particularly the E layer, is very sharp.

From these measurements, it has been possible to determine the average ionization density in the E layer each night. A close correlation has been found between this quantity and the barometric pressure at ground level. This correlation has been confirmed by the analysis of some months of natural fading records taken at Seymour on the transmitter 3AR Melbourne during 1931-32. This result suggests a closer connection between the troposphere and the ionosphere than has previously been thought probable.

A considerable amount of data concerning the intensity of the sky wave on broadcasting frequencies at various distances from the emitter has been collated. This material has been put into a form suitable for the determination of the fading radii of broadcasting emitters. It has also been utilised to determine the reflection coefficient of the E layer. Existing theories of the structure of the E layer have then been analyzed in the light of this knowledge. It has been found possible to show that the gradient of ionization in this layer—a quantity about which little was formerly known—must approach the exponential form. It has also been shown that the existence of an absorbing D layer is unlikely. A reasonably accurate determination of the collision frequency of the electrons with the air molecules at the level of the E layer has been possible.

Recently, considerable evidence of a new form of interference due to high-powered emitters, such as that at Luxembourg, has appeared in Europe. The interference is observed when listening to a distant station beyond Luxembourg, and is independent of the wavelength of the former station. Associate-Professor V. A. Bailey, of the University of Sydney, has suggested that so powerful an emitter must exercise an appreciable influence on the collision frequency of the electrons in the ionosphere, and, with his collaboration, it has been possible to show that the interference experienced in Europe can be fully explained by this effect.

The assistance of Professor Bailey has also been obtained in the problem of determining the dispersion and absorption curves for radio propagation in the ionosphere under the influence of the earth's magnetic field. The labour involved in obtaining these curves from the

(Continued on next page)

Self Bias Resistor Calculation Graphs

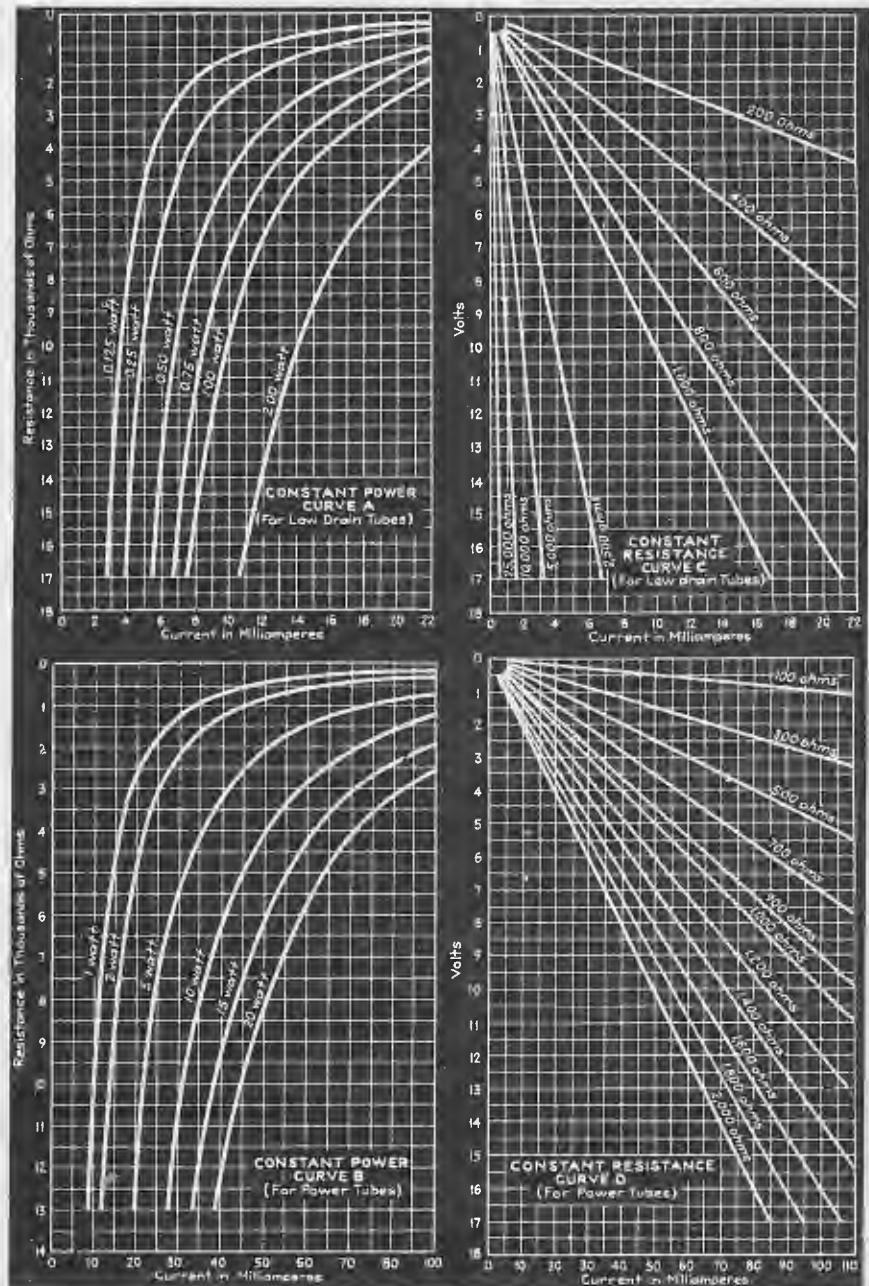
CURVES A and B permit rapid selection of resistors having the proper wattage rating where current and resistance are known. Curves C and D permit quick determination of required resistor values where cathode (sum of all d.c. currents flowing through biasing resistor) current and desired grid bias voltage are known.

Curves A and C are intended for use in computing resistor values for valves having low values of cathode current and are "paired" for convenient reference. Curves B and D are for higher drain power valves and are similarly paired.

This information should permit proper operating conditions to be supplied for any valve insofar as bias is concerned.

Curves A and B give **WATTAGE** rating where resistance and current are known.

Curves C and D give **RESISTANCE** where desired voltage drop and current are known.



THE COMPUTATION OF DECIBELS.—(Continued from page 199).

The great advantage of the decibel system is that overall figures may be obtained by adding the decibels gain or loss of the various stages. For example, consider the overall gain of an amplifier whose first stage has a voltage amplification factor of 15, followed by a 10 db attenuator, another stage whose amplification factor is 15, and a final stage whose factor is 5. Referring to the table, we have the following approximate figures:

$$\text{Overall gain} = 23 - 10 + 23 + 14 = 50 \text{ db.}$$

This is a much simpler and less unwieldy procedure

than the older method of multiplying the gain factors together.

It will be observed that 10 times power indicates a level of 10 db, 100 times indicates 20 db, 1,000 times indicates 30 db, etc. A handy rule for finding the level when the ratio of the powers involved is a power of 10, is to remember that the number of decibels is ten times the index figure. In the examples above, $10 = 10^1$, $100 = 10^2$, and $1,000 = 10^3$, hence the levels are (10 x 1), (10 x 2), and (10 x 3) decibels respectively. This should be of assistance to those unfamiliar with the use of logarithms.

Short Wave Reception

BEFORE dealing with the various types of receivers, it might not be amiss to include a few words on the subject of short-wave reception, dealing particularly with what results may and may not be expected. It is a fact that with very simple equipment it is possible to receive foreign broadcasting stations. At the same time it is frequently overlooked that the short waves are very adversely affected by certain astronomical and meteorological conditions which are not always so apparent in their effects on broadcast frequency reception.

WE have also to deal with the phenomenon of skip distance which is in itself an exceedingly complicated one, being closely allied with that of fading. The disturbance emitted from a short-wave transmitting aerial can be divided arbitrarily into two components, the ground wave and the sky wave. It is the ground wave from which reception is obtained up to short distances. On the broadcast frequencies the ground wave can be received at far greater distances than on the short waves, for as the frequency of transmission is increased the ground wave is correspondingly more absorbed. In the case of a longer wave, the sky wave is reflected or refracted from what is known as the **Heaviside** layer (consisting, it is believed, of a cloud of ionised gas particles which is continually varying in height and density), reaching the earth again before the ground wave has died out. As, however, the frequency is increased, a point comes where the ground wave dies out before the sky wave is reflected back to earth. It should be noted that only those waves which strike the layer at a very small angle are reflected; those which meet the layer at a large angle or practically at right angles pass on and are absorbed. Thus any receiver located near the edge of the skip region will experience a great deal of fading on the transmission due to the spontaneous variation of the reflecting medium, which has a very large effect on those waves meeting the layer near the "critical" angle where reflection and refraction cease.

Reception Phenomena

Exceedingly complicated effects are introduced at very great distances where several reflections may have occurred. In point to point services it is possible to partially control the effects of skip and fading by using directional aeriels, which can also be made to determine the angle at which the wave strikes the Heaviside layer.

Even so, conditions which are favourable for reception one day may be totally different the next. However, it is often reasonable to state that such and such a station (Paris, for example, near 19 metres) can be heard at such and such a time regularly (e.g., in this case 10 p.m. Sydney time).

Converters

The modern converter comprises a frequency changer system, with or without a preceding stage of radio frequency amplification. The high frequency signals are

converted by this means into some frequency in the broadcast band, usually of the order of 1500 kc/sec. This output, being a modulated signal of broadcast frequency, is fed into the aerial circuit of an ordinary broadcast receiver, tuned to the frequency obtained from the converter. The resultant amplified signal is de-modulated in the usual manner.

If the broadcast receiver is of the superheterodyne type the system is sometimes known as "triple-detection," since the signal passes through three "detectors" —to be correct, two are frequency-changers and only one is a true "detector."

These converter units are of two general types: (a) self-powered by an incorporated rectifier system, and (b) powered from the broadcast receiver. They can be operated into any type of receiver, although results are to a large extent dependent on the overall gain available from the particular receiver used.

T.R.F. Receivers

The most usual arrangement of a receiver of this kind comprises one tuned R.F. stage and a re-generative detector followed by one or two stages of audio. Apart from troubles in the audio end the majority of difficulties encountered concern smoothness of reaction control and

(Continued on page 206)

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Cleveland, Ohio, and Toronto, Ont., Canada

SHORT WAVE RECEPTION.—(Continued from page 205).

oscillation in the R.F. stage. However, these troubles can usually be cleaned up by proper de-coupling and the insertion of R.F. chokes in the positive supply leads. Any by-pass condensers intended to prevent stray R.F. currents in the pack or audio circuits should preferably be of the moulded mica and not of the tubular type. A value of .001 or .002 microfarad is generally satisfactory. Honeycomb R.F. chokes appear to be satisfactory. Regenerative receivers should be worked just below the oscillation point for the reception of 'phone signals. One advantage of such receivers, not possessed by most converters and all-wave receivers, is their ability to receive Morse code signals and to locate weak 'phone stations by heterodyning their carrier waves. Plug-in coils should be coated with some dope or varnish so as to preserve the same tuning position on the dials, even after long or rough handling of coils. Clear duco makes quite an efficient job.

All-Wave Receivers

At the present time the majority of receivers are arranged for dual-wave reception, covering approximately from 19 to 52 metres as well as the conventional broadcast band. A superheterodyne circuit is used, the wave-change being accomplished by coil switching from the front of the panel. With the advent of the Empire

broadcasting service there was a definite public demand for this type of receiver and it is probable that the dual-wave system will become standard. Certain all-wave receivers can be obtained to give continuous coverage from, say, 19 to 550 metres by means of coil switching as before. These receivers give excellent short-wave reception with extreme simplicity of operation. The provision of efficient automatic volume control systems in modern receivers assists materially in minimising the fading troubles usually associated with short-wave reception.

The troubles which beset shortwave receivers are essentially the same as with the broadcast receiver. The only additional problem of any great interest here is the extraordinary capacity of a short-wave receiver for picking up any inductive interference which may be present in any neighbourhood. In particular this is exemplified by the fact that it is quite possible to receive a noise from the ignition system of a car as far as 100 yards away. Loose guy wires, clothes lines or metal down-haul wires knocking against each other or other metal objects will create an annoying noise in a short-wave receiver, particularly noticeable on windy days. The remedy is to bond such metal objects together or securely stay them so that intermittent contact is impossible. The same remarks apply to any intermittent connection present in the house wiring system.

List of Stations

It should not be thought that all the stations listed in the following comprehensive list will always be audible in Sydney. It is only during periods of good conditions that it will be possible to hear the majority of them, and during the periods of bad conditions which are bound to occur it is sometimes impossible to hear with good strength more than three or four stations transmitting speech. Of course it must be remembered that Morse and Beam stations will always be audible. During the middle of the day when no short-wave broadcasting is audible, the Beam stations provide a very effective method of testing the sensitivity of a short-wave receiver or converter. In addition to the stations listed, numerous amateur 'phone stations in Australia and New Zealand can be heard between 75 and 85 metres (4000-3500 K.C.) at night, particularly in the winter months. In addition, on some evenings and during the week-ends, amateur 'phones may be heard on the so-called 40-metre band (41-42.8 metres, 7300-7000 K.C.). The third popular amateur band runs from 20.83 to 21.43 metres (14,400-14,000 K.C.), but is mainly used for Morse Code work.



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See page 208 for Skip Distance and Range Table.

COMPLETE TRANSMITTERS

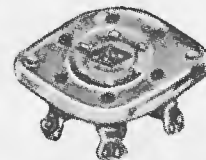
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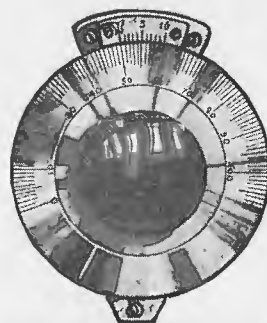
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SKIP DISTANCE AND RANGE TABLE

(for frequencies between 3,500 k.c. and 20,000 k.c.)

Frequency (K.C.)	Wave-length (metres)	Range of Ground Wave (miles)	Skip Distance (miles)				Max. Reliable Range (miles)			
			Summer		Winter		Summer		Winter	
			Day	Night	Day	Night	Day	Night	Day	Night
3,500—4,000	85—75	60	—	—	—	—	250	1,500	400	4,500
4,000—5,500	75—54	55	—	—	—	—	300	4,000	500	7,000
5,500—6,150	54—48.8	50	50	50	50	60	450	5,000	650	8,000
6,150—7,000	48.8—42.8	45	75	150	90	250	600	6,500	800	8,000
7,000—8,200	42.8—36.6	40	120	250	150	400	700	7,500	1,000	8,000
8,200—8,900	36.6—33.7	40	160	370	200	570	800	8,000	1,300	8,000
8,900—11,000	33.7—27.3	40	220	530	280	740	1,000	8,000	1,800	8,000
11,000—12,825	27.3—23.4	35	350	850	420	1,150	1,500	8,000	2,900	
12,825—15,000	23.4—20	30	400	1,100	500		2,000		3,800	
15,000—20,000	20—15	25	580		700		3,000		5,600	
				↑ Not reflected		↑ Not reflected		↑ Not reflected		↑ Not useful.

The above table is obtained from average figures. For night range assume the greater part of the path to be in darkness. Many discrepancies will be found in practice due to seasonal changes, local weather conditions, transmitting antennae, etc. At times signals may be received within the skip distance after travelling right around the world.

Principal Short Wave Stations of the World

The list which follows indicates the principal short-wave broadcasting stations which operate on reasonably definite schedules and which are most likely to be heard in Australia. Owing to propagation phenomena, many of these stations may not always be audible at the times stated. Even normally reliable stations are subject to seasonal variations and freak conditions generally.

The first set of figures indicates frequency in megacycles per second, followed by the corresponding wavelength in metres. Next comes the station call sign, the location of the station, the station power in kilowatts, and its normal operating schedule, in that order. The times stated are Sydney Mean Times.

- 26.100, 11.49, GSK, Daventry, England; 15.
- 21.540, 13.93, W8XK, Pittsburgh, Pa.; 40; 10 p.m. to 5 a.m.
- 21.530, 13.94, GSJ, Daventry, England; 15.
- 21.470, 13.97, GSH, Daventry, England; 15.
- 17.790, 16.86, GSG, Daventry, England; 15.
- 17.780, 16.87, W3XAL, Boundbrook, N.J.; 15; 1 a.m. to 7 a.m.
- 17.775, 16.88, PHI, Huizen, Holland; 60. Winter months 11 p.m. to 1.10 a.m., ex. Wed., Thurs.; Sun. to 1.40 a.m.; Mon. to 2.10 a.m.
- 17.310, 17.33, W3XL, Boundbrook, N.J., 25; Saturday, 2 a.m. to 7 a.m.
- 15.410, 19.47, PRADO, Riobamba, Ecuad.; 2; Monday, 7.30 a.m. to 9 a.m. (winter only).
- 15.370, 19.52, HAS3, Budapest, Hungary; 20; Mon., 11 p.m. to midnight.
- 15.330, 19.56, W2XAD, Schenectady, N.Y.; 20; Relays WGY 5.30 p.m. to 6.30 p.m.
- 15.340, 19.55, DJR, Zeesen, Germany; 5.
- 15.300, 19.60, CP7, La Paz, Bolivia; 1; Relays CP4 irregularly.
- 15.280, 19.63, DJQ, Zeesen, Germany; 5; 3.30 p.m. to 5 p.m.
- 15.270, 19.64, W2XE, Wayne, N.J.; 5; Relays WABC 2 p.m. to 4 p.m.
- 15.260, 19.66, GSI, Daventry, England; 15.
- 15.250, 19.67, W1XAL, Boston, Mass.; 5; Relays WEEI irregularly.
- 15.243, 19.68, FYA, Paris, France; 12; 10 p.m. to 2 a.m.
- 15.220, 19.71, PCJ, Eindhoven, Holland; 18; Relays PHI Mon. 11 p.m. to 1.40 a.m.
- 15.210, 19.72, W8XK, Pittsburgh, Pa.; 40; 1 a.m. to 7.15 a.m.

PRINCIPAL SHORT WAVE STATIONS.— (Continued from page 208).

- 15.200, 19.73, DJB, Zeesen, Germany; 5; 3.30 p.m. to 5 p.m. 6.45 p.m. to 10.15 p.m.
- 15.140, 19.82, GSF, Daventry, England; 15; 8 p.m. to midnight; Mon. 10.30 p.m. to midnight.
- 15.121, 19.84, HVJ, Vatican City; 12; 1.30 p.m. to 1.45 p.m.
- 15.040, 19.94, RKI, Moscow, U.S.S.R.; Sun., 9-10 p.m.; Mon., 1 a.m.-2 a.m. and irregular.
- 13.415, 22.36, TIEP, San Jose, C.R., 0.2; Mon., 4 a.m.-7 a.m.
- 13.075, 22.94, VPD, Suva, Fiji; 2; 3.30 p.m.-4.30 p.m. ex Sunday.
- 12.830, 23.38, CNR, Rabat, Morocco, 10; Mon., 10.30 p.m.-12.30 a.m.
- 12.396, 24.20, CT1GO, Parede, Portugal, 0.35; Mon., 1 a.m. 2.30 a.m.; Wed., Fri., Sat., 4 a.m.-5.15 a.m.
- 12.082, 24.83, CT1CT, Lisbon, Portugal 0.5; Mon., midnight 2 a.m.; Fri., 6 a.m.-7 a.m.
- 12.000, 25.00, RNE, Moscow, U.S.S.R.; 20; Sunday, 1 p.m.-2 p.m., 9 p.m.-10 p.m.; Monday, 1 a.m.-2 a.m.
- 11.880, 25.23, FYA, Paris, France, 12; 2.15 a.m.-5.15 a.m., 6 a.m.-9 a.m.
- 11.870, 25.27, W8XX, Pittsburgh, Pa., 40; 7.30 a.m. to 1 p.m.; Sunday, until 4 p.m.
- 11.860, 25.28, GSE, Daventry, England, 20; 9 p.m. to midnight; Monday, 11 p.m. to midnight.
- 11.855, 25.31, DJP, Zeesen, Germany, 5.
- 11.830, 25.36, W2XE, Wayne, N.J., 5. Relays WABC, 6 a.m.-8 a.m.
- 11.810, 25.40, 2RO, Rome, Italy, 9.
- 11.795, 25.43, DJO, Zeesen, Germany, 5.
- 11.790, 25.45, W1XAL, Boston, Mass., 5; relays WEEI (irregular).
- 11.770, 25.49, DJD, Zeesen, Germany, 5; 3 a.m. to 7.30 a.m.
- 11.750, 25.53, GSD, Daventry, England, 20; 4 a.m. to 7 a.m., 4.15 p.m.-6.15 p.m.
- 11.730, 25.57, PHI, Huizen, Holland, 23; Summer months, 11 p.m.-1.10 p.m. ex. Wednesday; Thursday, Sunday, to 1.40 a.m.; Monday, to 2.10 a.m.
- 11.720, 25.60, FYA, Paris, France, 12; 10 a.m. to 1 p.m., 2 p.m. to 4 p.m.
- 11.720, 25.60, CJRX, Winnipeg, Manitoba, 2; 11 a.m.-2 p.m., 2.30 p.m. to 3 p.m.
- 10.740, 27.93, JVM, Nazaki, Japan, 20; 7 p.m.-11 p.m. (irregular).
- 10.660, 28.14, JVN, Nazaki, Japan, 20; 7 p.m.-11 p.m. (irregularly).
- 10.290, 29.15, D1Q, Konigswusterhausen; Experimental.
- 10.350, 28.98, LSX, Buenos Aires, Arg., 20; Relays LR4 6 a.m.-7 a.m., 11 a.m. to 12 noon; and irregular.
- 10.332, 29.04, ORK, Ruysselede, Belgium, 8; 4.45 a.m.-6.15 a.m.
- 9.860, 30.43, EAQ, Madrid, Spain, 20; 8.15 a.m.-10 a.m.; Sunday, also 4 a.m.-6 a.m.
- 9.780, 30.67, 2RO, Rome, Italy, 20; 5.30 a.m. to 8 a.m.; Tuesday, Thursday, Saturday, also 10.45 a.m.-12.15 p.m.
- 9.667, 31.00, ZEB, Bulawayo, South Rhod., 0.5; Wednesday, 4.15 a.m. to 6.15 a.m.
- 9.667, 31.00, CTICT, Lisbon, Portugal, 0.5; Sunday, 10 p.m. to midnight; Friday, 7 a.m. to 9 a.m.
- 9.600, 31.25, CTIAA, Lisbon, Portugal, 2; Wednesday, Friday, Sunday, 7.30 a.m. to 10 a.m.
- 9.595, 31.27, HBL, Prangins, Switzerland, 18; Sunday, 8.30 a.m. to 9.15 a.m.
- 9.590, 31.28, W3XAU, Philadelphia, Pa., 1; 3 a.m. to 10.50 a.m.
- 9.590, 31.28, VK2ME, Sydney, N.S.W., 12; Sunday, 4 p.m.-6 p.m., 8 p.m.-2 a.m.
- 9.590, 31.28, HP5J, Panama City, Pan.; Tuesday, 10.30 a.m. to 11.30 a.m.

(Continued on page 210)

"RELIANCE" Sky Raider 6

A 6 Valve DUAL WAVE Battery Superheterodyne

FEATURING :

- | | |
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| Long range daylight reception. | Economical Operation ("A" Battery .8 amp; "B" Battery 7-9 mA.). |
| Phenomenal short-wave reception. | Selectivity 10 k.c. and Class B Audio. |
| Automatic volume control. | |

This remarkable receiver, together with all other Reliance Productions, including the magnificent 10-valve Reliance York luxury receiver, will be made available to a limited number of COUNTRY and INTERSTATE firms who are prepared to merchandise on a straight-out basis, without consignment stocks. Write for full particulars.

LIST PRICE **£29/10/0**

Complete with all batteries and aerial equipment.

Note that on and after the 7th July the factory will be located at 14 Barrack Street. It will be one of the most up-to-date factories in Sydney.

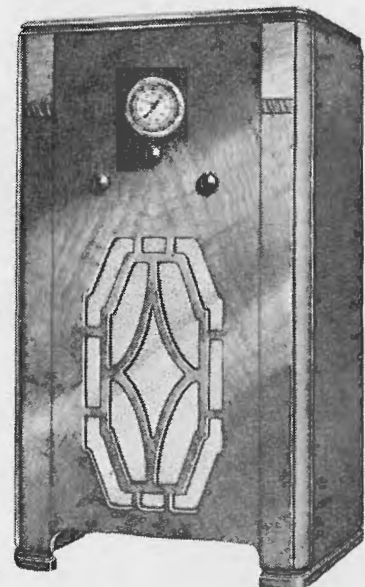
RELIANCE RADIO CO. (A/sia)

RADIO MANUFACTURERS AND WHOLESALE MERCHANTS

BW 2223

14 BARRACK ST., SYDNEY, N.S.W.

BW 6407



PRINCIPAL SHORT WAVE STATIONS.— (Continued from page 209).

- 9.580, 31.32, 3LR, Lyndhurst, Victoria, 0.6; 6.15 p.m.-10.30 p.m., except Sunday.
- 9.580, 31.32, VK3XX, Lyndhurst, Victoria, 0.6; P.O. Experimental station.
- 9.580, 31.32, GSC, Daventry, England, 20; 7 a.m.-8.45 a.m., 9 a.m.-11 a.m.; Monday, Wednesday, Friday, Sunday, also 12.30 p.m. to 1.30 p.m.
- 9.570, 31.35, W1XX, Millis., Mass., 5; Relays WBZ 10 p.m.-4 p.m.
- 9.570, 31.35, KZRM, Manila, P.I., 6; irregular.
- 9.565, 31.36, VUB, Bombay, India, 6; Thursday; Sunday, 2 a.m.-3.30 a.m.
- 9.560, 31.38, DJA, Zeesen, Germany, 5; 11 p.m. to 2.30 a.m., 8.15 a.m. to 12.15 p.m.
- 9.540, 31.45, LKJ1, Jeloy, Norway, 1; 8 p.m.-11 p.m.
- 9.540, 31.45, DJN, Zeesen, Germany, 5; 11 p.m.-2 a.m., 8.15 a.m.-1 p.m., 6.45 p.m.-10.15 p.m.
- 9.530, 31.48, W2XAF, Schenectady, N.Y., 40; Relays WGY 10.30 a.m.-2 p.m.
- 9.510, 31.55, VK3ME, Melbourne, Victoria, 3; Wednesday, Thursday, Friday, 8 p.m.-9.30 p.m.; Saturday, 8 p.m.-10 p.m.
- 9.510, 31.55, GSB, Daventry, England, 20; 12.15 a.m.-3.45 a.m., 4 a.m.-8.45 a.m., 4.5 p.m.-6.15 p.m.
- 9.500, 31.58, PRF5, Rio de Janeiro, Brazil, 60; 8.30 a.m. to 9.15 a.m.
- 9.428, 31.80, COH, Havana, Cuba, 0.15; 1 a.m.-2 a.m., 8 a.m.-9 a.m., 11 a.m.-12 noon.
- 9.415, 31.86, PLV, Bandoeng, Java, 80; irregular.
- 9.375, 32.00, CB32, Los Andes, Chile, 0.05.
- 9.120, 32.89, CP6, La Paz., Bolivia, 1; relays CP4 irregular.
- 9.050, 33.15, TFK, Reykjavik, Iceland.
- 8.200, 36.59, HJ5ABF, Popayan, Col., 0.05.
- 8.035, 37.33, CNR, Rabat, Morocco, 10; Monday, 6 a.m.-8.30 a.m.
- 8.020, 37.41, IRF, Rome, Italy, 20; experimental.
- 8.000, 37.50, HCIPM, Quite, Ecuador, 0.012; Tuesday, 11 a.m.-2 p.m.
- 7.855, 38.19, HC2JSB, Guayaquil, Ecuador, 0.05; 2.20 a.m.-4.50 a.m., 10.20 a.m.-2.20 p.m.
- 7.799, 38.47, HBP, Prangins, Switzerland, 18; Sunday, 8.30 a.m.-9.15 a.m.
- 7.510, 39.95, JVP, Nazaki, Japan, 20; 7 p.m.-11 p.m. irregularly.
- 7.500, 40.00, YGOY, Yunnan, China, 0.25; 5 p.m.-6 p.m.
- 7.400, 40.54, YNE, Puerto Cabezas, Nicaragua, 0.05.
- 7.400, 40.54, HJ3ABD, Bogota, Colom., 0.05; 10 a.m.-2 p.m.; Tuesday, Thursday, Saturday, also 9 a.m.-10 a.m.
- 7.390, 40.60, EA8AB, Santa Cruz de Tenerife, 0.2; Wednesday, Friday, Sunday, 9 a.m.-10 a.m.
- 7.375, 40.68, VS1AM, Johore, Malaya, 0.5.
- 7.280, 41.20, HJ1ABD, Cartagena, Col., 0.075; 11 a.m.-1 p.m.
- 7.200, 41.67, HJ4ABB, Manibales, Col., 0.3; 3.15 a.m.-4 a.m.; Tuesday, Friday, also 10.30 a.m.-1 p.m.; Monday, also 5.30 a.m.-7 a.m.
- 7.177, 41.78, CR6AA, Lobito, Angola, 0.5; Thursday, Sunday, 5.30 a.m.-7.30 a.m.
- 7.120, 42.14, HB9B, Basle, Switzerland, 0.05; 7 a.m.-7.30 a.m.
- 7.100, 42.25, —, Sincelejo, Colombia.
- 7.100, 42.25, HKE, Bogota, Colombia, 0.14; Tuesday, Friday, 9 a.m.-12 noon; Wednesday, Sunday, 11 a.m.-12 noon.
- 7.040, 42.60, HRP1, San Pedro Suja, Honduras.
- 7.005, 42.83, VK3ZX, Melbourne, Victoria, 0.025; Sunday, 3.30 p.m.-5 p.m.
- 7.000, 42.86, HJ5ABG, Cali., Colombia, 0.015.
- 7.000, 42.86, HJ5ABE, Cali., Colombia, 0.05.
- 6.814, 44.03, H1H, San Pedro de Macoris; Monday, Friday, 6.40 a.m.-8.40 a.m., 11.10 a.m.-1.10 p.m.
- 6.810, 44.05, OA4B, Lima, Peru.
- 6.810, 44.05, HC1JW, Quito, Ecuador, 0.3; irregular.

(Continued on Page 211)

"CHALLENGE" CHASSIS - COIL CANS - VALVE SHIELDS

LAMINATIONS Etc., ARE USED BY THE MAKERS OF
THE BEST RADIO RECEIVERS

"There's a Reason"

RADIO manufacturers only pay the same price for "Challenge" radio goods as they are asked to pay for the inferior kind.

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PINE ST., CHIPPENDALE
SYDNEY, N.S.W.



PRINCIPAL SHORT WAVE STATIONS.—
(Continued from page 210)

- 6.750, 44.44, JVT, Nazaki, Japan, 20; 7 p.m. to 11 p.m., irregular.
- 6.710, 44.71, TIEP, San Jose, Costa Rica, 0.2; 10 a.m.-1 p.m., except Monday.
- 6.667, 44.05, HC2RL, Guayaquil, Ecuador, 0.15; Monday, 8.45 a.m.-11 a.m.; Wednesday, 12.15 p.m.-2.15 p.m.
- 6.618, 45.31, PRADO, Riobamba, Ecuador, 2; Friday, 12 noon-2.30 p.m.
- 6.611, 45.38, RW72, Moscow, U.S.S.R., 10; midnight-2.15 a.m., 2.30 a.m.-5 a.m.
- 6.590, 45.50, TI4NRH, Heredia, Costa Rica.
- 6.520, 46.01, YV6RV, Valencia, Venez., 1; 7.30 a.m.-12.30 p.m.
- 6.518, 46.02, HIL, Santo Domingo, D.R.; Sunday, 10.40 a.m.-12.40 p.m.
- 6.490, 46.22, HJ5ABD, Cali, Colombia, 0.1; 10 a.m.-1 p.m., except Monday.
- 6.482, 46.28, HI4D, Santo Domingo, D.R., 0.045; 3.55 a.m.-4.40 a.m., 7.40 a.m.-10.40 a.m., except Monday.
- 6.447, 46.53, HJ1ABB, Barranquilla, Colombia, 0.3; 2.30 a.m.-4 a.m., 9 a.m.-1 p.m.
- 6.425, 46.69, W3XL, Boundbrook, N.J., 25; experimental.
- 6.425, 46.69, VE9AS, Fredericton, N.B.; relays CFNB 7 a.m.-12 noon, irregularly.
- 6.417, 46.90, CO2JB, Cienfuegos, Cuba.
- 6.400, 46.88, YN1GG, Managua, Nicarag., 0.15; 4 a.m.-5.30 a.m., 10 a.m.-12 noon.
- 6.400, 46.88, LU8AB, Buenos Aires, Arg.
- 6.386, 47.00, HC1MAR, Ambato, Ecuador; Thursday, 11 a.m.-1 p.m.
- 6.375, 47.06, YV4RC, Caracas, Venez., 1; 2.30 a.m.-3.30 a.m., 7.30 a.m.-1 p.m.; Sunday, 1.30 a.m.-3.30 a.m.
- 6.350, 47.24, HJ1ABH, Barranquilla, Colombia.
- 6.330, 47.39, JZG, Nazaki, Japan, 10; 7 p.m.-11 p.m., irregularly.
- 6.316, 47.50, HIZ, Santo Domingo, D.R., 0.15; 2 p.m.-3.30 p.m., except Monday.
- 6.250, 48.00, HI1A, Santo Domingo, D.R., 0.05; 10.40 a.m.-12.40 p.m., except Monday.
- 6.250, 48.00, OAX4B, Lima, Peru, 0.2; 10.30 a.m.-1 p.m.
- 6.250, 48.00, HJ1ABN, Cienaga, Colombia; 11.30 a.m.-12.30 p.m.; Monday, also 4.30 a.m.-5.30 a.m.
- 6.198, 48.40, CT1GO, Parede, Portugal, 0.35; Monday, 2.30 a.m.-4 a.m., 10.20 a.m.-11.30 a.m.; Wednesday, Thursday, Friday, Saturday, 10.20 a.m.-11.30 a.m.
- 6.710, 48.62, HJ3ABF, Bogota, Colombia, 0.05; 10 a.m.-2 p.m., except Monday.
- 6.150, 48.78, CO9GC, Santiago de Cuba, 0.04; midnight-1 a.m., 2.30 a.m.-5 a.m., 6 a.m.-7.30 a.m., 12 noon-1 p.m.
- 6.150, 48.78, YV3RC, Caracas, Venez., 1; 1.30 a.m.-4.30 a.m.; Monday, midnight-4 a.m., 5.15 a.m.-6.30 a.m., 10.30 a.m.-12.30 p.m.
- 6.150, 48.78, HJ2ABA, Tunja, Colombia, 0.25; 11 a.m.-1 p.m.
- 6.150, 48.78, CSL, Lisbon, Portugal, 0.5; 5 a.m.-9 a.m., 10 p.m.-11.30 p.m.
- 6.145, 48.82, CJRO, Winnipeg, Manitoba, 2; 11 a.m.-2 p.m., 2.30 p.m.-3 p.m.
- 6.145, 48.82, ZTD, Durban, S.A., 0.01.
- 6.140, 48.86, W8XK, Pittsburg, Penn., 40; 7.30 a.m.-4 p.m.
- 6.133, 48.92, ZGE, Kuala Lumpur F.M.S., 0.18; Tuesday, Friday, Sunday, 9.40 p.m.-11.40 p.m.
- 6.130, 48.94, LCL, Jeloy, Norway, 1; 1 a.m.-9 a.m.
- 6.128, 48.95, YV1RMO, Maracaibo, V.; irregular.
- 6.123, 49.00, HJ4ABN, Manizales, Co.
- 6.120, 49.02, YDA, Bandoeng, Java, 1.5; 8.45 a.m.-9.45 a.m., 1.30 p.m.-4.30 p.m., 8.30 p.m.-2 a.m.
- 6.120, 49.02, W2XE, Wayne, N.J., 5; relays WABC 9 a.m.-2 p.m.
- 6.115, 49.05, HJ1ABE, Cartagena, Col., 0.25; 2 a.m.-3 a.m.; Monday, midnight-3 a.m.; Tuesday, also 1 p.m.-3 p.m.; Thursday, also 11 a.m.-1 p.m.
- 6.112, 49.08, YV2RC, Caracas, Venez., 0.2; relays YV1RC 2 a.m.-4 a.m., 8.30 a.m.-10.30 a.m.; Monday, midnight-4 a.m., 5.15 a.m.-6.30 a.m., 9.30 a.m.-12.30 p.m.

(Continued on page 212)

The Ideal Combination

"SIMPSON"

ELEC. TURNTABLE (Gramo-Motor)

Nothing to wear out—silent—nothing to go wrong—safe. Reproduce the latest records in your own home at will.

With this new type of turntable no expert knowledge is needed to convert an ordinary gramophone. This device turns ordinary instruments into electric models. All the user of a "Simpson" Electric Turntable has to do is to remove the ordinary turntable from his gramophone, unscrew and remove the motor, and replace with "Simpson's" Electric Turntable, which is fitted with one locknut.

Special note is drawn to the fact that the ball-race does not revolve nor does it require lubrication. A flex and plug are supplied. You simply plug into the nearest electric light socket.

PRICE **£5/5/-**
Suitable for any A.C. 50-cycle supply between 200/250 volts.



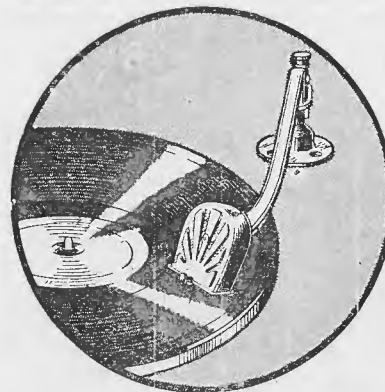
"WHITING" ELECTRIC PICK-UP

Some of the Reasons why the "Whiting" Pick-Up is better:—

Highest grade magnet steel ensures brilliant reproduction.

Detachable head with positive electrical contact.

Special method of pivoting stylus allows utmost needle play.



Curved tone arm ensures perfect tracking.

Counter balance for tone arm with adjustable spring allows needle pressure to be varied from zero to four ounces, reducing record wear to a minimum.

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Constructed from best instrument metals throughout, the "Whiting" Pick-Up is built for endurance.

Obtainable in Florentine Bronze or Special Nickel Plated Finish.

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Also at Adelaide — Hobart — Launceston

PRINCIPAL SHORT WAVE STATIONS.— (Continued from page 211)

- 6.110, 49.10, HJ4ABG, Medellin, Colom., 0.01.
6.110, 49.10, VUC, Calcutta, India, 0.5; midnight-2.30 a.m., except Monday; Monday, 12.30 a.m.-1.30 a.m.; Sunday, 3 p.m.-5.30 p.m.
6.110, 49.10, GSL, Daventry, England, 20; Monday, Wednesday, Friday, Sunday, 12.30 p.m. to 1.30 p.m.
6.100, 49.18, W9XF, Chicago, Ill., 10; 7.30 a.m.-11 a.m., 12.30 p.m.-5 p.m., except Sunday and Monday.
6.100, 49.18, W3XAL, Boundbrook, N.J., 20; Tuesday, Thursday, Sunday, 8.30 a.m.-5 p.m.
6.100, 49.18, HJ4BL, Manizales, Col.
6.100, 49.18, HJ1ABC, Quibdo, Colombia, 0.01; Sunday, 2 p.m.-2.30 p.m.
6.098, 49.20, ZTJ, Johannesburg, S.A., 5; Monday, 11 p.m.-1.15 a.m., 3.30 a.m.-6 a.m., 2.45 p.m.-3.30 p.m., 6.30 p.m.-10 p.m.; Tuesday to Saturday, midnight-7 a.m., 2.45 p.m.-3.30 p.m., 6.30 p.m.-10 p.m.; Saturday, also 7 a.m. to 8 a.m.; Sunday, midnight-8 a.m.
6.090, 49.26, VE9GW, Bowmanville, Ont., 0.5; Monday, 4 a.m.-noon; Tuesday, Wednesday, Thursday, 6 a.m.-3 p.m.; Thursday, Friday, Saturday, 10 p.m.-3 p.m.
6.090, 49.26, VE9BJ, St. John, N.B., 0.1; 10 a.m.-11.30 p.m.
6.090, 49.26, HJ4ABC, Pereira, Colom., 0.05; 11.30 a.m.-12.30 p.m.
6.085, 49.30, 2RO, Rome, Italy, 20; Tuesday, Thursday, Saturday, 9 a.m.-10.30 a.m.
6.080, 49.34, W9XAA, Chicago, Ill., 0.5; Monday, 2.30 a.m.-12 noon; Wednesday, Friday, Sunday, 7 a.m.-3 p.m.; Tuesday, Thursday, Saturday, 7.30 a.m.-10 a.m.
6.080, 49.34, VE9HX, Halifax, N.S., 0.2; 12.30 a.m.-4 a.m., 8 a.m.-2 p.m.
6.080, 49.34, DJM, Zeesen, Germany, 5.
6.080, 49.34, CP5, La Paz, Bolivia, 1; 10.40 a.m.-12.15 p.m.
6.079, 49.35, HJN, Bogota, Colombia, 1; 3 a.m.-4.30 a.m., 9 a.m.-2 p.m., except Monday.
6.072, 49.41, ZHJ, Penang, F.M.S., Tuesday, Thursday, Sunday, 10 p.m.-midnight; Wednesday, Friday, 6 p.m.-6.30 p.m.
6.072, 49.41, OER2, Vienna, Austria, 0.25; midnight-8 a.m.
6.070, 49.42, VE9CS, Vancouver, B.C., 0.007; 9 a.m.-10.30 a.m., Tuesday, also 2.30 a.m.-4.30 p.m.; Sunday, 4.45 p.m.-12 noon, 1.30 p.m.-4 p.m.
6.070, 49.42, HJ1ABF, Barranquilla, Col., 0.025.
6.060, 49.50, W8XAL, Cincinnati, Ohio, 10; 2 p.m.-4 p.m., 9.30 p.m.-11 p.m.
6.060, 49.50, W3XAU, Philadelphia, Pa., 1; 11 a.m.-2 p.m.
6.060, 49.50, VQ7LO, Nairobi, Kenya, 0.6; 2 a.m.-5 a.m.; Monday, Wednesday, Friday, also 8.45 p.m.-9.15 p.m.; Tuesday, also 11 p.m.-midnight; Sunday, also 5 a.m.-6 a.m.
6.060, 49.50, PRA8, Pernambuco, Brazil; 7.30 a.m.-11.30 a.m. a.m.
6.060, 49.50, OXY, Skamlebaek, Den., 0.5; 4 a.m.-10 a.m.; Monday, 2 a.m.-10 a.m.
6.050, 49.59, GSA, Daventry, England, 20; 9 a.m.-11 a.m.
6.042, 49.65, HJ1ABG, Barranquilla, Col., 0.15; 3 a.m.-4 a.m., 9.30 a.m.-1 p.m., except Monday.
6.040, 49.67, YDA, Tandjongpriok, Java, 10; 1.30 p.m.-4.30 p.m., 8.30 p.m.-2 a.m.
6.040, 49.67, W4XB, Miami, Fla., 2.5; relays WIOD 6 a.m.-2 p.m.
6.040, 49.67, W1XAL, Boston, Mass., 5; relays WEEI Monday, Wednesday, Friday, 10.30 a.m.-12.30 p.m.
6.030, 49.75, HP5B, Panama City, Pan., 0.5; 3 a.m.-4 a.m., 10 a.m.-1.30 p.m.
6.025, 49.81, CQN, Macao, Port. China, 0.5; Monday, Wednesday, Friday, 6 p.m.-8 p.m.
6.020, 49.83, DJC, Zeesen, Germany, 5; 3 a.m.-7.30 a.m., 8.0 a.m.-1.30 p.m.
6.012, 49.90, ZHI, Singapore, F.M.S., 0.09; Monday, Wednesday, Thursday, 9 p.m.-11.30 p.m.; Sunday, 1.40 p.m.-3.10 p.m., 8.40 p.m.-10 p.m.
6.010, 49.92, XEBT, Mexico City, Mex., 5; 10 a.m.-4 p.m.
6.010, 49.92, COC, Havana, Cuba, 5; 12.30 a.m.-2 a.m., 7 a.m.-9 a.m., 11 a.m.-12 noon; Sunday, also 1.30 p.m.-3.30 p.m.
6.005, 49.96, VE9DN, Drummondville, Q., 0.5; Wednesday, 4.15 a.m.-6.15 a.m.
6.000, 50.00, —, Tananarive, Madagascar, 0.5; Tuesday, 6 p.m.-6.45 p.m.; Wednesday, Friday, Saturday, 1 a.m.-2 a.m., 6 p.m.-6.45 p.m.; Thursday, 1 a.m.-2.30 a.m., 6 p.m.-6.45 p.m.; Sunday, 1 a.m.-2.30 a.m., 5.30 p.m.-7 p.m.
6.000, 50.00, ZEC, Salisbury, Rhodesia, 2; Sunday, 3 p.m.-4 p.m.
6.000, 50.00, RW 59, Moscow, U.S.S.R., 20; 6 a.m.-9 a.m.
5.980, 50.17, XECW, Mexico City, Mex., 0.01; 11 a.m.-2 p.m.
5.980, 50.17, HJ3ABH, Bogota, Colombia, 1.6; 10 a.m.-1 p.m.
5.980, 50.17, HIX, Santo Domingo, D.R., 0.2; Wednesday, Saturday, 11.10 a.m.-1.10 a.m.
5.969, 50.26, HVJ, Vatican City, 12; 5 a.m.-5.30 a.m.; Sunday, also 8 p.m.-9 p.m.
5.950, 50.42, YNLF, Managua, Nicarag, 0.25, 10 a.m.-12 noon.
5.950, 50.42, HJ4ABE, Medellin, Colom., 3; Tuesday, Thursday, Saturday, 10 a.m.-2 p.m.; Wednesday, Friday, Sunday, 9.30 a.m.-1 p.m.
5.940, 50.51, TGX, Guatemala City, Cu., 0.1; 11 p.m.-1 a.m., 4 a.m.-5.30 a.m., 11 a.m.-3 p.m., except Monday.
5.940, 50.51, HJ1ABJ, Santa Marta, Col.; 10 a.m.-12 noon.
5.880, 51.02, YV8RB, Barquisimeto, Ven.
5.870, 51.11, HJ2ABC, Cucuta, Colomb., 0.05; 2 a.m.-3 a.m., 9.30 a.m.-12 noon.
5.850, 51.25, YV5RMO, Maracaibo, Ven., 0.2; 8.15 a.m.-12.30 p.m., except Monday.
5.830, 51.46, TIXGP3, San Jose, C.R.; 11 a.m.-2 p.m.
5.790, 51.81, HCK, Quito, Ecuador; 2.30 a.m.-3.30 a.m., 11 a.m.-1.15 p.m., except Monday.
5.780, 51.90, OAX4D, Lima, Peru, 20; Thursday, Sunday, 12 noon-2.30 p.m.
5.780, 51.90, H11J, Santo Domingo, D.R.; 9 a.m.-2.30 p.m.
5.550, 54.05, CP9, Oruro, Bolivia, 0.2; 5 a.m.-6 a.m.
5.490, 54.64, HJ5ABB, Cali, Col.; 6.30 a.m.-12.30 p.m.
5.400, 55.56, HAT, Budapest, Hungary, 20; Monday, 11 a.m.-12 noon.
5.260, 57.03, YDU3, Medan, Sumatra.
5.145, 58.31, OK1MPT, Prague, Czech; Experimental station.
5.140, 58.37, PMY, Bandoeng, Java, 0.6; 7.30 p.m.-12.30 a.m.; Friday, Saturday, to 1.30 a.m.

(Continued on page 213)

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PRINCIPAL SHORT WAVE STATIONS.—
(Continued from page 212)

- 5.100, 58.82, HJ5ABC, Cali., Colombia, 0.03; Monday, 3 a.m.-4 a.m.; Wednesday, Saturday, 11 a.m.-1 p.m.
- 4.810, 62.37, YDL2, Solo, Java, 0.15; 9.30 p.m.-1.30 a.m.
- 4.810, 62.37, YDE2, Solo, Java, 0.1; Native music only.
- 4.615, 65.02, CT3AQ, Funchal, Madeira, 0.05; Wednesday, Friday, 8 a.m.-9.30 a.m.; Monday, 1.30 a.m.-4 a.m.
- 4.600, 65.22, YDU2, Medan, Sumatra.
- 4.600, 65.22, HC2ET, Guayaquil, Ecuador, 0.3; Thursday, Sunday, 1.30 a.m.-3 a.m., 12.30 p.m.-1.45 p.m.
- 4.470, 67.11, YDB, Soerabaja, Java, 1; 8.45 a.m.-9.45 a.m., 1.30 p.m.-4.30 p.m., 9.30 p.m.-2 a.m.
- 4.280, 70.09, YNOP, Managua, Nicaragua, 0.02.
- 4.273, 70.20, RW15, Khabaraovsk, U.S.S.R., 20; 6 p.m.-11 p.m.
- 4.107, 73.00, HCJB, Quito, Ecuador, 0.5; 9.45 a.m.-12.45 p.m., except Tuesday.
- 4.000, 75.00, CT2AJ, Ponta Delgada, Azores, 0.05; Thursday, Sunday, 8 a.m.-10 a.m.
- 3.545, 84.67, CR7AA, Lourenco Marque Mozambique, 0.15; Tuesday, Friday, Sunday, 4.30 a.m.-6.30 a.m.
- 3.530, 85.00, HB9B, Basle, Switz., 0.05; 7 a.m.-7.30 a.m.
- 3.490, 85.96, YDH3, Bandoeng, Java, 0.2; 7.15 p.m.-9 p.m., except Sunday; Sunday, 12 noon-1.15 p.m., 8 p.m.-9 p.m.
- 3.470, 86.46, YDG2, Batavia, Java, 0.45; 7.30 p.m.-1.30 a.m.
- 3.450, 86.96, YDL3, Solo, Java.
- 3.430, 87.46, YDO2, Soerabaja, Java; 7.30 p.m.-1.30 a.m.
- 3.410, 87.98, YDL4, Djokjakarta, Java; 8.30 p.m.-12.30 a.m., except Sunday.
- 3.390, 88.50, YDQ2, Djember, Java; 7.30 p.m.-1.30 a.m.; Sunday, to 9.30 p.m.
- 3.350, 89.95, YDQ3, Malang, Java; Sunday, 1.30 p.m.-4 p.m., 9.30 p.m.-11.30 p.m.; Monday, Wednesday, Thursday, 3 p.m.-4 p.m.; Tuesday, 3 p.m.-4 p.m., 8.30 p.m.-11.30 p.m.; Friday, Saturday, 3 p.m.-3.30 p.m., 8.30 p.m.-11.30 p.m.
- 3.330, 90.09, YDV2, Bandjermasin, Bor.
- 3.320, 90.36, YDM2, Tjepoe, Java; 7.30 p.m.-12.30 a.m.
- 3.310, 90.69, YDH4, Bandoeng, Java.
- 3.290, 91.19, YDO3, Soerabaja, Java; 7.30 p.m.-9.30 p.m.
- 3.270, 91.74, YDK4, Magelang, Java.
- 3.250, 92.31, YDH5, Garoet, Java.
- 3.230, 92.88, YDQ4, Malang, Java.
- 3.210, 93.46, YDL5, Djokjakarta, Java; 9 p.m.-9.30 p.m., except Sunday.
- 3.190, 94.04, YDK2, Samarang, Java.
- 3.150, 95.25, YDG3, Batavia, Java; Tuesday, Thursday, Saturday, 7.30 p.m.-9.30 p.m.
- 3.130, 95.85, YDH6, Bandoeng, Java.
- 3.040, 98.68, YDA, Tandjonpriok, Java, 10; 1.30 p.m.-4.30 p.m., 8.30 p.m.-10 p.m.
- 2.950, 101.69, YDQ5, Malang, Java.
- 2.930, 102.39, YDO5, Soerabaja, Java; Monday, Tuesday, Saturday, 7.30 p.m.-10 p.m.
- 2.910, 103.09, YDK3, Samarang, Java.
- 2.910, 103.09, YDE3, Samarang, Java, 0.015; Native music only.
- 2.890, 103.81, YDJ2, Pekalongan, Java.
- 2.870, 104.53, YDJ3, Tegal, Java.
- 2.850, 105.26, YDG4, Batavia, Java.
- 2.830, 106.00, YDU4, Medan, Sumatra.
- 2.810, 106.76, YDQ6, Malang, Java.
- 2.790, 107.53, YDN2, Madieon, Java.
- 2.770, 108.30, YDO6, Soerabaja, Java.
- 2.750, 109.09, YDL6, Djokjakarta, Java.
- 2.750, 109.09, YDE5, Djokjarta, Java, 0.025; Native music only.
- 2.730, 109.89, YDO4, Soerabaja, Java; 11.30 a.m.-12.30 p.m., 8.30 p.m.-10.30 p.m., except Sunday.
- 2.710, 110.70, YDK5, Samarang, Java; Monday, 8.30 p.m.-12.30 a.m.
- 2.450, 122.45, YDB2, Samarang, Java, 0.15; 8.45 a.m.-9.45 a.m., 1.30 p.m.-4.30 p.m., 8.30 p.m.-2 a.m.
- 2.415, 124.22, YDE4, Soerabaja, Java, 0.075; Native music only.
- 2.385, 125.87, YDA2, Batavia, Java, 0.15; 8.45 a.m.-9.45 a.m., 1.30 p.m.-4.30 p.m., 8.30 p.m.-2 a.m.
- 2.110, 142.18, YD12, Soekaboemi, Java; 7.30 p.m.-1.30 a.m.

- 2.090, 143.54, YDG5, Batavia, Java; 9.30 p.m.-midnight, native music.
- 2.070, 144.93, YDO7, Soerabaja, Java; 7.30 p.m.-10.30 p.m.
- 1.980, 151.52, YDO8, Soerabaja, Java; 7.30 p.m.-8.30 p.m.
- 1.960, 153.06, YDH8, Bandoeng, Java.
- 1.940, 154.64, YDN3, Kediri, Java.
- 1.920, 156.25, YDH9, Buitenzorg, Java; 7.30 p.m.-1.30 a.m.
- 1.900, 157.89, YDG6, Batavia, Java; 7.30 p.m.-1.30 a.m.
- 1.880, 159.57, YDO9, Soerabaja, Java.
- 1.860, 161.29, YDK6, Samarang, Java; Monday, 8.30 p.m.-12.30 a.m.
- 1.840, 163.04, YDJ4, Cheribon, Java; 7.30 p.m.-1.30 a.m.
- 1.660, 180.72, YDB3, Djokjakarta, Java, 0.01; 8.45 a.m.-9.45 a.m., 1.30 p.m.-4.30 p.m., 8.30 p.m.-2 a.m.
- 1.640, 182.92, YDA3, Buitenzorg, Java, 0.025; 8.45 a.m.-9.45 a.m., 1.30 p.m.-4.30 p.m., 8.30 p.m.-2 a.m.
- 1.630, 184.05, YDD2, Bandoeng, Java.
- 1.615, 185.76, YDB4, Tjepoe, Java, 0.025; 8.45 a.m.-9.45 a.m., 1.30 p.m.-4.30 p.m., 8.30 p.m.-2 a.m.
- 1.595, 188.09, YDB5, Solo, Java, 0.025; 8.45 a.m.-9.45 a.m., 1.30 p.m.-4.30 p.m., 8.30 p.m.-2 a.m.
- 1.585, 189.27, YDD3, Batavia, Java, 0.05.
- 1.570, 191.08, YDB6, Malang, Java, 0.1; 8.45 a.m.-9.45 a.m., 1.30 p.m.-4.30 p.m., 8.30 p.m.-2 a.m.
- 1.550, 193.55, YDA4, Soekaboemi, Java, 0.025; 8.45 a.m.-

SHORT WAVE BROADCASTING BANDS

It should be particularly noted that there are definite frequencies around which the short wave broadcasters are located. These are:—

16,000 Kc.	....	....	....	....	19 metres.
12,000 "	....	....	....	....	25 "
9,500 "	....	....	....	....	31 "
6,000 "	....	....	....	....	49 "
4,300 "	....	....	....	....	70 "

Standard Times
Referred to Greenwich Time

Great Britain, France, Portugal, Belgium, Spain, Ireland	Greenwich time
Austria, Denmark, Germany, Italy, Norway, Switzerland	1 " hour fast "
British South Africa, Egypt, Turkey	1½ or 2 hours fast
Japan	9 hours fast
Australia	8, 9½ or 10 hours fast
New Zealand	11½ hours fast
Canada and United States	4, 5, 6, 7 or 8 hours slow.

All readers who are connected with the radio or electrical trade should always read the weekly trade journal, the "Radio and Electrical Merchant" which is published every Friday by the publishers of this Radio Trade Annual. The annual subscription is only 10/- post free and will be posted regularly on receipt of a postal note for 10/- sent to Box 3765 G.P.O., Sydney.

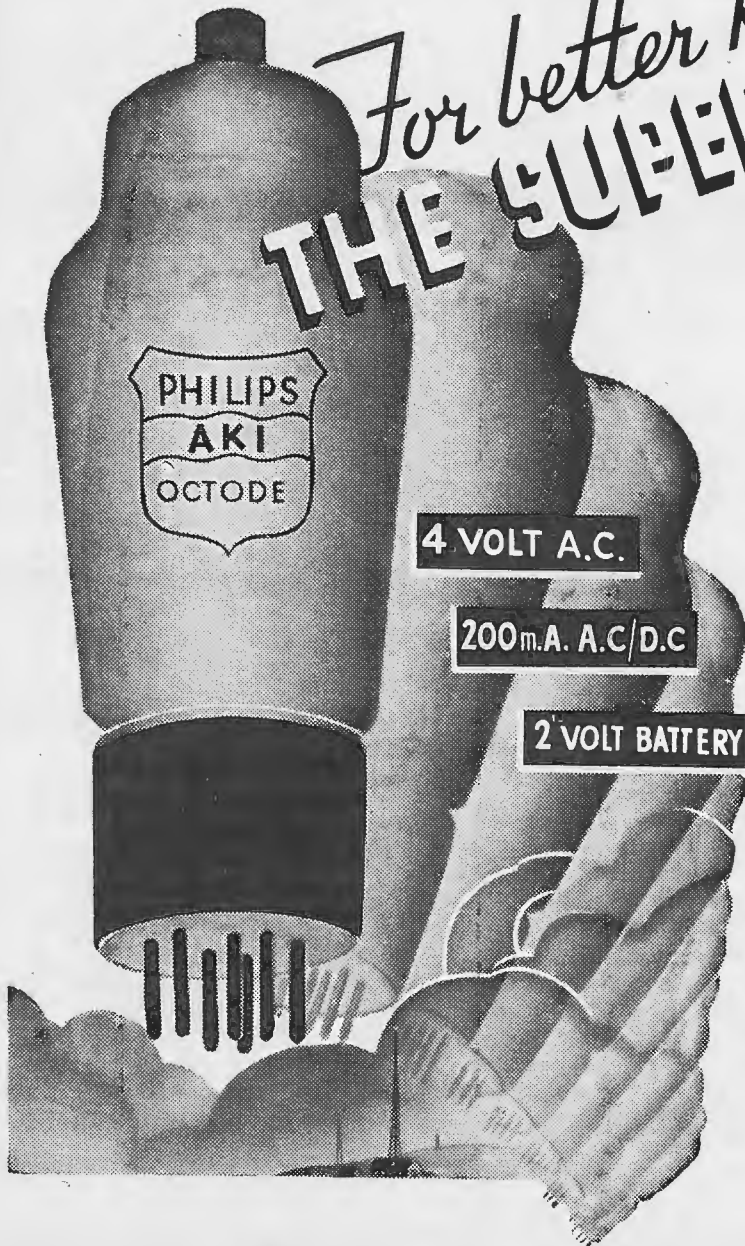
WORLD TIME CHART

Hawaiian Islands	U.S.A. Pacific S.T.	U.S.A. Mountain S.T.	U.S.A. Central S.T.	U.S.A. New York, Washington E.S.T.	Halifax, Buenos Aires	Rio de Janeiro, Brazil	London, Paris, Madrid	G.M.T. or G.C.T.	Sweden, Germany, Switzerland, Italy	Petrograd, Constantinople, Capetown	Bagdad, Persia	India	Borneo, Java, Dutch E.I.	P.I., China, Western Australia	Tokyo	Adelaide, South Aust.	Sydney, Melbourne, Eastern Aust.	New Zealand	Samoa
1.30	4.00	5.00	6.00	7.00	8.00	9.00	Midn.	0000	1.00	2.00	3.00	5.00	6.00	8.00	9.00	9.30	10.00	11.30	Noon
2.30	5.00	6.00	7.00	8.00	9.00	10.00	1.00	0100	2.00	3.00	4.00	6.00	7.00	9.00	10.00	10.30	11.00	12.30	1.00
3.30	6.00	7.00	8.00	9.00	10.00	11.00	2.00	0200	3.00	4.00	5.00	7.00	8.00	10.00	11.00	11.30	Noon	1.30	2.00
4.30	7.00	8.00	9.00	10.00	11.00	Midn.	3.00	0300	4.00	5.00	6.00	8.00	9.00	11.00	Noon	12.30	1.00	2.30	3.00
5.30	8.00	9.00	10.00	11.00	Midn.	1.00	4.00	0400	5.00	6.00	7.00	9.00	10.00	Noon	1.00	1.30	2.00	3.30	4.00
6.30	9.00	10.00	11.00	Midn.	1.00	2.00	5.00	0500	6.00	7.00	8.00	10.00	11.00	1.00	2.00	2.30	3.00	4.30	5.00
7.30	10.00	11.00	Midn.	1.00	2.00	3.00	6.00	0600	7.00	8.00	9.00	11.00	Noon	2.00	3.00	3.30	4.00	5.30	6.00
8.30	11.00	Midn.	1.00	2.00	3.00	4.00	7.00	0700	8.00	9.00	10.00	Noon	1.00	3.00	4.00	4.30	5.00	6.30	7.00
9.30	Midn.	1.00	2.00	3.00	4.00	5.00	8.00	0800	9.00	10.00	11.00	1.00	2.00	4.00	5.00	5.30	6.00	7.30	8.00
10.30	1.00	2.00	3.00	4.00	5.00	6.00	9.00	0900	10.00	11.00	Noon	2.00	3.00	5.00	6.00	6.30	7.00	8.30	9.00
11.30	2.00	3.00	4.00	5.00	6.00	7.00	10.00	1000	11.00	Noon	1.00	3.00	4.00	6.00	7.00	7.30	8.00	9.30	10.00
12.30	3.00	4.00	5.00	6.00	7.00	8.00	11.00	1100	Noon	1.00	2.00	4.00	5.00	7.00	8.00	8.30	9.00	10.30	11.00
1.30	4.00	5.00	6.00	7.00	8.00	9.00	Noon	1200	1.00	2.00	3.00	5.00	6.00	8.00	9.00	9.30	10.00	11.30	Midn.
2.30	5.00	6.00	7.00	8.00	9.00	10.00	1.00	1300	2.00	3.00	4.00	6.00	7.00	9.00	10.00	10.30	11.00	12.30	1.00
3.30	6.00	7.00	8.00	9.00	10.00	11.00	2.00	1400	3.00	4.00	5.00	7.00	8.00	10.00	11.00	11.30	Midn.	1.30	2.00
4.30	7.00	8.00	9.00	10.00	11.00	Noon	3.00	1500	4.00	5.00	6.00	8.00	9.00	11.00	Midn.	12.30	1.00	2.30	3.00
5.30	8.00	9.00	10.00	11.00	Noon	1.00	4.00	1600	5.00	6.00	7.00	9.00	10.00	Midn.	1.00	1.30	2.00	3.30	4.00
6.30	9.00	10.00	11.00	Noon	1.00	2.00	5.00	1700	6.00	7.00	8.00	10.00	11.00	1.00	2.00	2.30	3.00	4.30	5.00
7.30	10.00	11.00	Noon	1.00	2.00	3.00	6.00	1800	7.00	8.00	9.00	11.00	Midn.	2.00	3.00	3.30	4.00	5.30	6.00
8.30	11.00	Noon	1.00	2.00	3.00	4.00	7.00	1900	8.00	9.00	10.00	Midn.	1.00	3.00	4.00	4.30	5.00	6.30	7.00
9.30	Noon	1.00	2.00	3.00	4.00	5.00	8.00	2000	9.00	10.00	11.00	1.00	2.00	4.00	5.00	5.30	6.00	7.30	8.00
10.30	1.00	2.00	3.00	4.00	5.00	6.00	9.00	2100	10.00	11.00	Midn.	2.00	3.00	5.00	6.00	6.30	7.00	8.30	9.00
11.30	2.00	3.00	4.00	5.00	6.00	7.00	10.00	2200	11.00	Midn.	1.00	3.00	4.00	6.00	7.00	7.30	8.00	9.30	10.00
12.30	3.00	4.00	5.00	6.00	7.00	8.00	11.00	2300	Midn.	1.00	2.00	4.00	5.00	7.00	8.00	8.30	9.00	10.30	11.00

NOTE.—Crossing the midnight line from dark to light area and vice versa:—Crossing from LEFT to RIGHT indicates following day.
Crossing from RIGHT to LEFT indicates preceding day.

E.g.—Wednesday 2 p.m. in Sydney is Tuesday 11 p.m. in New York. Wednesday 11 p.m. in Sydney is Thursday 12.30 a.m. in Auckland. Wednesday 11 p.m. in Sydney is Wednesday 2.30 a.m. in Honolulu.

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SUPER SERIES

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The Super Series add new selling features to the receivers in which they are incorporated, and the improved performance which they give fulfills the demands of a discriminating public.

4-VOLT A.C.

Type.	Designation.
AK1	Octode.
AF2	Super Control R.F. Penthode.
E444	Diode-Tetrode
E446	R.F. Penthode
E447	Super Control R.F. Penthode.
E454	Duplex Diode Triode
E443H	Power Amplifier Penthode.
E463	Power Amplifier Penthode
1561	Full-Wave Vacuum Rect.
1867	Ind. Heated Rect.

200 m.A. A.C./D.C.

Type.	Designation.
CK1	Octode
CF2	Super Control R.F. Penthode
CB1	Duo Diode
CF1	R.F. Penthode
CL2	Power Penthode
CY2	Double Rectifier
CI	Barretter Lamp

BATTERY TYPES

Type.	Designation.
KF1	R.F. Penthode
KF2	Super Control R.F. Penthode
KBC1	Duo Diode Triode
B217	Triode, Driver, etc.
B240	Class B (Zero bias)
KDD1	Class B (Bias type)
C243N	Output Penthode

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Valve Data Tables

THE tables which appear on the subsequent pages should prove invaluable to designers, engineers, and servicemen. From an intelligent consideration of the characteristics quoted under the various headings there should be no difficulty in choosing a valve for replacement or any other specific purpose.

In this edition a scheme somewhat different from that of previous years has been adopted. As all American type valves have standardised characteristics, these types appear at the head of the respective sections and are available, generally, in all makes listed alongside. This avoids unnecessary and confusing duplication of figures. Manufacturers' special or individual types then appear under their appropriate trade names.

The sections appear as follow:—

Miscellaneous Triodes.—This section contains all triodes used as voltage amplifiers, ranging from medium to high impedance types. Characteristics for class A operation are shown. In addition, the characteristics of the triode portions of certain dual-purpose valves (such as duo-diode detector-amplifiers) have been included for reference purposes.

Screen Grid Valves. This section includes radio-frequency pentodes as well as tetrodes. With the advent of efficient automatic volume control systems the tendency is for this type of valve to be confined to frequency changer or demodulator uses. The inclusion of the suppressor grid in the pentode has made it possible to utilize a series resistance for screen voltage supply, a procedure which cannot be followed when a tetrode is used.

Variable-Mu Valves. Here again this section includes pentode types as well as tetrodes. The ability of this type of valve to change its amplification factor with variation in bias voltage, makes it eminently suitable for automatic volume control purposes in modern receivers. Cross-modulation, which often occurs in the case of ordinary "short-base" radio frequency amplifiers, is eliminated by the "long-base" characteristic of the variable-mu type. Distortion also is considerably reduced. As in the previous type, a series resistor may be utilised to provide screen voltage.

Frequency Changers. Under this heading are shown those types designed expressly for superheterodyne applications. The Octode type is a new development since last publication.

Diode and Special Detectors. This section shows all the diode detectors and detector-amplifiers, also certain special types of detector-amplifier. The characteristics, of course, apply to the amplifier portions of the valves. In some cases it will be noted that two valves are identical except for the placing of the diode plates. Where one diode plate is used for half-wave signal rectification, and the other for A.V.C. purposes, it is possible to obtain a "delay" voltage on the A.V.C. system by suitable placing of the diode plates with respect to the filament. The two valves in each case are for ordinary and delayed A.V.C. respectively.

Output Triodes. This section comprises all output triodes ranging from 100 milliwatts or so up to 10 watts undistorted output under class A conditions of operation. The distortion percentage should not exceed 5

per cent under such conditions. The method of determining the ratio of the output transformer for feeding into a loudspeaker will be found under a separate heading in this volume.

Output Pentodes. Here again we have output pentodes ranging from a few hundred milliwatts up to ten watts, under class A conditions. The percentage of distortion is rather higher than in the case of triodes, owing to the presence of third harmonic as well as second. Load resistances are comparatively critical for best results and should not be departed from. A few output tetrodes also appear in this section.

Class "B" Valves. A number of twin valves are included in this section. Where single valves are shown, the figures for input between grids, plate to plate load resistance, and power output per stage assume the use of two such valves in a conventional "push-pull" circuit.

Rectifying Valves. Where possible, output voltages have been given, both for condenser and choke input to the filter. In the case of mercury vapour type rectifiers the use of an input condenser is deprecated owing to the probability of exceeding the peak current rating of the valve. For the 82 and 83 these peak values are 400 and 800 milliamperes respectively, no other figures being available. The valves are described symbolically as full wave or half wave rectifiers, voltage doublers, or multi-purpose valves. Vacuum and mercury vapour types are also indicated. The second column of symbols indicates the application to which the figures apply.

Transmitting Valves and Rectifiers for use with transmitting apparatus. These two sections give representative details of the various types quoted. Full engineering data on any of these valves may be obtained from the respective manufacturer's representatives.

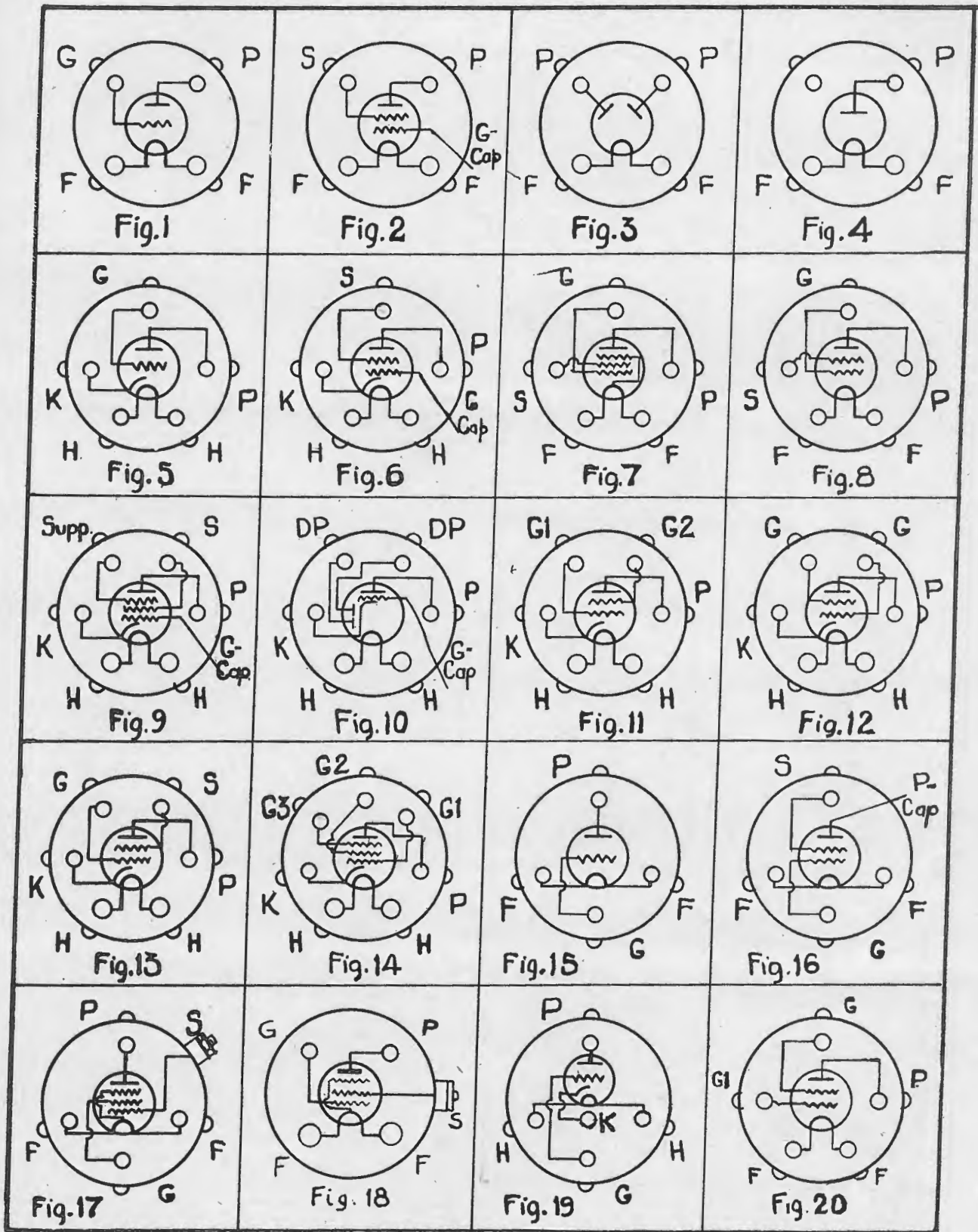
Bases and General. The symbols which appear in the last column of each section serve to identify bases and general details as follow:—

Bases

American Types	European Types
X 4 pin UX	3 3 pin
Y 5 pin UY	E 4 pin
6 6 pin	O 5 pin
7 7 pin	S 7 pin
General	P 8 side contacts
M Metallized bulb	V 5 side contacts

Top View Valve Socket Connections

FOR KEY OF VALVE TYPES USING THESE SOCKETS—See Key on Page 218.



Valve Socket Connections

REFERRING to the diagrams of the valve socket connections shown in Figs. 1-47, the socket number for each valve type is shown below.

It should be particularly noted that the sketches are top views of the socket.

The letters in the various diagrams refer to the following terms:—

- | | | | |
|----------------|-----------------------|----------------|-----------------|
| G | Control Grid | Supp | Suppressor Grid |
| OG | Oscillator Grid | P | Plate |
| OA | Oscillator Anode Grid | P _p | Pentode Plate |
| G _p | Pentode Grid | Pt | Triode Plate |
| G | Triode Grid | DP | Diode Plate |
| G ₁ | Grid No. 1 | K | Cathode |
| G ₂ | Grid No. 2 | F | Filament |
| G ₃ | Grid No. 3 | H | Heater |
| S | Screen Grid | M | Metal Coating |
| Cap | Contact Pillar | Term | Terminal |

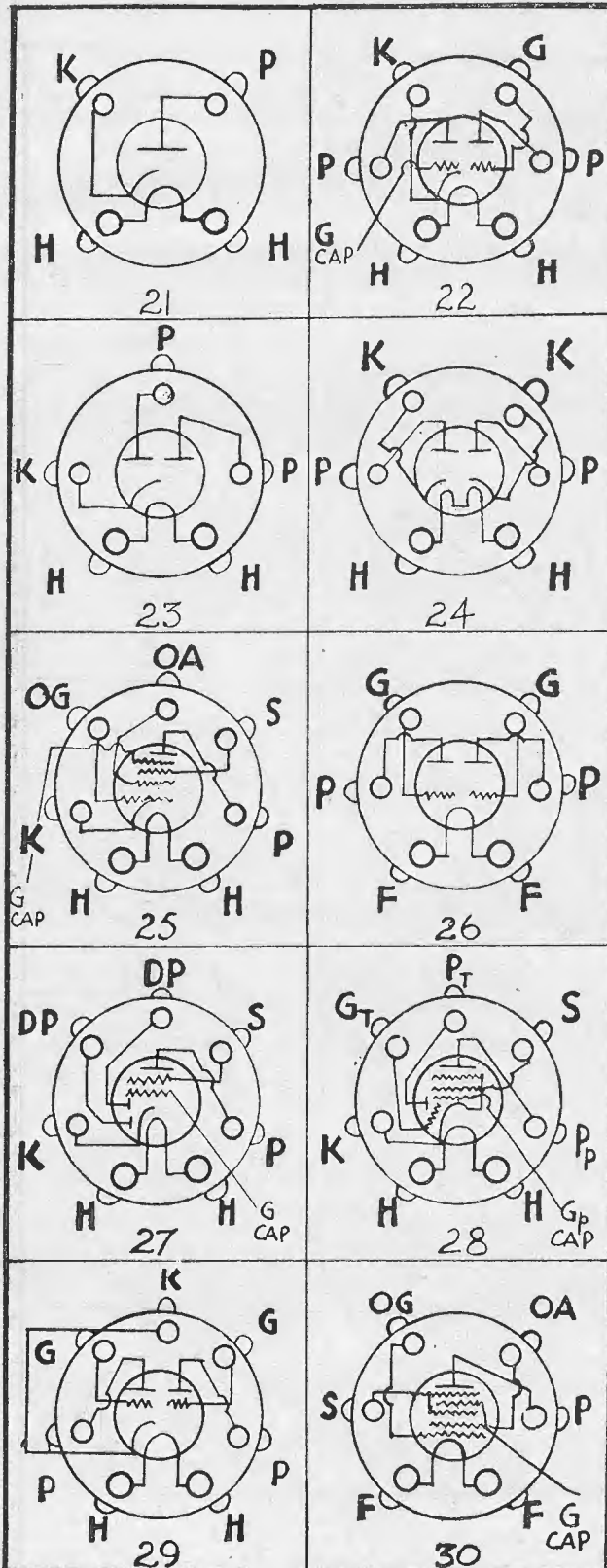
American Types

Valve Type	Socket No.	Valve Type	Socket No.
O1A	1	55	10
10	1	56	5
12A	1	57	9
18	13	58	9
19	26	59	14
20	1	71A	1
22	2	75	10
24A	6	76	5
26	1	77	9
27	5	78	9
30	1	79	22
31	1	85	10
32	2	864	1
33	7	89	9
34	2	90	12
35	6	92	12
36	6	99	1
37	5	1A6	30
38	6	1C6	31
39	6	2A3	1
40	1	2A5	13
41	13	2A6	10
42	13	2A7	25
43	13	2B7	27
44	6	6A4	8
45	1	6A6	29
46	8	6A7	25
47	7	6B7	27
48	13	6C6	9
49	8	6D6	9
50	1	6F7	28
53	29		

American Type Rectifiers

Valve Socket	Socket No.	Valve Type	Socket No.
80	3	866A	4
81	4	1V	21
82	3	5Z3	3
83	3	6Z4	23
83V	3	12Z3	21
84	23	25Z5	24
866	4		

(See page 220 for further Valves)



TOP VIEW VALVE SOCKET CONNECTIONS—(Continued)
FOR VALVE TYPES USING THESE SOCKETS—See Key on Page 218.

