The Strongest Medium In The Australian Radio Field —

Offering Advertisers MAXIMUM COVERAGE at MINIMUM COST

WHEN it comes to radio advertising it's coverage of listeners that counts. That job has been immensely simplified by the formation of the Macquarie Network. The Network has been skilfully designed to put your sales message into the maximum number of homes at a minimum cost. Behind it stands programme production facilities unrivalled in their scope in Australia. With the Network's unique coverage it is able to offer advertisers the most attractive programmes from the most commanding outlets.

The ONLY NETWORK with OUTLETS in EVERY STATE

The Macquarie Network embraces the following Stations:–2GB, Sydney; 2UE, Sydney; 2HR, Hunter River; 2CA, Canberra; 2WL, Wollongong; 3AW, Melbourne; 3TR, Sale; 3SH, Swan Hill; 3HA, Hamilton; 4BH, Brisbane, (Queensland associate); 5DN, Adelaide; 5RM, Renmark; 6PR, Perth; 6KG, Kalgoorlie; 7HO, Hobart; 7QT, Queenstown; 7LA, Launceston; 7DY, Derby and 7BU, Burnie.

"A Unit of the Macquarie Network"

Listeners welcome this slogan. When it follows a station's call sign, they know they're tuned to a programme that is the result of careful study of their entertainment requirements. Behind the Macquarie Broadcasting Services Pty. Ltd., is a most complete and modern programme production equipment — dramatists, writers, actors.

The Programme Division of Macquarie can supply transcriptions and recordings for any class of broadcast. This Division also is supplied by eighteen different transcription producing concerns in America and England.

The pick of the local and overseas programme features are at Macquarie.

29 Bligh Street, Sydney, B7887; 37 Queen Street, Melbourne, F4878. Cables: **ARTRANSA : MACRADIO**

MACQUARIE BROADCASTING NETWORK

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GENERAL

TECHNICAL

DIRECTORY

Foreword . . .

THIS third edition of the BROADCASTING BUSINESS YEAR BOOK is presented for the benefit of all those interested in Commercial Broadcasting activities in Australia.

The rapid changes going on in broadcasting circles make it very difficult to keep everything up to date, and therefore, it will be inevitable that some details, particularly in respect to personnel and stations, may be changed soon after release.

Again the apathy of some commercial stations is amazing, and it is obvious that they fail to appreciate, not only the value of the Year Book to advertisers on radio, but its value to the stations themselves. That attitude will no doubt be changed as time goes on.

The interesting quarterly figures issued by the P.M.G.'s department hitherto only covered a 50 miles radius, but recently this also included 25 miles figures, and so we have incorporated the March, 1938 25 miles and 50 miles figures in this Year Book. Commercial broadcasting in New Zealand is making great progress and so that is also included in this issue.

The rate card uniformity scheme sponsored by the Broadcasting Federation is going ahead, and it is hoped that more stations will give attention to this as published in this Year Book.

The subject of agency accreditation is also included as another phase of the Federation activity.

As a matter of important reference, full details of the celebrated broadcast-racing case, also the book case, etc., are included, because such decision and legislation, etc., is always of vital importance to commercial broadcasting.

The technical side of broadcasting and transcriptions has received our detailed attention. Readers will find this of great value.

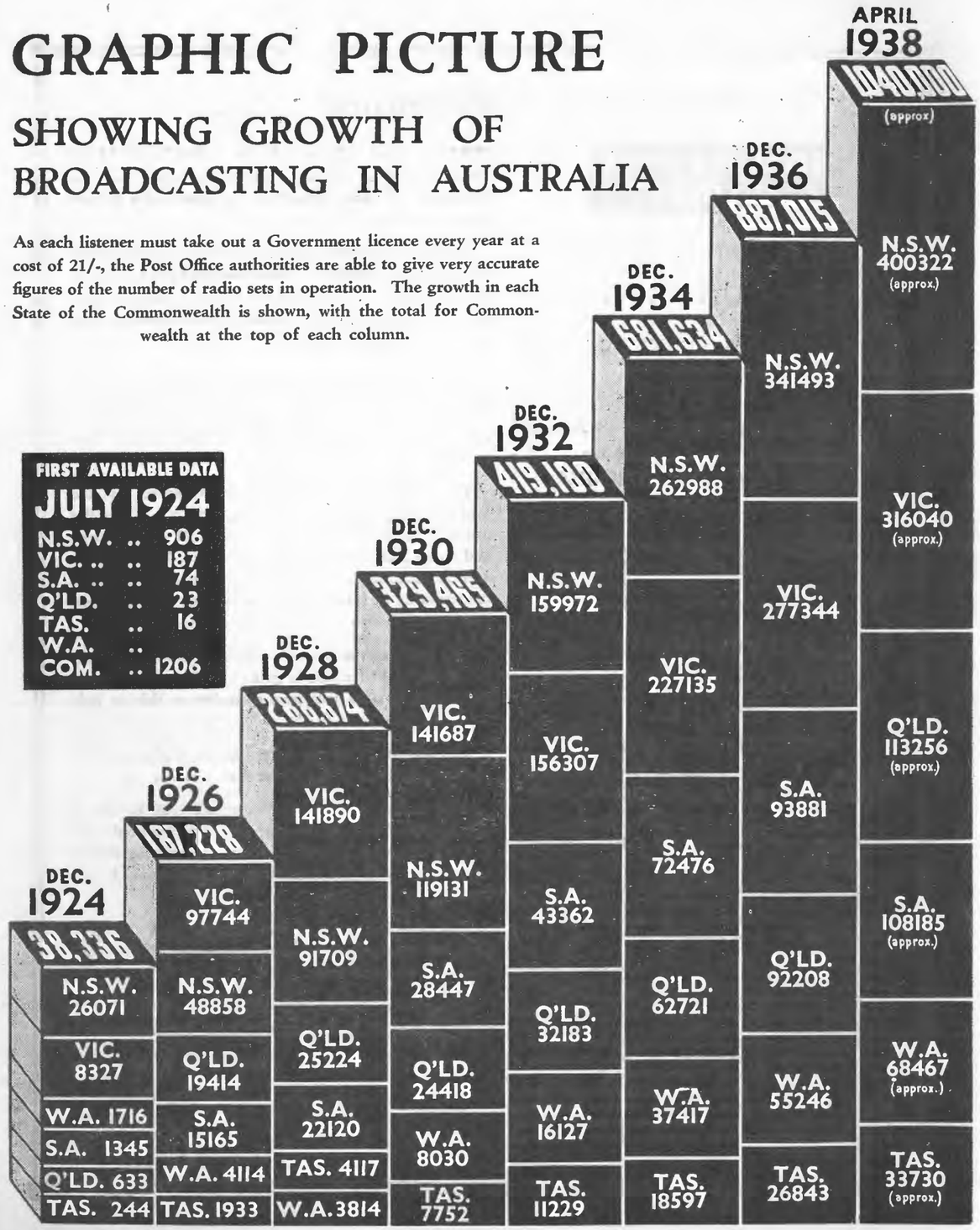
Our sincere thanks are offered to all those who have assisted us in making this Year Book possible.

OSWALD F. MINGAY
Managing Editor.

GRAPHIC PICTURE

SHOWING GROWTH OF BROADCASTING IN AUSTRALIA

As each listener must take out a Government licence every year at a cost of 21/-, the Post Office authorities are able to give very accurate figures of the number of radio sets in operation. The growth in each State of the Commonwealth is shown, with the total for Commonwealth at the top of each column.



A Review of Commercial Broadcasting in Australia

THERE are three very positive barometers or indicators of the growth of radio broadcasting in Australia. The first is reflected vividly in the number of broadcast listeners' licences taken out by the listening public, and which cost 21/- per annum, payable at any post office to the P.M.G.'s Department, and used for the national service.

The public do not and would not go on year after year, in increasing number, paying that tax if the entertainment value of the programmes broadcast by both the national and commercial stations did not meet with the public approval as a whole.

The second indicator is the large number of new radio factories erected during the past year or two, and the additions made to existing plants.

The third indicator is the growing number of commercial and national broadcasting stations operating throughout all the States of the Commonwealth.

AS this Year Book is chiefly concerned with the progress of commercial broadcasting in Australia, no specific purpose is served by dealing with the National service, but it is essential to note that the National broadcasting service is conducted by the Australian Broadcasting Commission under a special Act of Parliament, which gives the Postmaster-General virtual control of that National service. The Commission has no control of, or connection with, the commercial stations, which are conducted by private ownership under a licence from and the supervision of the P.M.G.

Owners of radio sets must take out a listener's licence at a cost of 21/- per annum, obtainable from any post office, which revenue (now over £1,000,000 per annum) is divided between the Australian Broadcasting Commission (12/- per licence) to conduct the programmes, and the P.M.G.'s Department (9/- per licence) to maintain the technical services for the Commission.

The revenue of the commercial stations is obtained solely from advertising revenue in selling "time" on the station. The commercial stations have succeeded in their business of selling "time" and presenting a popular programme which attracts the majority of listeners. That is, of course, the American system, and no one can deny that, as it is applied in Australia, it does serve the majority of listeners.

Similarly a competitive spirit exists very strongly among the advertisers over the air, who are also interested in increasing their audience so that a greater public acceptance is created for the products they have to sell. This has resulted in sponsors becoming more radio-minded and more discriminating so that they spend more money for good positions on the programme and better programme material. All this is a good sign for radio, as the big advertisers are very cautious in how they spend their money, and needs must that they "get results."

The transcription business has progressed remarkably during the past year or so, largely because of the flexibility and due to the expensiveness of land lines. There has been a tremendous influx of high-class American and European transcriptions, which have been availed of by enterprising sponsors. In spite of this importation of foreign transcriptions, there has been a truly remarkable growth in the Australian-made transcription business, the quality of which is equal to the best imported, and in many cases more suitable to Australian conditions.

Growth of Licences.

ELSEWHERE in this Year Book will be found extensive details of the growth of licence figures in all parts of Australia, but nevertheless, a few "highlights" will show how this growth has taken place.

New licences—i.e., persons who are **not** recorded as having previously had a listener's licence—for the calendar year of 1937 reached the high figure of 210,214, which has only been eclipsed on the occasion in the year 1934, when the Australian cricketers visited England, when it was 229,024.

The 1937 year under review was therefore very satisfactory considering that in 1936 the new issues reached 199,359, and in 1935 reached 169,621. (As this present year of 1938 is the year for another English visit by our Australian cricketers, it is anticipated that the 1934 figures will be beaten easily).

Remember that 210,214 **new** licences were paid for during 1937.

Cancellations.—The monthly list of licences issued by the P.M.G.'s Department always includes "cancelled licences." Now in this group come two kinds of "cancels." The first covers those people who fail to renew at any time their listener's licence because they cannot afford to keep it up or don't want to continue it, or have "moved" to some place or travelled and don't want it. The other group covers those people who fail to renew their licence or pay their 21/- on due date. If you pay next month or some months later, it is understood that the P.M.G.'s Department looks up your new card and enters your renewal thereon, and it therefore goes into the "cancelled" figures for the month it was due, and into the "renewals" for the month you actually pay. So quite a large number who have only delayed payment are counted in as "cancellations," but really are not such.

Nevertheless, the number and the ratio of "cancellations" to "total issues" gives a good indication of the public appreciation of the value of broadcasting. If that ratio increased it would surely show a decrease in public appreciation of programmes, but it is pleasing to note that there is a decline in the percentage ratio of "cancellations." For the year 1936 the cancellations totalled 82,496, with a ratio of 9.3, but for last year (1937) the total was 88,634, and a ratio of 8.7.

Nett Increase.—At the close of 1937 there was a total of 1,008,595 licences actually in force, as compared to 887,015 at December, 1936, showing a nett increase of 121,580 for 1937, as against a nett increase of 116,863 for 1936.

During November, 1937, the one millionth licence was issued, which is very creditable indeed, and marks an important milestone in the march of Australian radio progress.

Ratio of licences to population.—At the end of 1937 the State of South Australia had the highest percentage of radio sets to population with 17.68, with Victoria in second place at 16.52, then West Australia at 14.59, New South Wales with 14.32, Tasmania with 14.12 and Queensland 11.10, while the Commonwealth average was 14.76.

A glance at the figures elsewhere in this Year Book will show that the greatest percentage gain was made in Tas-

(Turn to Page 118.)

1937

JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
					1	2		1	2	3	4	5	6		1	2	3	4	5	6
3	4	5	6	7	8	9	7	8	9	10	11	12	13	7	8	9	10	11	12	13
10	11	12	13	14	15	16	14	15	16	17	18	19	20	14	15	16	17	18	19	20
17	18	19	20	21	22	23	21	22	23	24	25	26	27	21	22	23	24	25	26	27
24	25	26	27	28	29	30	28							28	29	30	31			
31																				

APRIL							MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
					1	2							1			1	2	3	4	5
3	4	5	6	7	8	9	2	3	4	5	6	7	8	6	7	8	9	10	11	12
10	11	12	13	14	15	16	9	10	11	12	13	14	15	13	14	15	16	17	18	19
17	18	19	20	21	22	23	16	17	18	19	20	21	22	20	21	22	23	24	25	26
24	25	26	27	28	29	30	23	24	25	26	27	28	29	27	28	29	30			
							30	31												

JULY							AUGUST							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
						1											1	2	3	4
2	3	4	5	6	7	8	6	7	8	9	10	11	12	5	6	7	8	9	10	11
9	10	11	12	13	14	15	13	14	15	16	17	18	19	12	13	14	15	16	17	18
16	17	18	19	20	21	22	20	21	22	23	24	25	26	19	20	21	22	23	24	25
23	24	25	26	27	28	29	27	28	29	30	31			26	27	28	29	30		
30	31																			

OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
						1		1	2	3	4	5	6				1	2	3	4
3	4	5	6	7	8	9	7	8	9	10	11	12	13	5	6	7	8	9	10	11
10	11	12	13	14	15	16	14	15	16	17	18	19	20	12	13	14	15	16	17	18
17	18	19	20	21	22	23	21	22	23	24	25	26	27	19	20	21	22	23	24	25
24	25	26	27	28	29	30	28	29	30					26	27	28	29	30	31	
31																				

1938

JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
						1			1	2	3	4	5			1	2	3	4	5
2	3	4	5	6	7	8	6	7	8	9	10	11	12	6	7	8	9	10	11	12
9	10	11	12	13	14	15	13	14	15	16	17	18	19	13	14	15	16	17	18	19
16	17	18	19	20	21	22	20	21	22	23	24	25	26	20	21	22	23	24	25	26
23	24	25	26	27	28	29	27	28						27	28	29	30	31		
30	31																			

APRIL							MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
					1	2	1	2	3	4	5	6	7				1	2	3	4
3	4	5	6	7	8	9	8	9	10	11	12	13	14	5	6	7	8	9	10	11
10	11	12	13	14	15	16	15	16	17	18	19	20	21	12	13	14	15	16	17	18
17	18	19	20	21	22	23	22	23	24	25	26	27	28	19	20	21	22	23	24	25
24	25	26	27	28	29	30	29	30	31					26	27	28	29	30		

JULY							AUGUST							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
					1	2		1	2	3	4	5	6					1	2	3
3	4	5	6	7	8	9	7	8	9	10	11	12	13	4	5	6	7	8	9	10
10	11	12	13	14	15	16	14	15	16	17	18	19	20	11	12	13	14	15	16	17
17	18	19	20	21	22	23	21	22	23	24	25	26	27	18	19	20	21	22	23	24
24	25	26	27	28	29	30	28	29	30	31				25	26	27	28	29	30	
31																				

OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
						1			1	2	3	4	5					1	2	3
2	3	4	5	6	7	8	6	7	8	9	10	11	12	4	5	6	7	8	9	10
9	10	11	12	13	14	15	13	14	15	16	17	18	19	11	12	13	14	15	16	17
16	17	18	19	20	21	22	20	21	22	23	24	25	26	18	19	20	21	22	23	24
23	24	25	26	27	28	29	27	28	29	30				25	26	27	28	29	30	31
30	31																			

1939

JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7				1	2	3	4				1	2	3	4
8	9	10	11	12	13	14	5	6	7	8	9	10	11	5	6	7	8	9	10	11
15	16	17	18	19	20	21	12	13	14	15	16	17	18	12	13	14	15	16	17	18
22	23	24	25	26	27	28	19	20	21	22	23	24	25	19	20	21	22	23	24	25
29	30	31					26	27	28					26	27	28	29	30	31	

APRIL							MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
						1		1	2	3	4	5	6					1	2	3
2	3	4	5	6	7	8	7	8	9	10	11	12	13	4	5	6	7	8	9	10
9	10	11	12	13	14	15	14	15	16	17	18	19	20	11	12	13	14	15	16	17
16	17	18	19	20	21	22	21	22	23	24	25	26	27	18	19	20	21	22	23	24
23	24	25	26	27	28	29	28	29	30	31				25	26	27	28	29	30	
30																				

JULY							AUGUST							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
						1				1	2	3	4						1	2
2	3	4	5	6	7	8	6	7	8	9	10	11	12	3	4	5	6	7	8	9
9	10	11	12	13	14	15	13	14	15	16	17	18	19	10	11	12	13	14	15	16
16	17	18	19	20	21	22	20	21	22	23	24	25	26	17	18	19	20	21	22	23
23	24	25	26	27	28	29	27	28	29	30	31			24	25	26	27	28	29	30
30	31																			

OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7														1
8	9	10	11	12	13	14	5	6	7	8	9	10	11	3	4	5	6	7	8	9
15	16	17	18	19	20	21	12	13	14	15	16	17	18	10	11	12	13	14	15	16
22	23	24	25	26	27	28	19	20	21	22	23	24	25	17	18	19	20	21	22	23
29	30	31					26	27	28	29	30			24	25	26	27	28	29	30
														31						

The Commonwealth of Australia Wireless Telegraphy Act

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

2. In this Act.—

"Australia" includes the Territories under the authority of the Commonwealth and the territorial waters of the Commonwealth and of any such Territory;

"Territories under the authority of the Commonwealth" includes any Territory governed by the Commonwealth under a mandate.

"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.

"Broadcasting Station" means a station on land for the purpose of broadcasting to licensed broadcast listeners' stations;

"Broadcast Listeners' Station" means a station used solely for the reception of programmes from broadcasting stations.

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. Licenses 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 rereceiving 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 committted 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.

(3) For the purposes of the application of this section in the Territories under the authority of the Commonwealth, "Court of Summary Jurisdiction" includes a court of any such Territory sitting as a court for the making of summary orders or the summary punishment of offences under the law of the Territory.

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.

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**, 1905-15.

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

AMENDMENT No. 4 OF 1919.

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

(2) The **Wireless Telegraphy Act**, 1905-15 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."

Commonwealth Wireless Regulations

Under the Wireless Telegraphy Act, 1905-1919

Statutory Rules No. 101 of 1924 have been amended from time to time bv No. 123 of 1925, No. 114 of 1926, Nos. 3, 24, 63, 153 of 1927, Nos. 79, 129 of 1928, No. 81 of 1929, No. 113 of 1930, No. 120 of 1935, No. 90 of 1936, and by Nos. 102 and 112 of 1937, 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 License.

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

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

46. An applicant for a Broadcasting Station License 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 License, 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 License 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 License available for inspection by any authorised officer as and when required.

48. (1) A Broadcasting Station License 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 License for a period not exceeding one year from the date of expiration of the current License.

(3) A Licensee who desires a renewal of his License shall make application for the renewal therof at least six months before the date of the expiration of his current license, except in cases where a license 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 license.

(Statutory Rules No. 120 of 1935 repealed Statutory Rules No. 104 of 1935, 23/10/35 and new regulations 48a read as follows:—)

48a. (1) Any person making application for the grant or renewal of a Broadcasting Station License shall supply such information as is required by the Postmaster-General, and shall lodge with the application a Statutory Declaration that the grant or renewal of the license will not result in the ownership by any person of more than—

(a) one metropolitan broadcasting station in any State;
(b) four metropolitan broadcasting stations in the Commonwealth;
(c) four broadcasting stations in any one State; or
(d) eight broadcasting stations in the Commonwealth,

and will not result in any person being in a position to exercise control, either directly or indirectly, of more than that number of stations.

(2) Where the applicant is a company, the Statutory Declaration referred to in the last preceding sub-regulation shall be made by a majority of the directors of the company and the manager or secretary of the company.

(3) Where the applicant is neither an individual or a company, the Statutory Declaration referred to in sub-regulation (1) of this regulation shall be made by such persons as the Postmaster-General determines.

(4) In this regulation—
"metropolitan broadcasting stations" means a broadcasting station situated within a radius of 30 miles from the General Post Office in the capital city of a State;
"person" includes a firm, body corporate or association.

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 License 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.

COMMONWEALTH WIRELESS REGULATIONS (Continued)

52. (1) The frequency (wave length) on which each Broadcasting Station shall operate shall be 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 License, to vary the conditions upon which the License 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 subscribers' 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 license fee for a Broadcasting Station License 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 license, 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 ot 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.

(Continued on Page 8.)

COMMONWEALTH WIRELESS REGULATIONS (Continued)

73. Any License 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 License 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 License so long as it remains in force.

Division II—
Broadcast Listeners' Licenses

75. A Broadcast Listener's License 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' Licenses 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' License or any renewal thereof shall be as follows:

(a) For Zone 1, 21/- per annum; and

(b) Zone 2, 15/- per annum (from 6/8/'34).

(2) License fees shall be paid in advance.

78. Where a Broadcast Listeners' License is being granted in respect of receiving equipment which has been used prior to the grant of the License, the License 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 License.

79. A Broadcast Listeners' License 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' License.

(2) Where a current Broadcast Listeners' License 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' License.

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

82. A Broadcast Listeners' License 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 intereference 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' License.

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 License shall be £1 10s. 0d. per annum."

"110. (1) Experimental licensees may use reaction (back coupling) in receivers, but every precaution shall be taken to prevent the interference with neighbouring stations that may be caused by re-radiation.

(2) Any experimental licensee who allows his receiver to energise his aerial to the extent that interference with neighbouring stations is caused, shall be guilty of an offence.

"111. Experimental Licensees shall be in possession of an Amateur Operator's Certificate of Proficiency:

"Provided that in certain cases as approved by the Postmaster-General or an authorised officer, a licensee may be exempted from the requirements of this regulation: in such event, the licensee shall undertake to have always in attendance during transmitting experiments and tests, a person in possession of an Amateur Operator's Certificate of Proficiency.

"112. (1) The power (measured in the High Frequency Generator Circuit) to be used in experimental transmitting station shall not exceed 50 watts except in such special cases as are approved by the Postmaster-General or an authorised officer.

"(2) Approved instruments for indicating the power used in the High Frequency Generator Circuit shall be installed in a manner satisfactory to the Postmaster-General or an authorised officer.

"113. Transmission by Experimental Stations shall be confined to such frequencies (wavelengths) as are approved by the Postmaster-General from time to time.

"114. During any transmitting tests extending in period over ten minutes, the call sign of the Experimental Station shall be signalled as frequently as practicable, and as a normal rule not less than once in every five minutes.

"115. The transmitting equipment operated in Experimental Stations must employ circuits loosely coupled to the radiating system and, in the case of telegraph experiments, devices or methods that will minimise the effect of key impacts, harmonics and anode supply modulation.

"116. An Experimental Licensee shall assure himself that the frequency (wavelength) on which transmissions are being carried out is accurate, and for that purpose a frequency meter (wavemeter) calibrated by comparison with standard instruments approved by the Postmaster-General or authorised officer shall be maintained in good order at the Experimental Station:

"Provided that the Postmaster-General or authorised officer may exempt an Experimental Licensee from the obligation of maintaining a frequency meter (wavemeter) for such period and in such circumstances as he determines.

"117. The use of licensed experimental installations shall be restricted to investigations, research, or instructional purposes in wireless telegraphy or telephony.

"118. (1) An Experimental Licensee shall not, without the express permission of the Postmaster-General or an authorised officer, transmit any message or other communication, the transmission of which would, if the licensed installation were a telegraph within the meaning of that Act, be in contravention of the provisions of the Post and Telegraph Act 1901-1923.

"(2) Notwithstanding anything contained in the last preceding sub-regulation, an experimental licensee may transmit and receive messages of an unimportant character in plain language relating to experiments, or consisting of remarks of a personal character:

"Provided that the exchange of such messages shall be prohibited with countries whose Administrations do not allow the transmission or receipt of such messages.

"(3) The transmission and receipt of messages for third parties, or of any message on payment in cash or kind is expressly forbidden.

"119. Normally transmissions will be limited to pure continuous wave and telephony. The transmission of damped wave (Spark transmission) will not be allowed except in special cases as approved by the Postmaster-General or an authorised officer. The transmission of telephony may be restricted to certain banks of frequencies (wavelengths) as decided from time to time by the Postmaster-General or authorised officer.

"120. Any apparatus used or intended to be used by an Experimental Licensee shall be so erected, fixed, placed and used as not, either directly or by reason of the working or use thereof, to interfere with the efficient and convenient working of other transmitting or receiving stations.

"121. The Postmaster-General or an authorised officer may grant a temporary permit to an Experimental Licensee for the demonstration of wireless telegraphy or telephony in connection with lectures, or entertainments where it is desired to assist the development or public appreciation of the art.

COMMONWEALTH WIRELESS REGULATIONS (Continued)

AMENDING REGULATION.

Free License to Blind.

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' License 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.

Amendments of Wireless Regulations, July 1, 1936

New Certificates.

6. Part VI. of the Wireless Telegraphy Regulations is repealed and the following Part inserted in its stead:—"Part VI.—Certificates of Proficiency in Wireless Telegraphy.

"126. A station (other than a Broadcast Listeners' Station) shall not be operated except by a person—(a) who holds such of the certificates referred to in this Part as is determined by the Postmaster-General or an authorised officer to be appropriate for that station; or (b) is qualified, to the satisfaction of the Postmaster-General or an authorised officer, to operate that station.

"127. (1) The Postmaster-General may issue certificates in accordance with Forms 11, 12, 13, 14, 14A, 14B, 14C and 14D in the First Schedule to these Regulations to persons who have reached the age of 18 years (or 15 years in the case of an Amateur Operator's Certificate of Proficiency) and who satisfy him, by examination or otherwise, that they possess the knowledge and qualifications referred to in those certificates respectively:

"Provided that a Commercial Operator's Certificate of Proficiency or an Aircraft Operator's Certificate of Proficiency shall not be issued to a person who is not a British subject unless—

(a) the consent in writing of the Minister for Defence has first been obtained; or

(b) the Postmaster-General is satisfied that the circumstances justify the issue of a certificate as a matter of urgency,

and any certificate issued under paragraph (b) of this proviso shall be in force in respect of one voyage only of the ship or aircraft upon which the holder of the certificate is to be carried.

"(2). In the event of a certificate being lost, the Postmaster-General may issue a duplicate certificate upon payment of the prescribed fee.

"(3). The fees specified in the Table contained in the Second Schedule to these Regulations shall be charged in connexion with—(a) the examination of candidates; (b) the issue of certificates without examination; and (c) the issue of duplicate certificates, under these Regulations.

"128. (1). The Director-General or an authorised officer may from time to time conduct examinations of applicants for certificates.

"(2). The examinations shall be held in such manner and subject to such conditions as the Director-General determines.

"129. The Examination for a First Class Commercial Operator's Certificate of Proficiency shall be such as to show that a successful candidate possesses the knowledge and qualifications specified in this regulation, namely:—(a) A knowledge of the general principles of electricity, of the theory of wireless telegraphy and wireless telephony, and of the regulation and practical working of the types of apparatus used in the mobile service. (b) A theoretical and practical knowledge of the working of the accessory apparatus used in the operation and adjustment of the apparatus referred to in paragraph (a) of this regulation. (c) The ability to effect, with the means available on board ship, repairs to damage which may occur to the wireless telegraph or wireless telephone installation during a voyage. (d) The ability to send correctly and to receive correctly, by ear, in Morse code, code groups at a speed of 20 groups per minute, and a message in plain language at a speed of 25 words per minute. (e) The ability to send and receive messages correctly by telephone. (f) A detailed knowledge of—(i) such of the Radiocommunication Regulations annexed to the Telecommunication Convention as relate to the exchange of radiocommunications and the assessment of charges in the mobile service; and (ii) that portion of the Safety Convention which relates to radiotelegraphy. (g) A knowledge of the general geography of the world, especially the principal navigation routes and the most important cable, telegraph, wireless telegraphy and wireless telephony routes.

"130. The examination for a Second Class Commercial Operator's Certificate of Proficiency shall be such as to show that a successful candidate possesses the knowledge and qualifications specified in this regulation, namely:—(a) An elementary theoretical knowledge of electricity and wireless telegraphy, and knowledge of the adjustment and practical working of the types of wireless telegraph apparatus used in the mobile service. (b) An elementary theoretical and practical knowledge of the working of the accessory apparatus used in the operation and adjustment of the apparatus referred to in paragraph (a) of this regulation. (c) The ability to effect minor repairs to damage occurring to the apparatus referred to in paragraphs (a) and (b) of this regulation. (d) The ability to send correctly, and to receive correctly by ear, in Morse code, code groups at a speed of 16 groups per minute. (e) A detailed knowledge of—(i) such of

(Continued on Page 10.)

COMMONWEALTH WIRELESS REGULATIONS (Continued)

the Radiocommunication Regulations annexed to the Telecommunication Convention as relate to the exchange of radiocommunications and the assessment of charges in the mobile service; and (ii) that portion of the Safety Convention which relates to radiotelegraphy. (f) A knowledge of the general geography of the world, especially the principal navigation routes and the most important cable, telegraph, wireless telegraphy, and wireless telephony routes.

"131. (1). A Third Class Commercial Operator's Certificate of Proficiency shall be issued in respect of proficiency in wireless telegraphy or wireless telephony, or both.

"(2). The examination for a Third Class Commercial Operator's Certificate of Proficiency shall be such as to show that a successful candidate possesses the knowledge and qualifications specified in this sub-regulation, namely:—(a) In the case of an examination for a Third Class Commercial Operator's Certificate of Proficiency in wireless telegraphy—(i) a practical knowledge of the working and adjustment of such type or types of wireless telegraph installation as is, or are, specified by the Director-General; (ii) ability to send correctly, and to receive correctly by ear, in Morse code, a message in plain language at a speed of 10 words per minute; (iii) a knowledge of the Radiocommunication Regulations annexed to the Telecommunication Convention relating to the exchange of radio-telegraph communications, to interference and to the Distress, Urgency, Alarm, and Safety Signals; and (iv) a knowledge of the precautions necessary for the safety of the installation referred to in subparagraph (i) of this paragraph. (b) In the case of an examination for a Third Class Commercial Operator's Certificate of Proficiency in wireless telephony—(i) a practical knowledge of the working and adjustment of such type or types of wireless telephone installation as is, or are, specified by the Director-General; (ii) ability to send and receive correctly messages by telephone; (iii) a knowledge of the Radiocommunication Regulations annexed to the Telecommunication Convention relating to the exchange of radiotelephone communications, to interference and to the Distress, Urgency, Alarm, and Safety Signals. (iv) a knowledge of the precautions necessary for the safety of the installation referred to in sub-paragraph (i) of this paragraph. (c) In the case of an examination for a Third Class Commercial Operator's Certificate of Proficiency in both wireless telegraphy and wireless telephony—the knowledge and qualifications specified in paragraphs (a) and (b) of this sub-regulation.

"131A. The examination for a First Class Aircraft Operator's Certificate of Proficiency shall be such as to show that a successful candidate possesses the knowledge and qualifications specified in this regulation, namely:—

(a) A knowledge of the general principles of electricity, of the theory of wireless telegraphy and wireless telephony, and of the adjustment and practical working of the types of apparatus used in the mobile service.
(b) A theoretical and practical knowledge of the accessory apparatus, such as motor-generator sets, accumulators, etc., used in the operation and adjustment of the apparatus referred to in paragraph (a) of this regulation.
(c) The practical knowledge necessary to effect, with the means available on board, the repair of damage which may occur to the wireless telegraph or wireless telephone apparatus during a voyage.
(d) The ability to send correctly, and to receive correctly by ear, in Morse code, code groups (mixed letters, figures and punctuation marks) at a speed of 20 groups per minute, and a message in plain language at a speed of 25 words per minute, each code group to comprise five characters and each figure or punctuation mark to count as two characters and the message in plain language to average five characters to the word.
(e) The ability to send and receive messages correctly by telephone.
(f) A detailed knowledge of—
  (i) such of the Radiocommunication Regulations annexed to the Telecommunication Convention as relate to the exchange of radiocommunications and the assessment of charges in the mobile service;
  (ii) that portion of the Convention for the Safety of Life at Sea which relates to radio-telegraphy; and
  (iii) The special provisions governing the radio-electric service of air navigation.
(g) A knowledge of the general geography of the world, especially the principal air navigation routes and the most important telecommunication routes.

"131B. The examination for a Second Class Aircraft Operator's Certificate of Proficiency shall be such as to show that the successful candidate possesses the knowledge and qualifications specified in this regulation, namely:—

(a) An elementary theoretical and practical knowledge of electricity and wireless telegraphy and a knowledge of the adjustment and the practical working of the types of apparatus used in the mobile service, particularly in relation to aircraft stations.
(b) An elementary theoretical and practical knowledge of the working of the accessory apparatus, such as motor-generator sets, accumulators, etc., used in the operation and adjustment of the apparatus mentioned in paragraph (a) of this regulation.
(c) A practical knowledge sufficient for effecting minor repairs in case of damage occurring to the wireless apparatus.
(d) The ability to send correctly, and to receive correctly by ear, in Morse code, code groups (mixed letters, figures and punctuation marks) at a speed of sixteen groups per minute, each group to comprise five characters and each figure or punctuation mark to count as two characters.
(e) A knowledge of—
  (i) such of the Radiocommunication Regulations annexed to the Telecommunication Convention as relate to the exchange of radio communications and the assessment of charges in the mobile service;
  (ii) that portion of the Convention for the Safety of Life at Sea which relates to radio-telegraphy; and
  (iii) the special provisions governing the radio-electric service of air navigation.
(f) A knowledge of the general geography of the world, especially the principal air navigation routes and the most important telecommunication routes.

"131C. The examination for a Third Class Aircraft Operator's Certificate of Proficiency shall be such as to show that the successful candidate possesses the knowledge and qualifications specified in this regulation, namely:—

(a) A practical knowledge of wireless telephony, especially with a view to avoiding interference.
(b) A knowledge of the adjustment and working of wireless telephone apparatus.
(c) The ability to send and receive messages correctly by telephone.
(d) The ability to send correctly, and to receive correctly by ear, in Morse code, a message in plain language at a speed of twelve words per minute.
(e) A knowledge of—
  (i) cuch of the Radiocommunication Regulations annexed to the Telecommunication Convention as relate to the exchange of radiotelephone communications and to the distress, urgency and safety signals; and
  (ii) the special provisions governing the radio-electric service of air navigation.

"132. The examination for a Broadcast Station Operator's Certificate of Proficiency shall be such as to show that a successful candidate possesses the knowledge and qualifications specified in this regulation, namely:—(a) A knowledge of the general principles of electricity and of radio-technology and of all the electrical and wireless telephony equipment used by broadcasting stations. (b) A practical knowledge of the working and adjustment of all apparatus normally used by broadcasting stations. (c) Ability to adjust and carry out repairs to the apparatus referred to in the last preceding paragraph of this regulation. (d) A knowledge of the provisions of Division 1 of Part III. of these regulations.

"133. The examination for an Amateur Operator's Certificate of Proficiency shall be such as to show that a successful candidate possesses the knowledge and qualifications specified in this regulation, namely—(a) An elementary knowledge of wireless telegraphy and wireless telephony and electrical principles. (b) A knowledge of —(i) such of the Radiocommunication Regulations annexed to the Telecommunication Convention as relate to the operation of experimental stations; (ii) the principal abbreviations set out in Appendix 9 of those Regulations; and (iii) Part IV. of these Regulations. (c) Ability to send correctly, and to receive correctly by ear, in Morse code, a message in plain language at a speed of 12 words per minute.

"134. The Postmaster-General may cancel or suspend any certificate issued under this Part—(a) if the holder of the certificate is convicted of a criminal offence; or (b) if the Postmaster-General is of the opinion, on account of the incompetence of the holder of the certificate or for any other reason, that it is desirable that the certificate should be cancelled or suspended.

"135. The Postmaster-General may at any time, by notice in writing, require the holder of a certificate issued under this Part to satisfy him, by examination or otherwise, within the time specified in the notice that he possesses the knowledge and qualifications referred to in the certificate. If the holder fails so to satisfy the Postmaster-General, the Postmaster-General may, by notice published in the "Gazette," cancel the certificate.

"136. Nothing in these Regulations shall be construed as rendering the Minister liable or responsible for any infringement by a licensee in the exercise of his licence, of copyright in any work or of any patent for an invention, or for any breach of the law arising out of the exercise of the licence, and nothing in these Regulations shall affect the liability of the licensee in respect of any such act done by him.

"137. These Regulations shall not prevent the use, without licence, by the Defence Authorities of wireless telegraphy for Defence purposes:

"Provided that each wireless telegraphy installation (other than a mere temporary installation) to be used shall be authorised in writing by the Minister.

"138. If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraphy station has been established, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within his jurisdiction, without a licence in that behalf, he may grant a search warrant to any police officer or officer appointed in that behalf by the Minister or authorised officer and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

"139. Any person who acts in contravention of any provision of these Regulations or fails to comply with any condition of a licence shall be guilty of an offence against these Regulations. Penalty: Twenty pounds.

"Second Schedule," Regulation 127

TABLE OF FEES AND CLASS OF CERTIFICATE.

	£	s.	d.
For examination for First Class Commercial Operator's Certificate of Proficiency	£1	0	0
For examination for Second Class Commercial Operator's Certificate of Proficiency	15	0	
For examination for Third Class Commercial Operator's Certificate of Proficiency	10	0	
For examination for First Class Aircraft Operator's Certificate of Proficiency	1	0	0
For examination for Second Class Aircraft Operator's Certificate of Proficiency	15	0	
For examination for Third Class Aircraft Operator's Certificate of Proficiency	10	0	
For examination for Broadcast Station Operator's Certificate of Proficiency	15	0	
For examination for Amateur Operator's Certificate of Proficiency	7	6	
For the issue of any certificate without examination	2	6	
For the issue of a duplicate certificate where original lost	2	6	

The Statists Story of AUSTRALIA'S MARCH OF PROGRESS for 1937

ON pages 15 and 16 of this issue of BROADCASTING BUSINESS YEAR BOOK will be found various statistical records of the business, trade, and production growth of the Commonwealth during the past few years. So great has been this growth, so important its bearing upon the future of the country, that the occasion cannot be allowed to pass without some reference here in a general sense to some of the salient features disclosed by these and other statistical records. For all the figures quoted we acknowledge the assistance and co-operation given by the Commonwealth Statistician (Dr. Roland Wilson).

Population.

Vital statistics showed a very marked improvement in 1937. The estimated population of Australia at June 30, 1937, was 6,813,363. This showed an increase of 11,652 on the figure for the close of the previous quarter compared with a corresponding increase during the second quarter of 1936 of only 8,915. The natural increase of the population during the three months was 13,296 compared with 11,680 during the same period in 1936. The overseas drift of our population was somewhat halted, the excess of departures over arrivals falling from 2,753 in the quarter ended June 30, 1936, to 1,644 in the corresponding quarter of 1937.

One disquieting fact not revealed in the Statistician's published reports, though made the subject for general comment throughout industry in Australia, was the noticeable drift of skilled factory workers from Australia principally to Great Britain during 1937. The reason for this was alluring prospects of more lucrative employment in the British munitions factory at the height of the international armaments race.

Production.

There was a comparatively slight increase in wool production for the year ended June 30, 1937, compared with the previous year, the figures being, respectively, 971,053,373 lbs. and (approximately) 975,000,000 lbs. Peak wool production was in the year ended June, 1933, when the clip totalled 1,062,622,628 lbs.

The area under wheat during 1936-37 was 12,342,190 acres from which 150,559,321 bushels were produced. The area for 1937-38 is estimated at 13,735,000 acres with a probable yield of 163,000,000 bushels.

In regard to Australian manufacturing industries the latest complete figures available from the official source at the time of going to press were to the year ended June 30, 1936. Since then general trade buoyancy resulted in a tremendous fillip to this branch of production. However, the available figures are enlightening. Salaries and wages paid in 1935-36 in manufacturing concerns amounted to £82,098,288, compared with £72,824,549 in the previous year while hands employed increased by 43,173 at 492,771. Value of materials used rose from £209,047,000 in 1934-35 to £238,974,794 in 1935-36. Total value of manufacturing industries production was £162,437,363 in 1935-36.

The gross value of all production in Australia for the year ended June 30, 1936, was £404,970,000, representing an increase of £48,621,000 over the previous year.

Oversea Trade.

Imports in 1936-37 amounted to £92,641,000 compared with £82,253,000 in the previous year in British currency values. Exports rose from £108,907,000 in 1925-26 to £128,143,000 in 1936-37.

Imports from Great Britain during 1936-37 were valued at £stg.38,560,402 while exports to Great Britain amounted to £A.74,356,583. Imports from America in the same term were valued at £stg.12,959,344 as against exports thereto of £A.18,763,152.

Finance.

The public debt of the Commonwealth and States at September 30, 1937, was £1,264,886,069, equivalent to £184/15/3 per head of population. The debt for Commonwealth purposes was £385,853,274, or £56/7/3 per head, while £879,032,795 (or £128/14/- per head) was the debt of the States.

Australian notes issued at the end of September, 1937, totalled £48,284,176, of which £17,518,526 was held by the banks and £30,765,650 by the public. Against this note issue was held a satisfactory reserve of £16,007,945 or 33.15 per cent. of the total issue of which £320,812 was in gold and £15,687,142 in English sterling.

Transport and Communication.

The Postmaster General's Department enjoyed a year of record activity in all branches. Telephone lines and instruments connected at September 30, 1937, totalled 446,992 and 603,972 respectively.

Broadcast listeners' licences, during the quarter ended September 30, increased from 938,331 to 984,193 (an increase of 45,862) and went on to pass the million mark two months later.

Australian Radio Research Board

9th ANNUAL REPORT

For The Year Ended 30th June, 1937

During the period covered in this report, the Radio Research Board of the Council was constituted as follows:—Professor J. P. V. 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, F.R.S. (University of Melbourne). Commander Cresswell has now retired from the Department of Defence and from the Board. The previous Annual Report of the Board was published in this BROADCASTING BUSINESS YEAR BOOK, page 12 of 1937.

1. General.

DURING the year, the investigations of the Board were concentrated as formerly on (i) propagation problems, which in turn involved studies of conditions in the ionosphere, and (ii) atmospherics. The former work is centred at the P. N. Russell School of Electrical Engineering in the University of Sydney; the latter is centred in the Natural Philosophy School of the University of Melbourne.

In February, 1937, Dr. H. C. Webster resigned from the service of the Board, and, in consequence, Messrs. A. F. B. Nickson and F. G. Nicholls are now working in Melbourne in a full-time capacity. At the Sydney end several staff changes took place. The promising career of Mr. W. G. Gordon was cut short during the year by an illness from which he subsequently died. Mr. J. H. Piddington left for England in July, 1936, in order to carry out work in the Cavendish Laboratory, Cambridge, as a Walter and Eliza Hall Research Fellow in electrical engineering. The two vacancies that resulted were filled by the appointment of Messrs. A. H. Mutton and W. K. Clothier. Shortly after his arrival in Australia to join the Board's staff, Mr. D. M. Myers resigned to take up a Fellowship created in the University of Sydney as one result of the Commonwealth Government's recent £30,000 per annum grant for University research. His place has now been filled by the appointment of Mr. F. W. Wood. During portion of the year, Dr. D. F. Martyn visited England and America, where he obtained much information concerning recent developments, and where he also attended several conferences arranged for the co-ordination of radio research throughout the world.

Professor Laby when in England placed before the Royal Meteorological Society results of the investigations of atmospherics by the physicists of the Board, and he read Drs. Martyn and Pulley's paper on the upper atmosphere to the Royal Society. On both occasions valuable discussions followed.

When Dr. H. S. W. Massey, formerly of the University of Melbourne, who is a distinguished authority on wave mechanics, recently visited Australia, the Board arranged for him to visit Sydney. There, he gave an account of his theoretical researches on the processes by which the light from the sun ionizes the upper atmosphere, to a number of physicists engaged in researches on the ionosphere.

2. Work on Conditions in the Ionosphere.

During the year work was completed on a simple and flexible method of measuring the polarisation of radio echoes. The method employs pulse emissions, and is therefore applicable when more than one echo is receivable, but avoids the difficulty of radio-frequency phase instability by a partial employment of the frequency-change technique of Appleton and Ratcliffe, as modified by Martyn and Green. The difficult problem of determining the sense of rotation of the vectors in the polarisation ellipse was solved by a method which involved defocussing the cathode ray beam. The results obtained afford strong evidence of magneto-ionic effects in the E region of the ionosphere. These are found to be due to electrons and not heavy ions. Evidence was found of the occasional presence of a thin layer of electrons in the E region. It was found that the polarisation of the echoes was elliptical, in accordance with Baker and Green's theory of limiting polarisation. A paper (by D. F. Martyn, J. H. Piddington, and G. H. Munro) embodying these conclusions was published by the Royal Society of London.

At the conclusion of this work, the method was extended so as to measure not only the polarisation but also the angles of incidence and lateral variation of the downcoming echoes. This result was achieved by employing the three aerial method, which had been previously employed only with continuous waves. Before the three aerial method could be adapted to pulse technique, an electron switch had to be developed to switch the aerials. For this work the officer responsible (Mr. Piddington) was awarded the P. N. Russell Medal of the University of Sydney.

Very recently, in collaboration with the Commonwealth Solar Observatory, a connection between ionospheric disturbances, fade-outs, and bright hydrogen solar eruptions, has been discovered. It is found that a type of ionospheric disturbance accompanies every bright hydrogen eruption. The main features of the disturbances are an increase of ionisation in the D region and a heating effect in, and below, the F_2 region. When the disturbances are large, they cause "fade-outs" in short wave communication. It is shown how these effects are due to a greatly increased emission of the hydrogen resonance line $L\alpha$ from the eruptive area. This causes ionisation of atomic oxygen in the D region, and dissociates the water vapour in the F_1 region, thus raising the equilibrium temperature. A preliminary communication describing this work has been sent to "Nature." One aspect of this work is now being followed up by a Commonwealth Research Fellow, Dr. S. E. Williams, who is working in the Department of Electrical Engineering on the ultra-violet absorption of the gases of the atmosphere.

Considerable work has been done on the design of the automatic height-frequency recorder. It was found that the original model, while giving immediately satisfactory results, developed mechanical faults under continuous operating conditions. These faults have now been remedied in the new equipments.

The development of an electronic-type oscillographic frequency-response curve apparatus of wide application has been completed. The apparatus, which is highly original in design, is of great use in the testing of radio receivers. The results of this work have been published in the "Journal of the Institution of Engineers, Australia."

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Radio Research Board—Annual Report

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A feature of the work in Sydney, as in Melbourne, is the assistance that is being given by University research workers who are not officers of the Board. Several different problems having a bearing on the work of the Board are now under investigation in this way. For instance, Mr. D. M. Myers, in his capacity as a Commonwealth Research Fellow, has been engaged since October, 1936, on the theoretical and experimental investigation of problems connected with electrical transient phenomena, particularly in circuits containing iron cores. The theoretical work has been assisted greatly by the use of graphical methods, developed by Professor V. A. Bailey and Mr. J. M. Somerville, for the solution of differential equations. In the meantime, an instrument, known as the "Graphintegrator," has been designed and constructed for the rapid solution of the differential equations encountered in transient problems. The completion of the transient work, together with other applications of the Graphintegrator, has been delayed, in order to make certain additions to the instrument for increasing its range of applicability.

3. Atmospherics.

The joint investigation of the association of atmospherics with cold fronts and other types of weather carried out for a year in collaboration with the Commonwealth Weather Bureau was discontinued at the end of July, 1936. The results showed that improvement in the accuracy of wireless location of lightning discharges is required for any adequate investigation of the conditions in the atmosphere, that is, the weather conditions which are necessary for the production of lightning.

In October, November and December of 1934, a close correlation between thunderstorms and cold fronts in south eastern Australia was found by Messrs. Boswell and Wark. The investigation of the association between lightning and cold fronts was continued during the year from August, 1935, to August, 1936, by Dr. Webster, Mr. Nicholls, and Mr. Nickson, who found that the association of cold fronts with atmospherics was much less frequent than in the last three months of 1934. It is probable that the difference in temperature between the cold and hot air at a front must reach a certain value for lightning to be produced.

Wave Form of Atmospherics and their Reflection by the Ionosphere.—Late in 1935 it was decided to investigate the form of the wave which constitutes an atmospheric, and to measure the peak power and the energy radiated. One object of this investigation was to obtain evidence as to whether all atmospherics are caused by lightning. The cathode ray tube used as the oscillograph is connected in a circuit similar to that of a modern television receiver. It has proved to be a valuable aperiodic oscillograph for the study of any type of transient, and full details of its construction have been prepared for publication.

When a suitable photographic technique and high-speed camera had been developed, oscillographs of the wave forms of atmospherics showing considerable detail were obtained.

As many atmospherics are found to approximate to damped waves of very long wave-length (of the order of 40 km.) and of great energy, it was to be expected that evidence of their reflection from the E ionised layer would be found. Although the wave form of atmospherics has been the subject of several investigations during recent years, evidence of such reflection had not been obtained. The oscillograms obtained were examined for pulses reflected by the E layer, and they have been found for a number of oscillograms. There are from 5 to 7 reflections in the 13 oscillograms which have been analysed in detail. Assuming an atmospheric is propagated with the velocity of light, simple geometrical considerations give the interval of time which elapses between the arrival of the ground wave and the wave which has been reflected **n** times at an ionised layer, and (n—1) times at the ground. If two or more reflected waves are observed, the distance of the source of the atmospheric and the height of the ionised layer can be calculated. It is found that the height of the reflecting layer is from 54km. to 83 km., which agrees excellently with what would be expected for reflection of a very long wave at the E layer. The distances of the sources have ranged from 180 km. to 1,220 km., and the observations agree most satisfactorily with the simple theory which has been mentioned, and they have a precision rather better than that anticipated. Not all atmospheric pulses show reflection, but, when the reflection pattern is obtained, the distance of the source can be determined with more precision than by triangulation from two C.R.D.F. stations. The superiority of the reflection method compared with the triangulation becomes the greater the more remote the source. The accuracy at 1,000 km. is about 20 km. By means of simultaneous observations with the reflection method and a C.R.D.F., the polar co-ordinates of the source can be obtained in principle; further observations will be necessary to show the value of such simultaneous observations in practice.

A knowledge of the distance is important in the estimation of the energy and peak power radiated. A provisional value for the mean energy radiated in the radio frequency region of the electromagnetic spectrum is 9×10^4 joules, and for the mean peak power 1.5×10^9 watts.

These values lead to the conclusion that the atmospherics observed on the instruments ordinarily used are invariably due to lightning flashes.

The aperiodic oscillographs includes an aperiodic amplifier with a voltage gain of 120 and linear from 50 cycles/sec. to 500,000 cycles/sec., the output of which is applied to the plates of a high vacuum photographic cathode ray tube. Auxiliary units bring the spot of the tube to full brilliance when it deflects from the central position, and also operate the 43.1 m. transmitter emitting a pulse which is used to synchronise the observations with simultaneous C.R.D.F. observations at Laverton and Canberra. The trace is recorded on a photographic film running at a speed of 800 cm/sec. using a high speed camera developed for the purpose.

4. Publications.

The following publications have been made during the past year as a result of the investigations carried out by the officers of the Board and by independent investigators who have been closely associated with these officers:—

1. D. F. Martyn and O. O. Pulley.—"Temperatures and Constituents of the Upper Atmosphere." Proc. Roy. Soc., London, A., 154: 755, 1936.
2. H. B. Woods.—"The Design of an Automatic Variable Frequency Radio Transmitter with Automatically Tuned Receiver for use in the Investigation of Radio Propagation in the Ionosphere." J. I. E., Aust., 8: 403, 1936.
3. J. H. Piddington.—"A Fundamental Suppression Type Harmonic Analyser," P. I. R. E., 24: 591, 1936.
4. J. H. Piddington.—"The Frequency Stability of Tuned Circuits." W. E., 13: 302, 1936.
5. O. O. Pulley.—"A Continuously Variable Phase Shifting Device." W. E., 13: 158, 1936.
6. D. M. Myers.—"Some Mechanical Aids to Calculation." J. I. E. Aust., 8: 423, 1936.
7. R. N. Morse.—"A Method of Investigating the Transient Characteristics of Electrical Circuits." J. I. E. Aust., 9: 77, 1937, with Appendices by W. G. Baker and W. G. Gordon.

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Important Australian Statistics

POPULATION AND VITAL STATISTICS.

States and Territories.	Area Square Miles	Population Estimated 30/6/37 Males	Females	Persons	Popn. Capital Cities 31/12/36
N.S.W.	309,432	1,360,058	1,332,601	2,692,659	1,267,350
Victoria	87,884	916,730	938,958	1,855,688	1,016,500
Queensland	670,500	519,502	472,589	992,091	313,430
South Aust.	380,070	294,338	294,340	588,678	316,860
West Aust.	975,920	239,952	214,279	454,231	212,150
Tasmania	26,215	117,905	114,381	232,286	61,500
North. Terr.	523,620	3,690	1,764	5,454	1,700
F.C.T.	940	5,612	4,664	10,276	8,050
Total	2,974,581	3,457,787	3,373,576	6,831,363	3,197,540

ESTIMATED INCREASE OF POPULATION.

ADJUSTED IN ACCORDANCE WITH THE REVISED RESULTS OF THE CENSUS OF THE 30th JUNE, 1933.

States and Territories	1934	1935	1936	1.1.36 to 30.6.36	1.1.37 to 30.6.37
N.S.W.	22,684	21,463	24,070	7,821	10,923
Victoria	13,011	5,609	8,763	3,745	3,826
Queensland	10,466	11,222	11,415	10,130	9,957
South Australia	1,617	2,149	2,869	850	- 634
West Australia	2,343	5,135	3,812	2,498	2,674
West Australia	2,346	5,135	3,812	- 3,481	- 2,773
Tasmania	- 663	1,585	2,027	2,498	2,674
North. Territory	126	147	214	223	149
F.C.T.	- 61	127	468	461	489
Total	49,526	47,437	53,638	22,247	24,611

NOTE.—Minus sign (-) denotes decrease.

WOOL (as in the Grease) PRODUCED.

	SEASON ENDED 30th JUNE. lbs. in 1934	lbs. in 1935	lbs. in 1936	lbs. in 1937 (c)
N.S.W. (a)	486,152,493	496,876,887	474,359,226	495,600,000
Victoria	161,146,436	156,761,979	163,397,896	161,000,000
Queensland	169,989,516	174,088,413	142,793,328	160,000,000
South Aust.	79,288,903	77,790,933	81,709,440	78,000,000
West. Aust. (b)	85,118,808	95,836,161	92,458,673	66,400,000
Tasmania	14,200,000	14,035,000	16,300,000	15,000,000
North. Terr.	35,000	35,000	35,000	35,000
Total	995,931,156	1,015,424,373	971,053,563	976,035,000

(a) Including F.C.T.; (b) For year ended previous 31st December; (c) Provisional.

ESTIMATED GROSS VALUE OF ALL PRODUCTION.

	1932-33 £'000	1933-34 £'000	1934-35 £'000	1935-36 £'000
Agricultural	75,562	70,731	68,587	75,388
Pastoral	64,851	95,613	74,556	91,286
Dairy, Poultry and Bee Farming	39,622	40,306	44,763	47,533
Forestry and Fisheries	8,470	9,605	10,856	11,624
Mining	15,583	17,608	19,949	23,248
Manufacturing (a)	114,136	123,355	137,638	155,891
Total	318,224	357,218	356,349	404,970

(a) These amounts differ from those given in the tables on the next page owing to the inclusion in those tables of certain products which in this table are included with Dairy Farming and Forestry.

PRINCIPAL CROPS—AUSTRALIA.

AREA UNDER CROPS.

	1933-34 Acres	1934-35 Acres	1935-36 Acres
Grain—			
Wheat	14,901,271	12,544,178	11,956,966
Oats	1,373,921	1,561,553	1,564,171
Maize	303,761	294,981	297,616
Hay	3,080,680	3,178,173	3,007,470
Sugar Cane	328,839	322,457	334,910
Total area under all crops	22,454,327	20,428,799	19,974,042

TOTAL PRODUCTION.

	1933-34 Bushels	1934-35 Bushels	1935-36 Bushels
Grain—			
Wheat	177,337,803	133,393,232	144,217,769
Oats	16,922,031	16,906,022	18,720,774
Maize	7,494,080	8,100,827	7,467,705
Hay (tons)	3,582,748	3,810,708	3,497,677
Sugar Cane (tons)	4,898,040	4,498,804	4,500,907
Cane Sugar (tons)	666,145	640,589	646,541

BIRTHS, DEATHS AND MARRIAGES.

Births—Number.

States and Territories	1934	1935	1936	1.1.36 to 30.6.36	1.1.37 to 30.6.37
N.S.W.	43,335	44,676	46,193	22,194	23,676
Victoria	27,828	27,884	28,883	14,087	14,451
Queensland	17,360	17,688	18,755	9,419	9,601
South Australia	8,459	8,270	8,911	4,328	4,456
West. Australia	7,801	8,119	8,479	4,124	4,196
Tasmania	4,470	4,456	4,581	2,120	2,323
North. Territory	88	84	113	49	46
F.C.T.	134	148	158	69	103
Total	109,475	111,325	116,073	56,390	58,852

Deaths—Number.

N.S.W.	23,474	24,547	24,376	11,582	12,048
Victoria	18,648	18,456	18,778	8,870	8,823
Queensland	8,192	8,851	8,593	4,068	4,315
South Australia	5,403	5,163	5,464	2,590	2,527
West Australia	4,076	4,118	4,230	1,949	2,015
Tasmania	2,345	2,353	2,387	1,102	1,025
North. Territory	60	70	60	30	27
F.C.T.	31	41	44	24	18
Total	62,229	63,599	63,932	30,215	30,798

Marriages—Number.

N.S.W.	20,210	22,361	22,873	11,511	11,479
Victoria	13,862	15,409	15,915	8,224	8,157
Queensland	7,635	8,280	8,306	4,129	4,080
South Australia	4,310	4,845	5,182	2,654	2,621
West Australia	3,682	3,940	4,242	2,212	2,192
Tasmania	1,678	1,875	2,073	1,048	1,039
North. Territory	30	42	41	15	28
F.C.T.	58	74	77	28	29
Total	51,465	56,826	58,709	29,821	29,625

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RADIO RESEARCH BOARD—ANNUAL REPORT (continued from page 14)

8. A. L. Green, and G. Builder.—"Control of Wireless Signal Variations." J. I. E. E., London, 80: 610, 1937.
9. A. L. Green and O. O. Pulley.—"Control of Phase-Fading in Long Distance Radio Communication." J. I. E. E., London, 80: 623, 1937.
10. W. G. Gordon, and A. H. Mutton.—"An Electronic-Type Oscillographic Frequency-Response Curve Apparatus of Wide Application." J. I. E. Aust., 9: 68, 1937.
11. D. F. Martyn, J. H. Piddington, and G. H. Munro.—"Polarisation of Radio Echoes." Proc. Roy. Soc. London, A., 158: 536, 1937.
12. Discussion on Thunderstorm Researches—opened by Prof. T. H. Laby, F.R.S., and including the Relation between Sources of Atmospherics and Meteorological Conditions in Southern Australia during October and November, 1934.—R. W. Boswell, and W. J. Wark, Q. J. Royal Met. Soc., 62: 499, 1936.
13. T. H. Laby, F.R.S., F. G. Nicholls, A. F. B. Nickson and H. C. Webster.—"Reflection of Atmospherics at an Ionised Layer." "Nature," 139: 837, 1937.
14. H. C. Webster.—"An Aperiodic Amplifier for Investigating the Wave Form of Atmospherics." Application of the Modulation Electrode of a Television Cathode Ray Tube in the Investigation of the Wave Form of Atmospherics. Accepted for publication in the Proceedings of the Physical Society of London..

Important Australian Statistics (*Continued from page 15*)

BASIC WEEKLY WAGE RATES FIXED BY STATE INDUSTRIAL TRIBUNALS.

State.	Males.	Females.	Date of Operation.	Family Unit (for Male Rate).
	£ s. d.	£ s. d.		
N.S.W. .. .. (a)	3 18 0	2 2 0	1/10/37	Man, wife and child.
Victoria	(b)	(b)	(b)	(b)
Queensland ..	3 18 0	2 1 0	1/4/37	Man, wife and three children.
South Aust. ..	3 14 0 (d)	1 16 6	25/11/37	Man, wife and three children.
West. Aust. .. (c)	3 14 11	2 0 5	26/7/37	Man, wife and two children.
Tasmania	(b)	(b)	(b)	(b)

(a) Plus child allowances. (b) None declared, but follow Federal rates to a large extent. (c) Metropolitan area. Basic wage for Goldfields Areas and other portions of State, exclusive of the S.W. Land Division: Males, £4/7/–; Females, £2/7/–; Agricultural Areas and S.W. Land Division: Males, £3/15/10; Females, £2/0/11.

TAXATION—Commonwealth and State per Head. Year Ended 30th June.

	1934 £ s. d.	1935 £ s. d.	1936 £ s. d.	1937 £ s. d.
Taxation by Commonwealth Government (a):				
Customs and Excise ..	4 19 11	5 2 11	6 2 9	6 6 4
Other (c)	3 10 0	3 6 7	3 5 9	2 18 5
Total	8 10 0	8 9 6	9 8 6	9 4 9
Taxation by State Governments (b) ..	5 13 3	5 3 7	6 1 8	6 13 11
Total Taxation (a) ..	14 3 1	13 12 11	15 9 11	15 18 4

(a) Based on mean population of Commonwealth for each financial year.

(b) Based on aggregate population of the six States, mean for each financial year.

(c) Inclusive of Sales Tax, £1/6/2 in 1933-34; £1/5/4 in 1934-35; £1/7/11 in 1935-36, and £1/3/6 in 1936-37; alo Flour Tax, 3/9 per head in 1933-34, 2/5 in 1934-35, and 3/5 in 1935-36.

MANUFACTURING INDUSTRIES.

Percentage of each item of outlay on value of Total Output, 1935-36.

Particulars	N.S.W.	V.	Q.	S.A.	W.A.	Tas.	Ttl.
	%	%	%	%	%	%	%
Wages (a) .	19.07	21.23	17.61	19.98	21.13	20.93	19.80
Fuel & light.	3.59	2.61	2.27	3.05	4.86	6.69	3.20
Materials used	56.64	57.07	64.83	60.37	52.33	47.38	57.63
Margin for profits and miscellaneous expenses and charges ..	20.70	19.09	15.29	16.60	21.68	25.00	19.37
Total Output.	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Per cent. of Wages on value of Production	47.96	52.65	53.53	54.63	49.36	45.57	50.54

(a) Exclusive of amounts drawn by working proprietors.
NOTE.—Production figures for 1936-37 are not available.

AVERAGE AMOUNT OF SALARIES AND WAGES PAID PER EMPLOYEE (a)

Year.	N.S.W.	Vic.	Q'land.	South Australia	Western Australia	Tas.	Total
1933-34—							
Males	206.98	191.45	208.23	185.58	206.27	182.05	199.32
Females ..	91.88	88.54	82.77	78.43	86.43	81.41	88.69
1934-35							
Males	208.57	193.31	219.93	190.22	210.66	183.68	202.48
Females ..	90.40	90.27	84.51	80.64	87.30	77.93	89.17
1935-36—							
Males	212.35	198.85	221.90	193.56	212.76	190.86	206.55
Females ..	91.30	93.58	85.80	80.70	86.84	85.33	91.19

(a) Exclusive of working proprietors and amounts drawn by them.

AVERAGE NUMBER OF MALES AND FEMALES EMPLOYED, 1935-36.

Sex.	N.S.W.	Vic.	Q'land.	South Australia	Western Australia	Tas.	Total
Males	140,896	121,734	36,411	31,391	16,911	9,211	356,554
Females .	52,304	61,656	8,717	7,080	4,082	2,378	136,217

MANUFACTURING TOTALS.

	1933-34 No.	1934-35 No.	1935-36 No.
Number of establishments	23,297	24,211	24,894
Hands employed	405,909	449,598	492,771
Paid (a)	£64.444,660	£72,824,549	£82,098,288
Value of Plant, Machinery, Land and Buildings ..	227,714,293	233,481,612	£239,840,993
Value of Materials used .	189,827,264	209,047,017	£238,974,797
Value of Production	129,091,915	143,816,160	£162,437,363
Value of Output	330,134,060	365,201,384	£414,688,455

(a) Exclusive of amounts drawn by working proprietors.

MOTOR VEHICLES REGISTERED IN AUSTRALIA, 1936-37.

State and Territories	Motor Cars	Commercial Vehicles	Motor Cycles	Total	Drivers' and Riders' Licences Issued
N.S.W.	190,963	66,244	23,439	280,646	395,523
Victoria	137,885	69,025	26,663	233,573	315,826
Queensland ..	68,857	34,868	8,040	111,765	139,056
S. Australia ..	50,633	19,209	9,097	78,939	135,320
W. Australia ..	34,180	19,919	6,977	61,076	77,317
Tasmania	15,089	4,012	3,573	22,674	26,538
N. Territory ..	336	704	41	1,081	989
F.C.T.	1,346	315	82	1,743	2,404
Total	499,289	214,296	77,912	791,497	1,092,973

ALL SAVINGS BANK DEPOSITS (including Commonwealth.)

	30/6/'35 £'000	31/12/'35 £'000	30/6/'36 £'000	31/12/'36 £'000	30/6/'37 £'000
N.S.W.	77,906	78,534	80,000	79,467	81,952
Victoria	72,019	72,256	73,890	73,272	75,721
Queensland	26,197	27,029	27,132	27,347	27,304
South Australia	24,208	24,569	25,308	25,434	26,506
West. Australia .	10,929	11,286	11,517	11,517	11,835
Tasmania	6,430	6,569	6,818	6,859	7,215
F.C.T.	230	222	239	240	259
N. Territory ..	53	60	58	58	59
Total	217,972	220,525	224,962	224,194	230,851

AVERAGE DEPOSIT PER HEAD OF POPULATION.

	30/6/35 £ s. d	31/12/35 £ s. d.	30/6/36 £ s. d.	31/12/36 £ s. d.	30/6/37 £ s. d.
N.S.W. ..	29 9 2	29 11 0	30 0 3	29 13 0	30 8 9
Victoria ..	39 3 8	39 4 1	40 0 2	39 10 10	40 16 1
Queensland	27 1 3	27 16 11	27 13 3	27 15 10	27 10 5
S. Australia	41 7 1	41 17 11	43 1 10	43 3 8	45 0 6
W. Australia	24 10 5	25 4 2	25 11 7	25 9 7	26 1 1
Tasmania	28 2 3	28 3 10	29 14 1	29 6 3	31 1 2
F.C.T.	24 15 2	23 17 7	24 8 1	23 19 9	25 4 4
North. Terr.	10 9 6	11 14 10	10 17 2	11 10 5	10 16 10
Total ..	32 8 3	32 13 1	33 4 1	32 18 9	33 15 10

BASIC WEEKLY WAGE RATES FIXED BY COMMONWEALTH COURT OF CONCILIATION AND ARBITRATION FOR EACH CAPITAL CITY.

	1/12/'35 (a)	1/12/'36 (a)	1/6/'37 (a)	1/9/'37 (b)	1/12/'37 (b)
Sydney	70 0	10 0	72 0	75 0	78 0
Melbourne	66 0	69 0	69 0	73 0	77 0
Brisbane	64 0	66 0	68 6	70 0	74 0
Adelaide	67 0	69 0	69 0	71 0	74 0
Perth	68 0	71 0	71 0	73 0	75 0
Hobart	69 0	69 0	69 0	73 0	75 0
Weighted Average— Six Capitals	68 0	68 0	70 0	73 0	76 0

(a) "C" Series Index Nos.—Commonwealth Arbitration Court's "Restoration" wage of the 17th April, 1934. The family unit associated with this wage consists of man, wife and two children.

(b) "Court" Series Index Nos.—Commonwealth Court's Judgment of 23rd June, 1937, includes "prosperity loadings" granted by Judgment.

COMMONWEALTH POSTAL INFORMATION

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 Island, etc.), Nauru, Bougainville and Buka (Solomon Islands):—

Letters and Lettercards.—2d. per oz. (Late Fee, 1d.) (Registration Fee, 3d.).

Postcards.—1½ each.

Second-class Mail Matter, comprising:

(a) Commercial Papers (maximum weight, 5lbs.), Patterns, Samples and Merchandise (maximum weight, 1lb.).—1d. per 2 oz.

(b) Printed Matter: comprising printed Papers, Circulars and Catalogues (which may contain samples of material) and Books, Periodicals and Newspapers not registered at a General Post Office (Maximum weight, 5lbs.).—1d. per 4 oz.

Third-class Mail Matter, comprising:

Books, Periodicals, and Newspapers registered at a General Post Office for transmission as such. (Maximum weight, 5lbs.)—1d. per 6 oz.

Newspapers published by registered newspaper proprietors to addresses within the Commonwealth or Papua, 20 oz., 1½d.; to New Zealand and Fiji, 16 oz., 2d.

EXPRESS DELIVERY SERVICE.

Prepayment of special fee in addition to the postage secures immediate delivery by special messenger. Minimum fee payable is 4d.

Acknowledgment of Receipt of Registered Letter or Article.—Fee 3d. in addition to Postage and Registration Fee.

PERMIT MAIL.

Printed Circulars signed by hand or personally addressed, posted in sealed envelopes.—Printed Matter rates, plus ½d. for each article.

AERIAL SERVICE.

Within the Commonwealth.—Articles except Parcels.—3d. per ½ oz. in addition to ordinary postage.

INSURANCE OF PARCELS.

To addresses within the Commonwealth:—

Fee	Value
3d.	£2
4d.	£5
6d.	£10
9d.	£20
1/-	£30
1/3	£40
1/6	£50

For loss, damage, or rifling of contents.

CASH ON DELIVERY PARCELS.

Within the Commonwealth.—In addition to the postage, commission on amount to be collected from addresses:—

Not exceeding 10/- .. .. 9d.
Over 10/-, and not exceeding 20/- .. 1/–
,, 20/- ,, ,, 30/- .. 1/3
,, 30/- ,, ,, 40/- .. 1/6
,, 40/- ,, ,, 60/- .. 1/9
For each additional 20/-, or fraction 3d.

BEYOND THE COMMONWEALTH.

Letters and Lettercards.—To places within the British Empire.—2d. per oz.

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

Postcards.—To places within the British Empire.—1½d. each.

To all other places.—2d. each.

Commercial Papers.—To New Zealand 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.—1d. per 4 oz.

To all other places—1d. per 2 oz.

Newspapers.—To New Zealand 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 places in the British Empire.—1d. per 4 oz.

To all other places.—1d. per 2 oz.

Samples.—To places within the British Empire.—1d. per 2 oz.

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

Merchandise.—To New Zealand and Fiji.—1d. per 2 oz.

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

Aerial Service (Australia-Singapore-London)—1/6 per ½ oz.

PARCELS (Limit of Weight, 11 lbs.)

To New Zealand.—11lb., 8d.; each additional lb., 6d.

To United Kingdom, by Long Sea Route, 11lb., 1/4; each additional lb., 6d.

To United States of America, via 'Frisco, 11lb., 1/-; each additional lb., 6d.; via London, 11lb., 3/1; 2lbs., 3/5; 3lbs., 3/9; 4lbs., 6/1; 5lbs., 6/8; 6lbs., 7/-; 7lbs., 7/4; 8lbs., 9/11; 9lbs., 10/3; 10lbs., 10/7; 11lbs., 10/11; via Vancouver, 11lb, 1/1½, each additional 11lb., 7½d.

Insurance of Parcels.—To addresses in New Zealand: Up to £12, 6d.; £24, 9d; £36, 1/-; £50, 1/6, in addition to postage.

MONEY ORDERS.

Within the Commonwealth.—6d. for each £5 or part.

New Zealand, Papua, Rabaul (New Guinea), New Caledonia.—3d. for each £1 or part. Minimum 6d.

Fiji.—3d. for each £1 or part. Minimum, 6d. Exchange, 1.6 pence for each 1/- or 2/8 for each £1.

Gilbert and Ellice Islands, North Borneo, Solomon Islands and Tonga.—4d. for each £1 in first £6, and 3d. for each additional £1 or part. Minimum, 9d.

Philippine Islands.—4d. for each £1 in first £6, and 3d. for each additional £1 or part. Minimum, 9d. Exchange 3d. for each 1/- or part.

United Kingdom, Canada, Ceylon, China, Dutch East Indies, Egypt, Federated Malay States, Germany, Hong Kong, India, Irish Free State, Italy, Japan, Malta, Mauritius, Norway, Straits Settlements, South Africa, United States of America.—4d. for each £1 in the first £6, and 3d. for each additional £1 or part. Exchange, 3d. for each 1/- or part.

Other Countries in Europe, Asia, Africa, North America, and Islands adjacent to those Continents.—4d. for each £1 in the first £6, and 3d. for each additional £1 or part. Minimum, 9d. Exchange, 3d. in 1/-. These must be forwarded via London and are subject to an additional charge of 2d. in each £1 or part. Minimum, 4d.

POSTAL NOTES.

Payable throughout the Commonwealth.—1/-, 1/6, 2/-, 2/6—1d.; 3/-, 3/6, 4/-, 4/6—1½d.; 5/-, 5/6, 6/-, 7/6—2d.; 10/-, 11/-, 15/-, 20/—3d.

TELEGRAPHIC RATES.

City and Suburban, or within 15 miles of sending station.—16 words, including address and signature, 9d. Each additional word, 1d.

Country.—16 words, including address and signature, 1/-. Each additional word, 1d.

Interstate.—16 words, including address and signature, 1/4. Each additional word, 1d.

Urgent Telegrams and Sunday, Christmas Day and Good Friday, double the above rates.

Lettergrams to addresses within the Commonwealth will be forwarded by Telegraph during the night, and delivered as ordinary letters by first delivery.—30 words, 1/3; each additional word, ½d.

TELEGRAMS TO CATCH MAIL STEAMERS.

On payment of postage in addition to telegraphic rates, telegrams may be sent to any telegraph office in Australia, to be forwarded thence by post to any destination beyond the Commonwealth.

OVERSEA TELEGRAMS.

To New Zealand 4½d.	To Suva Ord.	6d. Def.
United Kingdom via Cable ..	2/–	1/–
United Kingdom via Beam	1/8	/10
New York via Cable & Beam	2/5	1/2½
Paris via Cable	2/7	1/3½
Paris via Beam	2/0½	1/0¼
	per word	

DAILY LETTER TELEGRAMS.

From Australia to:—

	Min.	Each Add. Word
United Kingdom via Cable	16/8	8d.
United Kingdom via Beam	13/11	6⅔d.
Canada via Cable	13/2½	6⅓d.
Canada via Beam	12/2	5⅝d.
United States via Cable ..	20/2	9⅔d.
United States via Beam ..	18/5	8⅝d.
Straits Settlements via Cable	20/10	10d.
India and Ceylon via Cable	20/10	10d.
Burma via Cable	22/3	10⅝d.
and many other countries	at varying rates.	

WIRELESS CONTROL IN AUSTRALIA

Wireless activities in Australia, as in all other countries, are under Federal Government 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.

(Supplied by the P.M.G.'s Dept.)

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 license from the Postmaster-General. The Wireless Telegraphy Regulations published herein set out the detailed conditions under which licenses are obtained.

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

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

and

Special Licenses covering such services as the Beam Service and other services for which specific licenses are not provided.

With the exception of Broadcasting Station Licenses and Special Licenses, the applicant meets with scarcely any difficulty, provided that the required conditions are complied with. The name of the license generally indicates the type of service to be covered which, with the exception of Broadcasting Station Licenses, refer mainly to commercial wireless-telegraph or wireless-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 Licenses is a matter of greater complexity because the number of such licenses 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 licenses are to be granted, keeping in view the essential factor that service to listeners must be the paramount consideration.

Inspection of Stations.

When licenses 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.

Examinations are held periodically for the following certificates :—

- First Class Commercial Operator's Certificate of Proficiency in Wireless Telegraphy and Wireless Telephony.
- Second Class Commercial Operator's Certificate of Proficiency in Wireless Telegraphy.
- Third Class Commercial Operator's Certificate of Proficiency in Wireless Telegraphy or Wireless Telephony, or both.
- First Class Aircraft Operator's Certificate of Proficiency in Wireless Telegraphy and Wireless Telephony.
- Second Class Aircraft Operator's Certificate of Proficiency in Wireless Telegraphy.
- Third Class Aircraft Operator's Certificate of Proficiency in Wireless Telegraphy.
- Broadcast Station Operator's Certificate of Proficiency.
- Amateur Operator's Certificate of Proficiency.

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 license fee is on a different basis. In all other cases the license fee is a nominal amount, sufficient to defray the administrative costs incurred by the Department.

In the case of Broadcast Listeners' Licenses, 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.

WIRELESS CONTROL IN AUSTRALIA (Cont'd)

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:—

(a) The provision of the technical services of the National Broadcasting Stations (installation, erection and operation);
(b) The inter-connecting telephone circuits between the various National Stations;
(c) Other technical services, including the investigation of radio inductive interference and research; and
(d) 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 1937 there were more than 3,300 convictions for this offence.

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 any 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 per cent. (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.

INTERFERENCE with broadcast reception caused by electrical appliances has developed in Australia, as in other countries, somewhat seriously. The Department was fully alive to this development, and during the past nine years has undertaken the work of investigation into the interference. Information concerning listeners' difficulties is invited by the Department, and questionnaire forms for the purpose are provided at Post Offices. All such complaints are investigated and, where necessary, Radio Inspectors visit the localities, carry out investigations with the object of locating the cause of the interference, and demonstrate to the people concerned methods of fitting suppressors whereby the interference may be reduced or eliminated.

A considerable amount of co-operation in this matter is given promptly by Electric Supply Authorities, radio dealers and Listeners' Leagues, with the result that the growth of the interference has been checked.

With the establishment of further stations, thereby ensuring a higher signal strength in the different localities. the menace of radio inductive interference becomes less serious, but, nevertheless, the Department is continuing its work of helping the broadcasters and listeners in this problem.

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 technical staff of the Department has been considerably augmented to deal with complaints from listeners, and equipment of the most modern design has been provided to enable the source of the interference to be speedily located.

Many towns in the Commonwealth have been made interference free by the co-operative efforts of machine owners, power supply authorities and in some cases the listeners themselves, in conjunction with the Department's experts, by arranging for offending appliances and devices to be fitted with an appropriate suppressor.

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.

AUSTRALIAN TRANSMITTING PATENT LICENCE

LICENCE No. 2

THIS AGREEMENT made the day of One thousand nine hundred and thirty BETWEEN AMALGAMATED WIRELESS (AUSTRAL-ASIA) LIMITED having its Registered Office at 47 York Street, Sydney in the State of New South Wales AND STANDARD TELEPHONES AND CABLES (AUSTRAL-ASIA) LIMITED having its Registered Office at 71 York Street Sydney in the State of New South Wales (hereinafter called "the Grantors") of the one part AND of (hereinafter called "the Licensee") of the other part WHEREAS the Grantors are the owners of or control or are entitled to grant licences or sub-licences in respect of certain inventions the subject of certain Letters Patent (hereinafter referred to as "the said Letters Patent") AND WHEREAS the Licensee owns and operates wireless broadcasting station and has applied to the Grantors to grant and the Grantors have agreed to grant the Licensee such a Licence upon the terms and conditions hereinafter appearing NOW IT IS HEREBY AGREED BETWEEN THE PARTIES HERETO AS FOLLOWS:

1. (a) The Grantors grant and agree to grant to the Licensee personally subject always to the terms and conditions hereinafter appearing a non-exclusive non-assignable licence to use and exercise within the Commonwealth of Australia and not elsewhere all or any of the inventions the subject of the said Letters Patent or any of them which on the thirtieth day of June nineteen hundred and thirty-four belonged to or were controlled by the Grantors or either of them in respect of which the Grantors or either of them have power to grant Licences or sub-Licences for the purpose of carrying on the wireless telephonic transmitting station known as and situated at in the State of for broadcasting only and to be operated only in accordance with the regulations of the Commonwealth Government in force for the time being relating to "Broadcasting" but such Licence shall only extend to and be for the purpose specifically defined and limited in the Schedule hereto such Licence to be deemed to have commenced on the first day of July 1934 and shall continue until the thirtieth day of June 1937 unless previously revoked as hereinafter provided and to be subject to the due performance and observance of the terms and conditions on the part of the Licensee herein contained.

(b) The expression "Broadcasting" where herein used shall mean the transmission of speech or music intended for simultaneous reception by all listeners.

2. The Licensee agrees with the Grantors and each of them as follows:

(a) The Licensee will not use or exercise or knowingly permit to be used or exercised any of the inventions the subject of the said Letters Patent or any of them otherwise than strictly in accordance with the terms of this Agreement.

(b) Except with the written consent of the Grantor the Licensee will not during the subsistence of this Licence be associated with the manufacture, importation, sale, letting on hire, rental, supply or trade of any kind of or in any apparatus instrument or thing covered by the patent rights of the Grantors or either of them unless such manufacture importation sale letting on hire renting supply or trade is duly licensed by the Grantors.

(c) During the subsistence of this Licence the Licensee shall pay to the Grantors Royalties as follows: For each year the sum of £ . This sum shall be payable (a) as to the sum of £ part thereof by equal quarterly instalments of £ each payable on the first day of each quarter and (b) as to the sum of £ by the Licensee broadcasting advertisements for the Grantors at such times as it may require and at the rates from time to time fixed for the public by the Licensee until such sum shall have been exhausted.

(d) The Licensee will not at any time during the subsistence hereof dispute or impeach or assist others to dispute or impeach the validity of the said Letters Patent.

(e) The Licensee will not assign transfer mortgage charge grant any interest in or sub-licence under this Licence nor in any manner part with the possession control or benefit of this Licence or any part thereof or interest therein.

(f) The Licensee will in respect of all things that may be done or caused to be done by him under this Licence conform in all respects with the regulations of the Government of the Commonwealth of Australia in force for the time being in relation to "Broadcasting" and will indemnify and hold harmless the Grantors in respect of any failure on his part so to conform.

(g) The Licensee will exhibit at the said Station a clear and legible notice that the apparatus used at such Station is licensed under the Patent rights of the Grantors.

(h) The Licensee will if so required mark all licensed apparatus in accordance with the requirements of the Patents Act of the Commonwealth of Australia and any amendments thereof made during the subsistence of this Licence.

3. It is further agreed between the Grantors and the Licensee as follows:

(a) During the subsistence of this Licence the Grantors will keep the Licensee fully indemnified from and against 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 in Australia his right to restrain the user and exercise by the Licensee of any of the said Letters Patent in connection with the purpose of this Licence 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 that the Licensee will prior to the granting of this Licence supply to the Grantors diagrams illustrations and full descriptions of the apparatus proposed to be used under this Licence and will notify the Grantors of all modifications and alterations from time to time made in the said apparatus and will at all times permit and hereby does expressly licence the Grantors or any persons authorised by them from time to time to inspect and examine the Licensee's transmitting station and all premises used in connection therewith and all plant and apparatus in about or upon the said station or premises and/or used under this licence.

(b) Provided also that the Grantors are immediately informed of the Institution of such proceedings and may assume at their own cost the defence of any such proceedings as are referred to in sub-clause (a) of this clause and may defend compromise submit to judgment in abandon discontinue or otherwise dispose of the same as to the Grantors may seem expedient. If the Grantors shall assume the defence of any such proceedings the Licensee shall at the cost of the Grantors facilitate the Grantors in everything appertaining to such defence and shall at the cost of the Grantors do and execute all acts matters things and documents as may be reasonably required by the Grantors or their solicitors in connection with or for the said defence. If the Grantors shall fail within seven days of a request in that behalf in writing by the Licensee to assume such defence the Licensee shall be entitled to defend or to compromise or submit to judgment in the same and in any such case the Grantors shall hold the Licensee fully indemnified in respect of costs damages or charges in the same manner as if the Grantors had themselves assumed such defence.

4. The Grantors may without any notice revoke this Licence on the happening of any of the following events:

(a) If any royalty is due and remains unpaid for the space of fourteen days after the due date for payment thereof notwithstanding the fact that no demand has been made therefor.

(b) If the Licensee commits any breach of any of the other terms and conditions of this agreement and the same is not remedied made good or desisted from within such times as the Grantors shall in writing require or

(c) If the Licensee shall become bankrupt or assign his estate or part thereof for the benefit of his creditors or shall be in an insolvent condition or (being a company) shall go into either compulsory or voluntary liquidation or

(d) If the Licensee does not continue the service in respect of which this Licence is granted;

and any such revocation shall be without prejudice to all the rights of the Grantors against the Licensee for prior breaches of this Licence or otherwise.

5. Upon the determination or revocation of this Licence it shall be ascertained what (if any) sum remains due from the Licensee to the Grantors in respect of royalties and the Licensee shall pay the same forthwith to the Grantors.

IN WITNESS WHEREOF the said parties hereto have duly executed these presents the day and year first before written.

The Grantors hereby acknowledge that amounts payable by the Licensee under this License by way of royalty for the rights hereby granted and throughout the period for which this Licence is in force have been included in the money received for the purchase of the said station equipment and that the Licensee is hereby discharged and exonerated from all liability therefor accordingly.

THE SCHEDULE ABOVE REFERRED TO.

To carry on a wireless telephonic transmitting station known as situated at in the State of for the purpose of broadcasting only and to be operated only in accordance with the regulations of the Government of the Commonwealth of Australia in force for the time being relating to "broadcasting" and in accordance with this agreement.

Australian Transmitting Patent Licence *(Continued)*

Australian Radio Tariff Schedule

The Customs Tariff in force in Australia is the Customs Tariff, 1933-1936 (as proposed to be amended by Customs Tariff Proposals of December 8, 1937) which provides for the collection of duties under three headings. Throughout the following, the actual tariff rate if indicated by 3 sets of figures showing in the first BRITISH PREFERENTIAL TARIFF; second INTERMEDIATE TARIFF (not yet operative for radio); third GENERAL TARIFF, as an example (B.P. free) (I.T. 15%), (G.T. 15%).

179. **ELECTRICAL MACHINES AND APPLIANCES** (D) (4) (a) Elements for electric current rectifier assemblies, other than rectifying valves covered by item 181 (A) (2), ad val., B.P. free; I.T. 15%; G.T. 15%.

180. (E) **WIRELESS RECEIVERS, PARTS THEREOF, AND ACCESSORIES THEREFOR,** viz.:—

(1) Chargers, Battery, exceeding 1 ampere and up to and including 5 amperes, each *15/- B.P.; *24/- I.T.; *26/6 G.T. And in respect of paragraph (1)—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 each *2/4 B.P.; *2/4 I.T.; *2/4 G.T.

(2) Condensers, fixed mica, each *3d. B.P.; *4d. I.T.; *4½d. G.T. And in respect of paragraph (2)—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 each *.02d. B.P.; *.02d. I.T.; *.02d. G.T.

(3) Articles for tuning devices, viz.:—(a) Dials, complete, per unit *2/- B.P.; *2/6 I.T.; *2/8 G.T. And in respect of sub-paragraph (a)—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, per unit *.16d. B.P.; *.16d. I.T.; *.16d. G.T. (b) Dial or scale assembly, per unit *6d. B.P.; *9d. I.T.; *9½d. G.T. And in respect of sub-paragraph (b)—for each £1 by which the equivalent in Australian currency of £100 sterling is less than £125 at the date of exportation—add additional duty of, per unit, *.04d. B.P.; *.04d. I.T.; *.04d. G.T. (c) Drives, ratio reducing, per unit *1/6 B.P.; *1/9 I.T.; 1/10½d. G.T. And in respect of sub-paragraph (c)—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, per unit *.12d. B.P.; *.12d. I.T.; *.12d. G.T.

(4) Resistors, fixed each ¾d. B.P.; 1d. I.T.; 1½d. G.T. And in respect of paragraph (4)—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 each .01d. B.P.; .01d. I.T.; .01d. G.T.

(5) Rheostats, potentiometers and variable resistances other than carbon type variable resistances, each *6d. B.P.; *8d. I.T.; *8¾d. G.T. And in respect of paragraph (5)—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 each *.06d. B.P.; *.06d. I.T.; *.06d. G.T.

(6) Sockets, valve, each *2d. B.P.; *3½d. I.T.; *4d. G.T. And in respect of paragraph (6)—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, each *.04d. B.P.; *.04d. I.T.; *.04d. G.T.

(7) Transformers, audio and radio, each *1/6 B.P.; *2/6 I.T.; *2/9 G.T. And in respect of paragraph (7)—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, each *¼d. B.P.; *¼d. I.T.; *¼d. G.T.

(8) Combined power transformers and chokes or any device for eliminating "AB," "BC" or "ABC" batteries, such as power packs and similar devices, whether imported separately or incorporated in a wireless receiving set, each *15/- B.P.; *25/- I.T.; *26/6 G.T. And in respect of paragraph (8)—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, each *1½d. B.P.; *1½d. I.T.; *1½d. G.T.; or, as to all the goods covered by paragraphs (1) to (8) of sub-item (E) the following rates if same return a higher duty, viz.:—ad val. 30% B.P.; 50% I.T.; 57½% G.T. 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 ad val. .6% B.P.; .6% I.T.; .6% G.T.

† (9) Choke coils suitable for use in connection with battery eliminating devices, each 5/- B.P.; 10/- I.T.; 10/- G.T.

† (10) Condensers, variable, of capacities exceeding .0001 microfarad, but not exceeding .001 microfarad—with gang or drum controls — per each condenser contained therein 1/6 B.P.; 3/- I.T.; 3/- G.T. Without gang or drum control each 1/6 B.P.; 3/- I.T.; 3/- G.T.

† (11) Condensers, variable, midget, of .0001 microfarad capacity or less, each 1/- B.P.; 1/6 I.T.; 1/6 G.T.

† (12) Loudspeakers and Parts thereof—

(a) Loudspeakers including transformers, each 10/- B.P.; 12/6 I.T.; 12/6 G.T.

(b) Parts of loudspeakers imported other than in complete loudspeakers, viz:— (1) Field Coils each 2/- B.P.; 3/- I.T.; 3/- G.T.; (2) Field Coil Cores each 9d. B.P.; 1/3 I.T.; 1/3 G.T. (3) Field Coil Housings each 1/- B.P.; 1/6 I.T.; 1/6 G.T. (4) Cones with or without voice coils each 1/3 B.P.; 1/9 I.T. 1/9 G.T. (5) Cone Housings each 1/9 B.P.; 2/3 I.T.; 2/3 G.T. (6) N.E.I. other than transformers ad val, 35% B.P.; 55% I.T.; 55% G.T. Provided however that in the case of combinations of any of the abovementioned parts duty shall be payable on such combinations as though the parts were imported separately.

† (13) Transformers, power, each 10/- B.P.; 15/- I.T.; 15/- G.T. or as to all the goods covered by paragraphs (9) to (13) of sub-item (E) with the exception of the goods covered by clause (6) of sub-paragraph (b) of paragraph (12) the following rates if same return a higher duty, viz:— ad val. 35% B.P.; 55% I.T.; 55% G.T.

(14) Headphone: Parts N.E.I. of wireless receivers, other than cabinets, ad val. 30% B.P.; 50% I.T.; 57½% G.T. And in respect of paragraph (14)—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 ad val. .6% B.P.; .6% I.T.; .6% G.T.

(15) 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 part of any battery eliminating device, 12/6 B.P.; 25/- I.T.; 25/- G.T. or ad val. 35% B.P.; 55% I.T.; 55% G.T. whichever rate returns the higher duty.

*See provision after paragraph (8) of this sub-item for alternative ad valorem rates.

†See provision after paragraph (13) this sub-item for alternative ad valorem rates.

Customs Tariff Schedule (*Continued*)

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.

(16) Wireless receiving sets and gramophones combined, excluding cabinets, valves, loudspeakers, headphones, batteries or any device for eliminating batteries each 20/- B.P.; 25/- I.T.; 25/- G.T.; and in addition per valve socket excluding sockets for valves forming part of any battery eliminating device 12/6 B.P.; 25/- I.T.; 25/- G.T.; or as an alternative to the cumulative fixed rates provided above ad val. 35% B.P.; 55% I.T.; 55% G.T. 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.:—

(1) Storage batteries for wireless receiving sets, whether imported separately or incorporated in or forming part of a wireless receiving set.—ad val. 50% B.P.; — I.T.; 70% G.T.

(2) Composition parts including containers for storage batteries for wireless receiving sets and for storage batteries suitable for use in motor vehicles (other than motor cycles) otherwise than for propulsion purposes, per lb. 2d. B.P.; — I.T.; 2½d. G.T. and ad val. 40% B.P.; — I.T.; 60% G.T.

180 (1) **DRY BATTERIES AND DRY CELLS.**

Dry batteries and dry cells of all descriptions whether imported separately or incorporated in any article or appliance per lb. 2d. B.P.; 5d. I.T.; 5½d. G.T. or ad val. 25% B.P.; 42½% I.T.; 48¾% G.T. whichever rate returns the higher duty. And in respect of sub-item (1)—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 per lb. .02d. B.P.; .02d. I.T.; .02d G.T. or ad val. .4% B.P.; .5% I.T.; .5% G.T., whichever is applicable.

181. (A) (2) **VALVES.**

Valves for wireless telegraphy and telephony, including rectifying valves each 2/3 B.P.; — I.T.; 3/6 G.T.; or ad val. 20% B.P.; — I.T.; 40% G.T., whichever rate returns the higher duty.

NOTE: Under Excise Tariff Item 19, valves for wireless telegraphy and telephony including rectifying valves are subject to a duty of 2/- each.

Articles for Manufacturing Purposes

The radio trade is also interested in certain goods prescribed for admission under either Item 404 or Item 415 (2).

Item 404 provides for the admission of materials and minor articles being of a class or kind not commercially produced or manufactured in Australia for use in the manufacture of goods within the Commonwealth.

The goods mentioned at the beginning of each paragraph in bold type are manufactured in Australia; the materials or minor articles used in the manufacture of these goods and admitted under tariff Item 404 follow on in light type. (The rates of duty being British Preferential—Free and General 15%).

ALL PURPOSES: Aluminium sheets, plain, satin finished, and/or polished. Copper sheets, of gauges finer than No. 40 gauge (I.S.W.G.).

ELECTRICAL APPARATUS AND APPLIANCES, viz.: All kinds of alloys, resistance, in the form of wire, bars, rods, sheets, or strips; beads, insulating, jet; beads, insulating, porcelain, of sizes less than ¾ in. diameter x ¾ in. long over-all measurement; discs, tungsten; paper, insulating, varnished, not exceeding 4 inches in width, in reels; rods, insulating, except of hard rubber; tubes, insulating, except—braiding or sleeving, cotton, tubular; paper, bakelised; porcelain, rubber, hard; wire, copper, cotton covered, finer than 30 gauge (I.S.W.G.).

ARRESTERS, LIGHTNING (out-door type) resistances.

BATTERIES, RADIO "B," ALKALINE TYPE, TO BE FITTED INTO CABINETS, COMPLETE WITH CHARGING APPARATUS OF AUSTRALIAN MANUFACTURE: Connectors, under security; elements, under security; separators, under security.

CELLS, DRY: Caps, brass, with nuts, under security; carbons; flour, potato, or farina, under security; manganese in coarse powder form; manganese in lump form; terminals (including binding posts) of brass, and nuts and washers, but not including either terminals having metal strips or other metal attachments soldered thereto, or battery clips, under security.

CONDENSERS foil, metal, under security; paper, tissue, used as a dielectric, under security.

CONDENSERS FOR WIRELESS RECEIVING SETS, hard rubber sheets, perforated, under security.

CONTROLS, VOLUME: Carbon rings, under security.

HOUSINGS, FIELD COIL, FOR LOUD SPEAKERS: Strips, steel, cold rolled, 3½ inches wide by 3/16 in. thick, under security.

LEADS OR CABLES, BRAIDED, FOR WIRELESS RECEIVING SETS: Yarns or threads, cotton, polished, single or two-ply, dyed or otherwise, under security.

LOUD SPEAKERS: Magnets, permanent, under security.

LOUD SPEAKERS, MAGNETIC TYPE: Speaker units, under security.

METERS, MILLIVOLT: Magnets, permanent, under security.

METERS, TESTING AND TUNING, FOR RADIO EQUIPMENT: Magnets, permanent, under security.

PICK-UPS: Magnets, permanent, under security.

POTENTIOMETERS: Carbon rings, under security.

RADIO GRAMOPHONE SETS, COMBINED: Record changing devices imported unassembled, excluding pick-ups, 12 in. turntables and motors.

RECTIFIERS, ELECTRIC CURRENT: Plates, copper-oxide, zinc-coated, with or without connectors affixed, when used in conjunction with Australian-made transformers, under security.

RESISTANCES, VARIABLE: Carbon rings, under security.

TRANSFORMERS, RADIO FREQUENCY: Cores and slugs wholly or partly composed of iron dust, colloidal iron or magnetite.

(Continued on Page 24.)

Customs Tariff Schedule (*Continued*)

VALVES, WIRELESS: Bases, valve, bakelite, with metal pins attached; bulbs, glass, soda or lime; pellets, barium magnesium; sheets, pure iron, of gauges Nos. 18 to 46 (S.W.G.) both gauges inclusive; strips, magnesium; strips, metal, having a nickel content greater than 20 per cent., under security; strips, nickel chromium, in rolls, of gauges Nos. 18 to 46 (S.W.G.) both gauges inclusive. Valve parts, fabricated, of metal or mica, viz.: Caps, eyelets, filament clips and supports, getter cups and tabs, grid collars, grids, heaters and cathodes, mica spacers, plates, top shields, screens, welds and spuds; wire mesh, less than 120 holes per lineal inch, viz., monel metal, nickel, pure iron; wire magnesium; wire, pure iron, of gauges Nos. 18 to 46 (S.W.G.) both gauges inclusive.

WIRELESS RECEIVING SETS: Antenna, woven, i.e., serial tape without terminals; cables, battery (not including terminals), consisting of several flexible cords contained in one braided cover; cords with or without terminals affixed thereto whether imported with loud speakers or separately; wire, loop antenna, cotton covered, for inside aerials, under security.

Item 415A (2) provides, inter alia, for the admission of manufactures imported for use in the development of an Australian industry which are of a class or kind not commercially manufactured in the Commonwealth. The rates of duty are free (British preferential tariff) and 15 per cent. (general tariff). The following radio goods and materials are admissable under Item 415A (2):—

Boards, insulating, of a quality or kind which the Minister is satisfied is not being made in Australia, for use in electrical apparatus and appliances. (Security is required for boards of paper other than Elephantide, Fibreboard, Leatheroid and Presspahn.)

Braid, copper, made of wire of gauges finer than No. 30 (I.S.W.G.), for use in electrical apparatus and appliances.

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.

Cells, thermionic photo electric, consisting of a tube socket or valve holder, amplifying tube, and resistance tube, for use in laboratories for testing purposes.

Cords, flat laid, cotton covered, with terminals affixed thereto, for use with radio head sets.

Generators, standard signal, being instruments for testing radio equipment.

Oscillators, beat frequency, and low frequency, being instruments for testing radio equipment.

Picture transmitting and receiving apparatus, wireless or telegraph system.

PRIMAGE DUTIES. In addition to the duties imposed by the Schedule to the Customs Tariff, 1933-1936, in respect of radio goods and materials, ad valorem primage duties are imposed for revenue purposes. The duties imposed on each item may be summarised as follows :—

Tariff Item	Primage Duty: British Preferential Tariff	Primage Duty: General Tariff
179(D)(4)(a)	Free	4 per cent
180(E)	5 per cent	10 per cent
180(G)	5 per cent	10 per cent
180(I)	5 per cent	10 per cent
181(A)(2)	10 per cent	10 per cent
404	Free	4 per cent
415A(2)	Free	4 per cent

EXCHANGE ADJUSTMENT. A Customs Tariff Exchange Adjustment Act is also in operation which provides for certain deductions from the amounts of duty payable on goods which qualify for admission under the British Preferential Tariff. The deductions are made in accordance with the following provision :—

(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 the less.

The Customs Tariff Exchange Adjustment Act operates in respect of radio goods and materials admissible under Tariff Items 180(E)(9), 180(E)(10), 180(E)(11), 180(E)-(12), 180(E)(13), 180(E)(15), 180(E)(16), and 180(G). The other items under which radio goods and materials are admissible do not qualify for deductions under the Customs Tariff Exchange Adjustment Act as they are either not regarded as protective items or have provisions for automatic variations in duties in accordance with the provision to each item regarding fluctuations in the rate of exchange.

TRADE RESTRICTIONS. The importation of the undermentioned goods from all non-British countries is prohibited unless the consent of the Minister has first been obtained, viz :—

Wireless receivers, parts thereof and accessories therefor.
Valves for wireless telegraphy and telephony, including rectifying valves.
Carbon manufactures of all kinds, including carbon blocks.

Application for permits to import should be made to the Collector in the State into which the goods are to be imported.

(See Index for latest Tariff Revisions.)

Report of Convention at Southport (Qld.)

Of the Australian Federation of Commercial Broadcasting Stations.

November 8, 1937

SECRETARY-GENERAL DUFFY'S REPORT

IN submitting this report of my activities for the past year, I feel it is desirable to make reference to the decisions of the 1935 Convention and the cause that prompted that gathering to set up the position which I have occupied over the past two years.

At that time, regulations had been issued which were considered against the best interests of commercial broadcasting and a feeling was abroad that by restrictive regulation, the security and liberty of the commercial stations was seriously challenged. It was, therefore, decided to set on foot an organisation that could in addition to the usual negotiations with other organisations for the working of commercial broadcasting, do something practical in the way of security for the industry, some degree of permanence.

Security of tenure became then the paramount question facing the industry. During 1936 we were able to get the regulations amended in a more favourable way, and although all that was desired was not achieved, stations generally recognised that a worthwhile effort had been made with good results.

At the last Convention unfortunately, I was unable to report success with the Federal Government on the question of security of tenure. Favourable promises had been made by the Postmaster-General and the Prime Minister, but for some unknown reason it was not possible to get the matter before Cabinet for decision. Delegates will remember the efforts made at the last Convention to get a public declaration of policy from the Government but without avail.

Subsequent to the Convention, interviews were held at Canberra with the Prime Minister and Postmaster-General at which the president attended, but no satisfactory response was forthcoming. Later in the year a deputation was arranged to the Prime Minister on the subject, but at the last minute the deputation was diverted to the Postmaster-General who in effect said to the deputation: "There is no need for you to put your case. I know it and it has my full support. It is a question that will have to be decided by Cabinet, and I will get it before that body as soon as possible. In the meantime set out in writing exactly what you want and I will then have a memorandum prepared for submission to Cabinet."

The outline of this memorandum was prepared by a sub-committee consisting of the president, the country vice-president (Mr. G. H. Anderson) and the N.S.W. vice-president (Mr. C. F. Marden) copy of which is attached. No reply was received to this memorandum. Copies were also sent to other members of the Cabinet.

Mr. M. B. Duffy, Secretary General of the Federation.

Later in the year the Melbourne executive constituted another deputation, this time to the Acting Prime Minister (Dr. Earle Page), urging that the Cabinet should do something before the expiration of Parliament, to give security to the industry. I understand the matter did go before Cabinet, but was adjourned pending the return of the Prime Minister from abroad. Just prior to the return of the Prime Minister from abroad the Leader of the Opposition published a handbook as a guide to speakers at the pending election in which he made reference to broadcasting policy.

One of the morning dailies placed an interpretation upon this policy to the effect that it meant nationalisation of the commercial services. Mr. Curtin immediately informed me by telephone from Canberra that this interpretation was incorrect and he then confirmed to me the undertaking he had previously given to Messrs. Bennett and Kemsley and myself in 1936 to the effect that he recognised that commercial broadcasting had become part of the system in Australia and was so well received that it would be folly to attempt to disturb it over the next ten years. This statement, while being helpful, was only verbal, and it was decided to seek confirmation in writing. Consequently the reply was received from Mr. Curtin that was circulated to stations.

The delay in receiving any word from the Government, notwithstanding frequent interviews with Ministers, caused me to write to the Postmaster-General and the Prime Minister in the terms of the attached letters. It was not until the dissolution of Parliament that I was able to obtain an intimation that the matter would be dealt with in the Prime Minister's policy speech. The declaration of policy on commercial broadcasting in that speech must have been received by members as something achieved after two years of continuous pressure, but all is not over and it is now necessary to see that the policy is implemented and on the most favourable lines that we can obtain.

This Convention should give serious consideration to the declaration of the Prime Minister and make up its mind as to whether or not it is a sufficient measure of security or whether it would not be better tactics to press still for the independent Board of Control.

Racing Case.

AS you all are no doubt aware, this case had reached the stage of hearing at the time of the last Convention, and the decision was to accept financial responsibility for the case up to the primary trial. The decision of the primary trial was in our favour, but an appeal was taken to the High Court of Australia. Members were circularised after a decision of the executive to contest the appeal, asking their concurrence and the vast majority of the stations agreed that it should be contested.

The appeal to the High Court was decided in our favour by a majority decision of 3 to 2. Copies of the judgments were circulated. An appeal has now been lodged to the Privy Council and it will be a question for conference to decide as to whether the appeal should be resisted. Failure to contest it will have

Commercial Broadcasting Stations 1937 Convention *(continued)*

the onus on 2UW as to whether they will take the obligation of contesting the case. Should the Federation and 2UW refuse to contest the appeal there, the case will be decided against 2UW by default and members will be involved in the payment of the costs of the other side.

The amount recoverable on success in the appeal by the Federation, however, will not be the full outlay, and I estimate that about two-thirds only can be recovered. On the other hand, failure to appear will involve the payment of costs of the other side by the Federation up to the High Court stage, which will be about £2000, with the prospect of an action for damages against any station that has done broadcasting without the permission of the promoters.

Mechanical Copyright.

AT last Convention the question of an extension of the existing agreement was left to the executive to appoint a committee of importing stations to arrange. An amended proposition was received from the copyright owners, but was stoutly resisted as it was considered that any payment on a period basis was in effect, additional performance fees and was not in accordance with the legal agreements under the Act.

Eventually the old agreement was renewed up till the end of this year, but evidence has been forthcoming that the new idea has not been abandoned, for recently in discussions on the question of mechanical recordings made locally, the same proposition has been put forward. This discussion on local recordings arose because of the legal position associated with recordings by stations of programmes including music for subsequent transmission. A conference was held in Sydney of stations interested with a representative of Featuradio, at which Columbia were invited to attend, and although its representative intimated his willingness to be present, eventually sent along a note intimating that the firm could not be represented.

At a subsequent conference with the owners of copyright, it transpired that an agreement had already been made with the Columbia Company for locally produced recorded programmes. The owners were informed that we considered that where programmes are recorded for convenience of broadcasting, that mechanical copyright charge should be waived as the owners of copyright receive from broadcasting their fees on performance and it should be immaterial to the owners of copyright whether the public performance by radio is given in record form or in present form.

The owners would not accept this contention and requested that the case be set out in writing, covering the three forms of recording: (a) where a station records its own artists for subsequent transmission by that station; (b) as in (a), but where the programme is relayed to other stations; and (c) where programmes are recorded for general sale to advertisers or stations. This latter covered also the musical introduction to recorded commercial announcements.

Since submitting the written statement to the representative of the owners, no further reply has been received, but this is anticipated at any moment. I feel confident that the first classification has a good chance of being accepted as free of charge The renewal of the existing agreement on imported recordings is a matter for consideration, as the present agreement expires at the end of this year.

Radio Technicians' Award.

AS the outcome of the discussion at last Convention the sub-committee appointed conferred in Melbourne and drew up a counter log to be submitted to the Court. Subsequently an award was made by the Court covering technicians employed by stations in the capital cities and Newcastle A new log has been served on certain country stations and a sub-committee, representing N.S.W. and Victorian country stations has prepared a log as a counter to the claim of the technicians. It has been suggested that all country stations might feel inclined to come within the ambit of this claim instead of having the stations dealt with in sections. It is anticipated that a compulsory conference will be called by the Court soon after this Convention.

A.P.R.A. Agreement.

As you are all no doubt aware, the existing agreement with A.P.R.A. expires at the end of 1938. The Broadcasting Commission at the present time is in dispute with this body, and arbitration under the terms of the Copyright Act has been applied for. I understand that the commencement of the arbitration proceedings will be sometime this month and I have heard unofficially that the Commission intends to seek an award up to the end of 1938 only, and may approach us during the coming year as to whether we will be prepared to join them in a joint arbitration case covering the use of copyright music for broadcasting in Australia. Direction from the Convention upon this matter would be appreciated.

Copyright Act.

No progress has been made with our attempts to have the Copyright Act altered to provide for compulsory arbitration. The proposed amendments to the British Board of Trade to the International Convention are still in suspense as the convention has been postponed and no definite date has yet been fixed The Federal Government does not feel disposed to make a move in the direction of any general amendments of the Act until after the International Convention has met. The fact that the Government is putting through a bill to ratify the Statute of Westminster will give the Government power to amend the Copyright Act without reference to Great Britain and it may be possible when that Act is passed, to prevail upon the Government to make the existing arbitration machinery compulsory.

Accreditation Scheme.

In accordance with the decision of last Convention, efforts were made throughout the year to establish an agents' accreditation scheme. Executive officers and sub-committees did a tremendous amount of work preparing the main outlines of the scheme, and submitted it to the agents' executive in Sydney, who accepted the plan as outlined, but at subsequent meetings of the Agents' Association, they decided against working under the plan, and while the Melbourne executive was anxious that the plan should be proceeded with in spite of the agents' opposition, the Sydney executive did not consider that wise, consequently no accreditation scheme has been put into operation generally. The Melbourne stations, however, have put the plan into operation as far as they are concerned, and are only paying commission to those agencies accredited by them in Victoria. Copy of the rules of accreditation were forwarded to all stations and you are no doubt familiar with the contents thereof.

Gramophone Records.

During the year the basis of a new agreement with the record manufacturers was arrived at. This agreement was negotiated by your president, and covers a period of five years. The new agreement came into operation as from July 1 this year.

News Service.

Negotiations have taken place from the rising of the last Convention until very recently, with the object of trying to arrive at a satisfactory basis for an agreement between the newspapers and the commercial broadcasting stations for a news service. The discussions were around two separate issues, one being a local or Australian news service and the other cable or overseas news. Particulars of the newspapers' proposition insofar as they are covered by the Australian Newspaper Conference and the Australian Associated Press are set out in notes for the Convention. It would then be left to the Federation to distribute it over its stations in its own way.

The question of sponsorship, which seemed to be a stumbling block at one stage, has been met by a proposal that a special form of sponsorship be adopted as follows:—

"The following half hour has been sponsored by 'X & Co., of etc., etc.,' but before proceeding further, we desire to make way for the latest news as supplied by '—— Newspaper.'"

Communication has been sent to stations seeking their wishes in the matter and it is hoped that some finality can be reached at an early date. Incidentally, the A.N.C. will be meeting concurrently with this Convention, and if any further points of doubt exist, communication with that body while in session may help to clear the matter.

Recorded Commercial Announcements

The tendency to use recorded announcements more extensively is not without its problems and recently complaints have been numerous as to the length and nature of these recordings. On the initiative of the Sydney executive, a sub-committee has been set up to consider this question and if possible, submit a report to this Convention on the most appropriate way of dealing with the situation.

Musicians' Award.

The negotiations between the commission and the Union are still proceeding and it does not seem that any result suitable to commercial stations will be the outcome. Recent talks with representatives of the Union do not lead me to feel that any concessions from the award will be made voluntarily. If it is desired to take this matter further, it appears necessary to frame a log seeking a variation of the award.

President.

I desire to pay tribute to the amount of time, energy and capacity devoted to the Federation's affairs by your president. Mr. Chandler, who as the circulated minutes will show, attended nearly all the executive meetings in Sydney and handled the important negotiations with the record manufacturers and advertising agents. His sacrifice of personal interests for the Federation has been considerable.

Administration.

During the year, Mr. Dooley has proved to be an excellent co-operator in the administration of the Federation, and I feel sure stations will recognise that the contact has been well maintained. No one could give better service.

Broadcasting Accreditation Bureau

(See Index for final draft of Accreditation Rules.)

RULES FOR ACCREDITATION OF ADVERTISING SERVICE AGENTS.

1. Definitions.—

(a) "Federation" means Australian Federation of Broadcasting Stations.

(b) "Bureau" means the Accreditation Bureau established by The Australian Federation of Broadcasting Stations.

(c) "Secretary" means the Administrative-Secretary of the Australian Federation of Broadcasting Stations.

(d) An "Agency" for the purpose of these rules is one that has received Accreditation from the Bureau.

2. For the purposes of this Accreditation, full powers to issue withhold and cancel Accreditation Certificates are vested in the Bureau:

3. Agencies may be accredited under one of the following headings:—

(a) For the whole of Australia,

(b) for a State only,

(c) for a probationary period only.

A certificate shall be issued for accreditation for which a charge shall be made of £1/1/- for Australia-wide accreditation and 10/6 for State accreditation.

4. Applications for accreditation shall be made individually by Agencies whether trading as individuals, partners or incorporated Companies. Only such Agencies as are duly accredited shall be eligible to receive commission.

5. All applications for any of the above classes of accreditation shall be made to the Secretary on the form prescribed for that purpose, and shall contain a signed undertaking to abide by the rules of accreditation and shall be accompanied by the prescribed fee.

6. An applicant may, if it be deemed necessary, be appointed as Agent for a period of probation without being accredited, such period in no case to exceed twelve months, and shall be deemed to be an Agency during such probation.

7. The full period of accreditation shall be 12 months.

8. Agencies that are accredited shall be issued with an Accreditation Certificate by the Bureau, such Certificate to have a currency of one year. Before receiving renewal of Accreditation, an Agency may be required to produce evidence showing that it has secured and is actively developing commission earning contracts for members of the Federation to an extent satisfactory to the Bureau.

9. This Accreditation Certificate shall be subject to cancellation by the Bureau at its absolute discretion and without stating the reason therefor, and in any such event neither the Bureau nor any member thereof shall be liable to be sued by reason or in respect thereof.

10. No Agency shall quote an advertiser nor seek from any Station any business at any rate lower than that shown on its current official rate-card for the amount of business decided upon, provided that such rate is the lowest at which the Station's time for the business is being offered.

11. It shall be an absolute condition of accreditation that no advertising agency accredited under these rules and regulations shall accept from any Station any higher rate of commission than 12½%.

12. Full commission allowed by the Stations shall be retained by the Agency and, subject to the provision in this clause contained, shall not be shared with or rebated to any person, firm or company directly or indirectly and shall be apart from the service charges usually collected by the Agency. This shall not be held to prohibit any Agency sharing any part of the commission with another Agency or from paying to any bona fide employee of the Agency a share of the commission payable by Stations. Commission is to be paid at the agreed rate with a definite understanding that it is not to be rebated in any shape or form either by supplying free entertainment, free advertising of any other type, free advertising material or part or whole payment of the advertiser's staff.

13. The Agency shall accept full responsibility for the payment of its client's account in respect of all contracts placed by the Agency, or on which commission is paid or payable.

14. Stations will pay to an Agency in respect of each contract a sum of 12½% on the total value of the air-time and 7½% on features purchased from the Station by the Agency on behalf of the client; but no commission shall be payable unless payments for accounts duly rendered and certified, if required, are despatched by the Agency to the Station by the end of the month following date of broadcast.

15. Excepting by arrangement with the Station concerned, no commission shall be payable on business taken over by the Agency during the currency of a contract which was obtained direct by the Station, unless such business shall have been obtained from an existing client of the Agency who has current radio business with the Agency and the account is serviced by the Agency thereafter. Commission on such contracts shall be payable upon the renewal of the contracts where the Agency co-operates in securing the renewal

16. Where a principal transfers his advertising account from one Agency to another during the currency of the contract, it is expressly agreed that no responsibility shall attach to the Station for the payment of commission to the first Agency on advertising broadcast after the date notified by the principal to the station as that upon which the second Agency shall take over the servicing of the account. Commission shall be payable only to the Agency preparing and lodging the copy and only as time is paid for.

17. No commission shall be payable on landlines and other out-of-pocket expenses.

18. An accredited Agency shall not sub-let Station time of its principal in any form, nor shall such time be made

Commercial Broadcasting Stations 1937 Convention *(continued)*

the subject of a rebate of goods indirectly or otherwise. Distributing Agencies or others are not permitted to advertise the goods of several manufacturing or business houses under one contract without the approval of the Station.

19. No Agency shall seek from any Station free entertainment, free time, or special press advertising in association with any contract provided always that the Station itself makes no such offers direct and provided always that pointers for a feature programme are excluded from this clause when such pointers refer specifically to the programme and the sponsor and do not state the terms of any special offer.

20. The Agency shall conform strictly to the Federation's code of ethics and the individual Station's conditions respecting:

(a) Programme standards;
(b) Policy;
(c) Receipt of copy;
(d) Amount of wordage.

21. The Advertising Agency shall endeavour to see that all advertising submitted is clean, honest and truthful advertising conforming as far as ascertainable to the standards of the respective Stations concerned.

22. Should an Agency retire from business, its accreditation shall forthwith lapse.

23. In the event of an Agency reconstructing its business or effecting any changes in its Proprietary, the Secretary shall immediately be advised and its accreditation shall be subject to review by the Bureau in the light of the information tendered and, unless continuance be approved, shall lapse and a fresh application for accreditation shall be necessary.

24. The Bureau shall be the sole arbiter upon the interpretation of these rules and regulations and any question or questions arising from or not covered by them and its decision or decisions shall be final, but neither the Bureau nor the individual members thereof shall be liable therefor. The Bureau shall at all times be open to receive and consider representations.

25. All contracts are to be subject to the conditions stipulated on the printed contract form of the Station with which the contract is placed. Such conditions shall operate irrespective of whether or not a contract is issued on the official order form of the Agency and such conditions shall supersede anything to the contrary which may appear on the contract issued by the Agency provided always that a waiver of any condition on the Station's printed contract form may be issued in writing by the Station accepting the contract.

26. An Agent may require from any Station a declaration certifying that announcements scheduled have been duly made in terms of the contract between the Agent and the advertiser.

27. An Agency shall not undertake to deal exclusively with any Station or group of Stations, but nothing in this clause shall prohibit the National Council of Accredited Advertising Agents or any group of Agencies from withholding business from any Station for infringement of the Federation Code of Ethics.

28. Agencies shall, before being officially accredited, signify in writing their acceptance of those rules.

In a later section of this YEAR BOOK will be found the Accreditation Rules as agreed to by all parties in April, 1938.

MR. BROWN'S OPENING ADDRESS

"Mr. President and Gentlemen:

"I am obliged to you for the invitation to be present at your Conference, but you will, I know, understand my difficulty in leaving Melbourne so early after my return from abroad. I do, however, greatly appreciate this opportunity of saying a few words to you even though I cannot be present in person.

"I am sure it must be beneficial for the executives of commercial broadcasting stations to meet periodically in conference to discuss their difficulties and their aspirations, to formulate plans for the future, and, in short, to pool their ideas on matters of general policy with a view to still further improving the services which they conduct.

"Broadcasting has made remarkable progress in Australia, and I am convinced that one of the important reasons for the high standard which has been reached is to be found in the joint system of private enterprise working cordially alongside the nationally-owned service.

"An indication of that progress may be found in the growth of the system itself. There are now 89 commercial broadcasting stations and 21 national stations, and the number of listeners' licences is within measurable distance of one million. The licence density is striking. Taking the Commonwealth as a whole, there are nearly 15 licences to every hundred of the population or, expressed in other words, 61 out of every one hundred houses has at least one wireless set. The highest density is naturally in the metropolitan areas —Adelaide holding first place with 85 per cent. of its dwellings having receivers.

"It is gratifying to note that commercial broadcasting is a desirable medium of investment, for without financial benefit to those devoting their time and energy to the service and those providing the wherewithal to carry on, broadcasting could not possibly attain to the meritorious standard which it has now reached. There is, of course, another side to this aspect of the question which is occasionally the cause of some little embarrassment—the applications for additional licences are never-ending, and the great bulk of them obviously cannot be granted. Apart from the technical aspect, the Department has always been concerned to see the industry established on safe lines, financially sound to ensure continuity, for then it may be expected that service will continually improve in quality.

"You, gentlemen, have a great responsibility to the community as trustees of public property, that property being a channel of communication which can reach many thousands of people. Fortunately, you have

Mr. H. P. Brown, Director General, P.M.G.'s Dept.

always realised this, and you have recognised the position of the Post Office and the obligation which rests upon it from an administrative standpoint to control broadcasting in the public interest. I am happy to say that the Department has always received generous co-operation from all the broadcasters, and that jointly we have managed to conduct these affairs of mutual interest without making reference to statutory powers or rights which either the one or the other may possess. You may be surprised to hear it, but I have a dislike of regulations and always prefer to conduct business with as little reference to them as possible. In public affairs they are, of course, essential, but they should be paraded as seldom as circumstances permit.

"I hope that the pleasant relationship existing between broadcasters and the Department may continue, for that state of affairs is an important factor in the public being well served, and it is also a condition which makes the lives of those concerned in the business more pleasant than they might otherwise be.

"I am aware that at least some of your members wish for an alteration in the system of Government control, and doubtless those who hold these views feel they have good reasons to support their opinions that alterations are desirable.

"I am enthusiastic for progress—for all change which will achieve something good and better. In this matter there are two interests only—one the great public which accepts us in their service, and the other those who are entrusted with the practical day to day management of the broadcasting services.

"The relevant questions raised in my mind are—firstly, does the present system militate against the effectiveness of the broadcasters in their efforts to meet their obligations to the public; secondly, does the system impose any hardship or present any obstacle to the broadcasters in securing for themselves the benefits to which they are legitimately entitled for acting as the servants of the public?

"If either of these questions must be answered in the affirmative, then change is desirable. I am sure the members of the Federation will be honest to themselves in this matter and will seek to do whatever they feel is likely to be most beneficial towards the continued development of this great public service.

"It is a pleasure to note the improvement in the technical performance of the various broadcasting stations, particularly in regard to frequency stability of the transmitters. Frequency stability is possibly of greater importance than may be generally realised, as it ensures a minimum of interference between stations and increases the useful night time service area.

"During my observations abroad I was frequently confirmed in my belief that the Australian listener is very fortunate in having at his disposal an unusually wide diversity of programmes of such excellent quality. This is a great tribute to you, gentlemen, and as I mentioned earlier I am convinced that it is the joint system of national and private enterprise which has made the efforts of all concerned so successful. The policy which has been pursued almost from the inception of broadcasting in Australia has proved itself admirably suited to the conditions prevailing in this country, and I cannot imagine that anyone having the interests of the community at heart would contemplate for a moment any radical change in the plan hitherto followed.

"May I thank you for all the consideration you have extended to the Department in the past, and assure you that it is our wish to maintain and develop that friendly co-operation which, I believe, has assisted the progress of broadcasting in Australia during the years which have gone.

"Now, gentlemen, I must not detain you longer, but I take this opportunity of conveying my good wishes to you, and on declaring your Convention open, may I express the hope that your deliberations will be highly successful and satisfactory to all concerned."

Commercial Broadcasting Stations 1937 Convention *(continued)*

MR. BROWN'S ADDRESS (Continued)

Federation President's Speech at Convention Opening

At the conclusion of the Director-General's speech, the President thanked Mr. Brown, and a vote of thanks, by acclamation, was passed by the Conference.

President's Address.

The President, Mr. Chandler, then delivered the following excellent presidential address, which was enthusiastically and most favourably commented on.

I AM pleased indeed to greet you—first as delegates to this Convention and secondly, on behalf of the Queensland stations, to bid you welcome to this State.

We appreciate very much indeed your decision to hold the Convention in Queensland, but even more the splendid manner in which this Convention is attended and the very large number of its delegates present to-day, and we regard it is a very great compliment indeed that so many of you have travelled such long distances to be present. I hope your stay will be a pleasant one and assure you that it will be a pleasure for us to do anything that we can to add to your comfort and enjoyment and ask you not to hesitate to make known any wishes, desires or needs that you may have, as anything that we can do to assist you will be regarded by us as a very great privilege.

Custom, even in so young an organisation makes itself felt and precedents are quickly established, with the result that an item now regularly appears on the agenda sheet labelled "Address by President." Perhaps you will accept that as my excuse for talking, and your consolation for listening to me for a few minutes this morning. First of all I should like to thank the officers and members of the Federation for the help which they have given to me as President, and for their very great kindness which has made my presidential year such a pleasant period. Particularly I want to express my appreciation of the work of the vice-presidents, who have not only carried a considerable portion of the burden, but who have always been ready and willing to assist and to co-operate with me in every possible way; also the secretaries.

I have attended a good many of the Sydney executive meetings as well as a number of Conferences in that city—have twice visited Canberra, but unfortunately have not been able to visit Melbourne as frequently as I would have wished, nor have I been able to visit the other States, and for this I express my regret to our interstate friends.

All the meetings over which I have presided have been most harmonious; in fact, when thinking of our past history, I have sometimes wondered if we are not getting a little too respectable, but there is no doubt that the industry is growing up and that that fact is reflected in our meetings.

Mr. J. B. Chandler, Ex-President of the Federation.

Agents Repudiated Agreement.

I DO not intend to cover the work of the past year; that is dealt with in the secretary's report, but I think that perhaps it is a source of some gratification to know that we have won two law cases and that our Record Agreement is completed for a period of five years. To me, it is equally a matter for regret that our negotations with the advertising agencies culminated so unsatisfactorily. A great deal of time was spent both by the vice-presidents and myself on the question of accreditation, and to say the least it was disappointing to feel that after having completely accepted the scheme, the agents should at the last minute have repudiated the arrangements. The question of security of tenure I will deal with later. Particularly encouraging is the fact that almost every commercial station in the Commonwealth is now a member of the Federation; of the 89 stations mentioned by Mr. Brown over 80 are members.

Probably few of us who were associated with broadcasting in its early days ever imagined the size to which it would grow and the tremendous force which it would develop in such a short space of time. Perhaps even now we may not fully visualise the future which is ahead. But perhaps quite equal in importance with our own development and growth, is the development in other industries which broadcasting has made possible. There are now one million licensed radio receivers in the Commonwealth, which means that allowing for replacement, many more than that number—perhaps twice that many have been sold. A conservative estimate of the sales value

Commercial Broadcasting Stations 1937 Convention *(continued)*

of those receivers in the hands of the public would be from £30,000,000 to £50,000,000; probably 90 per cent. of those receivers have been made in Australia. To-day no receivers at all are imported, and we now have scores of factories employing thousands of people in the manufacture of radio receivers, which, without broadcasting would be utterly impossible. Whether or not there should be some closer co-operation between the manufacturers of receivers and broadcasters is a matter which we might well consider at this Convention.

But this is not all—there is scarcely any other industry which has not benefited to a greater or lesser degree by means of broadcasting. Manufacturers and merchants have been enabled to reach out and make almost personal contact with customers and prospective customers by their tens of thousands. There is scarcely a marketer of any product or commodity who has not been able to extend his operations and increase his sales through this new medium of "audible sales building," and next to tariff or other protection, this has probably played the most important part in the tremendous development which has taken place in our general manufacturing industries. When we consider that this has taken place during the worst depression period, is there any doubt but that the contribution of broadcasting must be reckoned as one of the greatest contributions made by any industry to the stabilisation and rehabilitation of the Commonwealth during one of the worst crises in its history?

But when you think that insofar as commercial broadcasting is concerned, all this has been accomplished in spite of regulations and restrictions which limit its usefulness, with no assurance of continuity, no protection for either capital or enterprise and the knowledge that its whole existence might depend upon the favour of a Government or the whim of a politician, I believe you will consider me right in saying that the achievement is astounding.

Federal Government's Promise.

FOR we still have no charter. Fortunately some progress has been made in this direction, and it has been laid down as an item of its policy by the present Government to give us at least some form of that security which we seek, and it must be our aim to have this promise implemented at the earliest possible date. If during the coming year we can secure this charter, the Federation will not only have more than justified its existence and demonstrated its usefulness, but also the truth of the old adage "United we stand, divided we fall."

The question as to the terms and conditions under which security of tenure will be given us must receive our most careful thought and attention. We must not rest content with the thought that the attainment of continuity of existence is in itself enough, or all we need. In spite of our progress, our development, our service to listeners—perhaps in some cases even because of these—the commercial services are still regarded as the "Cinderella" of broadcasting.

Members of this Federation cannot afford to sit idly by with restrictions on their power, duplications of their wave channels and limitation upon their opportunity for service while a heavily subsidised rival is allowed full and unfettered freedom. I am in no sense attacking the national service; rather I welcome its advancement, believing that the greater the development of all broadcasting services, the greater the good to the industry as a whole, but I do say that the services which the commercial stations have rendered to broadcasting in this country do deserve the recognition of equality of status, and that the commercial stations are entitled to be regarded not as stepchildren but with the national service as equally honoured and cherished members of the one family by the parents who gave them birth.

Let us not delude ourselves. The number, the power and the revenue of the national stations are rapidly increasing. Greater coverage, greater penetration and greater spending power must have its effect, just as the constant dripping wears away the stone, and unless we are able to keep pace it seems likely that our influence and popularity must gradually diminish.

I can see no reason why the two services should not operate side by side on a perfectly equal basis, and believe that it would be very much to the good of both services and of the listeners that they should be allowed to do so. I suggest you give consideration to this thought during the Convention.

Important Racing Case.

You must make a decision in the racing case, either to retire gracefully or to fight determinedly. I feel that in the interests of the industry, as well as in fairness to the station most directly concerned, the Federation must support the case to the finish.

Proposals will probably be put before you involving an alteration in the constitution so as both to limit the individual liabilities of members and to enable the Federation to function better as a corporate body, and the suggestions appear to have considerable merit. If the commercial stations wish gradually to establish their own sources of supply, as for example in copyrights, it is very essential that you have an organisation that can function as a complete entity which might well co-operate with similar associations abroad, and ultimately establish very valuable libraries and other essentials.

But this Convention will not be completely successful unless in addition to the setting out of our own desires and planning the achievement of our own ambitions, it also assists us in the realisation of our responsibilities and the better discharge of our obligations to the public. It is fitting for us to remember that as owners of broadcasting stations, we are guardians or custodians of one of the world's greatest forces for good or evil. It behoves us to give careful consideration to any suggestion either for the better use, or the prevention of abuse of that power which is placed in our hands. Stations are not wholly free from blame in this respect, particularly with certain types of advertising being broadcast.

If, in the course of our discussions, suggestions are made which appear to limit or control our individual liberty, let us remember that as the price of security is eternal vigilance, so the price of freedom from interference by constituted authority in this industry must be the application of constant and rigid self-discipline.

Licence to Serve.

IF this Convention teaches us to regard the possession of a broadcast licence, not merely as a passport to profits but as a means and opportunity to serve, in the honest belief that "he profits most who serves best," it will not have been held in vain.

In the course of our business there will be many matters to discuss and many points of view. It is good that there should be difference of opinion. Whatever subject you discuss I ask you to state your opinions fearlessly and if you will, forcefully, but at the same time in a spirit of friendliness and sweet reasonableness.

May your deliberations be guided by the thought of not so much "what can I get," but "what can I give"; not so much by "what profits me most," but by "what is best for the industry as a whole," believing that from all benefits accruing to the industry, we each must receive our share, and may your discussions be tempered with such tolerance, courtesy and consideration for each other as befits the chosen representatives of the world's greatest entertainment industry—"broadcasting."

Opening of Convention.

The Convention was opened officially by H. P. Brown, Esq., Director-General of Posts and Telegraphs, by landline.

Admission of Members.

Stations 2KM and 4VL were admitted to the Federation.

It was ruled by the president that provided a station made application to join the Federation, it would be eligible to be represented at the Convention on the 10th inst.

Advice was received by the chairman that the following Tasmanian stations had decided to join the Federation:—7LA, 7BU, 7QT, 7DY, and they asked that a proxy at the Convention be held by Mr. Brooker. It was agreed to communicate with these stations, expressing satisfaction at their decision to become members.

Commercial Broadcasting Stations 1937 Convention *(continued)*

President's Address.

The chairman addressed the meeting, covering the activities of the Federation for the past year, and outlining problems to be dealt with in the future and, in addition, welcoming delegates to the Convention. The president's address is reproduced herewith.

Administrative Arrangements for 1938

The following resolution was submitted to the meeting:—

The Federation being of the opinion that for obvious reasons it is desirable in the interests of its members that it should constitute itself into a registered body, resolves:—

"That the president and vice-presidents for the time being are hereby appointed to collaborate with the Federation's legal advisers and such other persons as they may consider advisable, and to proceed with all expedition to take the necessary steps to form the association into a properly constituted legal body under such appropriate Act or Acts as they, in consultation with the said solicitors, shall decide, with the object of, inter alia:—

(1) Providing that the liability of members is limited.
(2) Indemnifying members in respect of any action, etc., taken by them on behalf of the registered body.
(3) Securing to members all the advantages of unity of action to protect them in all matters affecting their interests within the limits already determined by the Federation and existing at the present time, and as may be altered or varied from time to time by the registered body at annual meetings or conventions.
(4) Providing a scale of annual contribution which for the first year shall be decided at this Convention with the right to make a levy of a like amount upon members in such year, provided further that the basis of contribution and levy may be altered by annual meetings or conventions.
(5) Providing for alterations of Rules and/or Articles at specially called meetings or conventions.

And that all members present or represented at this Convention hereby agree to become and be members of such legally constituted body and be bound by the Rules and/or Articles and Memorandum of such body."

In support of the resolution it was pointed out that it was necessary for the Federation to be placed on a permanent basis in order that it could enter into negotiations on behalf of members and also to ensure that the liability of all members would be limited.

While members generally were of opinion that the objects of the resolution were essential to the future of the Federation, it was felt that, in a body such as the Federation, it was essential that each member should know the principles of any alterations proposed to the rules before being committeed to their acceptance. The following resolution was agreed to:—

"That a constitution sub-committee be set up by this Convention to draft a constitution, and that the sub-committee report back to the Convention."

Mr. D. Worrall, Federation President.

The committee was appointed, comprising Messrs. Paddison, Griffin and Anderson.

At a later stage of the proceedings, the following resolutions were agreed to:—

1. That steps be taken to register the Federation as a limited liability organisation, either (a) under the Trade Union and Friendly Societies Acts, or (b) as a company limited by guarantee.
2. That the executive be instructed to collaborate with the Federation's legal advisers and such other persons as they may consider advisable, and to proceed with all expedition to take the necessary steps to form the association into a properly constituted legal body under such Act or Acts as they, in consultation with the said solicitors, shall decide.
3. That the existing constitution be recast and amended to incorporate the following amendments:—
   (a) Change name to Australian Federation of Commercial Broadcasting Stations.
   (b) Limit membership to commercial broadcasting stations.
   (c) Add new Clause "g" to secure to members all the advantages of unity of action to protect them in all matters affecting their interests.
   Add new Clause "h" to provide for development and increased activities of Federation, e.g., cricket services, musical libraries, etc. (to be fairly wide).
   (d) Delete present Clause "4" and substitute suitable clause to allow Federation to function for members as party to contracts.
   (e) Clauses 5 and 6—stet.
4. That the existing regulations be recast in conformity with registration requirements, and the following amendments to be incorporated, and in addition, necessary consequential alterations to be made.

   (a) **Membership.**
      (i) Eligibility limited to holders of operating commercial broadcasting stations.
      (ii) All applications to be approved by State executives.
      (iii) Resignations to be subject to three months' notice in writing.
      (iv) Members may only be removed from membership by resolution of Convention.
      (v) Members are not partners and not in any way liable for each other.

   (b) **Contributions and Calls.**
      (i) The Convention shall annually determine the aggregate amount required from membership fees for financing Federation during ensuing twelve months.
      (ii) Individual contributions shall be in accordance with scale determined by executive.
      (iii) The council shall have power to make a levy or levies upon members during any year up to a total aggregate amount equivalent to the membership contributions, but an additional levy may be made by Convention or two-thirds majority of a postal vote.

   (c) **Control of Federation.**
      (i) The governing body of the Federation shall be Convention.
      (ii) Representation at Convention shall be on present basis.
      (iii) The policy of the Federation shall be determined by Convention or by postal vote of members.
      (iv) Convention shall have power to delegate any of its powers to any council, committee, or sub-committee for a specific purpose and to rescind such delegation.

   (d) **Management of Federation.**
      Present method of constituting council, Federal and State executive committees to be retained to implement policy laid down by Convention, and to manage the affairs of Federation.

The Constitution of the Federation as drafted here is provisional only. The amended Constitution is published later in this YEAR BOOK—(See index).

Commercial Broadcasting Stations 1937 Convention *(continued)*

(e) **Office Bearers.**
Election of office bearers—as at present.

(f) **Paid Officials.**
(i) **Administrative:** Appointment, removal, remuneration and conditions of employment to be governed by Federal executive.
(ii) **Auditors:** Provision for appointment of auditors to be made at Convention.

(g) **Amendment of Constitution.**
(i) Notice of amendment to constitution must be in the hands of secretary six weeks prior to Convention.
(ii) Notices of proposed amendments to be circulated by

Mr. C. F. Marden, Metropolitan Vice-President of Federation.

secretary and be in the hands of members at least a fortnight prior to Convention.
(iii) Amendments to constitution require 75% vote in favour.

Control of Broadcasting.

This question was fully discussed, particularly in relation to the promises of the present Federal Government that a Board would be established to deal with such matters as the issue of licences, etc. The following resolutions were agreed to:—

"That the policy of the Federation in respect to the appointment of a Board to regulate commercial broadcasting be as follows:—

(a) 1. That a Board be created by Act of Parliament to regulate all commercial broadcasting in Australia.
2. The Board shall consist of three members, viz.: The chairman (to be a man with legal train-training) and two other members, one having technical knowledge nominated by the Postmaster-General's Department and one nominated by the Australian Federation of Broadcasting Stations.
3. The period of appointment of Board to be:
Chairman—7 years.
One member—5 years.
One member—3 years.
and thereafter the appointments shall be renewable for terms of 7 years.
4. The Board shall hold its meetings in public and interested persons shall have the right to appear before the Board and submit evidence; also shall publish its reports.
5. The Board shall renew licences subject to licencees having maintained satisfactory service and observed the regulations (the regulations in the form of statutory rules to be framed by the Board).
6. The expenses of the Board shall be met out of listeners' licence fees.
7. The allocation of all frequencies other than those specified herein for National purposes shall be made by the Postmaster-General's Department, only after agreement with the Board. The Board shall have power to:
(a) Issue licences for commercial broadcasting and television.
(b) Review licences.
(c) Fix wave lengths and power.
(d) Make regulations to give effect to same.
(e) Arbitrate on all disputes of a general nature between commercial stations as a whole and/or other organisations, bodies or individuals, and to determine the issue within the limits of legislation concerned.
8. Appeals against decisions of the Board shall be to a select committee set up by Parliament.

(b) That a letter be sent to the Prime Minister and the Leader of the Country Party drawing attention to their election promise and asking them to put the proposal into effect as soon as possible on the lines of the Convention decisions, and that a copy of the letter be sent to all other members of Cabinet.

(c) That the executive committee be instructed to do everything possible to press the matter forward.

Use of the Term "Commercial Station."

The following resolution was agreed to:—

"That the Government be requested to ensure that, in all future legislation and regulations affecting this industry, the term 'Commercial' to be used instead of 'B Class.'"

Dual Wave Lengths.

The following resolution was passed:—

"That this Convention records with regret that since May, 1936, when the P.M.G. promised the Federation's representatives at Canberra that, pending a decision by the Commonwealth Government on the requests by the Federation for security of tenure and a Board to administer certain aspects of commercial broadcasting, not less than 16 licences involving wave lengths have been granted. The Federation therefore again expresses its objection to further allotments of duplicated wave lengths until the Board proposed to be set up by the Government is operating."

A.P.R.A. Agreement—Classification of Stations.

The following resolution was agreed to:—

(a) That a committee be set up to enquire into the question of classifaction of stations with a view to arriving at an equitable formula

Mr. G. H. Anderson, Country Vice-President of Federation.

for payments to A.P.R.A., and report to the Convention in 1938.

(b) That the committee comprise four members.

(c) The following were appointed to the committee: Messrs. Anderson, Yeldon, Fairhall and Paddison.

Vocal Items for Musical Plays.

The following resolution was agreed to:—

"That the previous decision that members be asked to refrain as far as possible from using those vocal items for which a charge of 3/- is made be re-affirmed."

Copyright Act.

The following resolution was agreed to:—

"That it be an instruction to the executive that, if and when, the Statute of Westminster is passed by the Federal Parliament, steps be taken to urge the Federal Government to amend the Copyright Act to provide for compulsory arbitration in disputes on copyright matters.

Mechanical Copyright.

The Secretary-General gave a resume of negotiations which had taken place with publishers regarding copyright, and it was noted by the Convention that these negotiations had not been completed, and that they were being continued.

International Copyright Convention.

It was reported to the Convention that no date had yet been fixed for this Convention, and that the initiative in calling the Convention was in the hands of the Belgium Government so that it was not possible to force the position from Australia. It had been suggested by the Solicitor-General that the delay in convening the meeting was to some extent due to anticipated legislation in U.S.A., which, if it was passed, would enable the United States Government to participate in the conference.

Commercial Broadcasting Stations 1937 Convention *(continued)*

Musicians' Award.

The Secretary-General gave a resume of discussions which had been held with the secretary of the Union, and also with representatives of the Broadcasting Commission, regarding the rates in the award for musicians engaged for broadcasting performances. As the present award had been made before the requirements of commercial stations were known, it was decided that the Federation would apply for a variation of the award with a view to obtaining conditions more suitable to commercial broadcasting stations.

Professional Radio Employees' Institution.

(a) City Station's Award.

It was pointed out to the Convention that, as the present award was made for one year only, it was open to any station to suggest variations which could be brought before the Court. It was considered that there were a number of anomalies in the present award, and it was agreed that members would send to the Federation for consideration by the executive, any variations which they would like to have embodied in the award so that an application to the Court for variation might be considered.

It was also agreed that members would be asked to send to the Federation any claims associated with the award which they might receive from the Union.

(b) Log Served on Country Stations.

The following recommendation at the country stations' meeting was agreed to:

"That the proposals of the committee as circulated to country stations be adopted, and that all country station members be asked to be parties to the counter log."

News Service.

The Secretary-General summarised the negotiations which had taken place both with the Australian Newspaper Conference for local news service and Australian Associated Press for cable service. This question was discussed very fully, and it was apparent that it would be impossible to obtain any unanimity among members for a news service to be arranged as a Federation matter.

The following resolution was agreed to:—

"That the matter of a news service be referred back to the executive with a request to negotiate an agreement suitable for individual stations, but not to contain any clause which would be in any way binding on non-participants."

Race Broadcast Case—Appeal to Privy Council.

The question whether the Federation should oppose the application by the racing club to the Privy Council for leave to appeal against the judgment of the High Court of Australia, was fully discussed. It was pointed out that, if the Federation did not appeal it would lose the case by default and would probably have judgment entered against the Station 2UW for costs, in which case the Federation would be liable for several thousand pounds. On the other hand, if the Federation decided to oppose the appeal the costs would be approximately £1,500, apart from any expense involved in sending counsel from Australia, but it was considered that there was every reason to expect, in view of the previous judgments, that the Federation would be successful. On the question whether counsel should be sent from Australia, it was pointed out that the racing club had thought it worth while to take this course and that the amount, quite apart from the principles involved, was sufficiently important to warrant the Federation also sending counsel, who would be fully aware of the act that had been taken in the Australian Court, and would, therefore, be in a position to assist senior counsel in England in the preparation of a suitable defence. The following resolutions were adopted:—

"That the Federation proceed with the case, and that a levy be called to finance the matter.

"That the whole arrangements, including the question of leading counsel, be left in the hands of the executive committee."

Accreditation of Service Agents.

The chairman gave a brief history of the negotiations which had taken place with the National Council of Accredited Agents, following upon the decision of the last Convention to establish a Federal Accreditation Bureau.

The following resolution was adopted:

"That the Advertising Agents' Association be advised that if it still desires an accreditation scheme, the Federation is willing to implement at any time, the scheme already prepared and circulated."

Following upon the decision reached regarding commission to service agents, the above decision was amended to embody the alteration in the reduction of commission as from 1st January, 1938.

Commission to Service Agents.

The following resolution was agreed to:—

That, as from 1/1/'38, the rate of commission on all new contracts will be:—
Sponsored sessions, 12½%.
All forms of direct advertisements. 10%.

Recommendations of Country Stations

The following resolutions of the country stations were approved:—

(a) **Landline Facilities.**
That stations be asked to supply to the Federation full details regarding disabilities experienced with landlines with a view to taking the matter up further with the Postal Department.

(b) **Rates for Transmission of News.**
That commercial broadcasting stations be granted the same facilities and rates as newspapers for the transmission of news, that such news be permitted to be broadcast at any time, and that the Postmaster-General be approached with a view to putting this resolution into effect.

Broadcasting of Advertisements in Conflict with State Laws.

Consideration was given to a resolution of the country stations meeting that counsel's opinion be obtained as to the legal position of broadcasting stations in accepting advertising for lotteries in States other than New South Wales, and the effect of the present wireless regulations that stations must accept advertisements on an equal basis without discrimination. It was pointed out by members that there were other matters excepting the question of lotteries which were similarly affected, and the following resolutions were agreed to:—

(i) That counsel's opinion be sought as to the legal position of broadcasting stations accepting advertising where State prohibitions apply and the effect of present Commonwealth wireless regulations that stations must accept advertising on an equal basis without discrimination.
(ii) The fact that legal opinion is obtained on the question will not involve the Federation in any obligation to defend any action arising out of this opinion.
(iii) That this resolution be sent to stations with copy of the opinion.

Censorship of Recorded Announcements, Length of Advertising Copy and Patent Medicine Advertising.

The following resolution was adopted:

(a) That representatives of stations in each capital city confer with advertising agents and recording companies with a view to instituting some method of controlling recorded announcements.

(b) That at the same time, length of advertising copy and patent medicines advertising be discussed.

Patents.

A letter was read from Standard Telephones and Cables Pty. Ltd., suggesting the matter of patent licences be discussed at the Convention so that a policy for the renewal and issue of licences might be given consideration. The following resolution was adopted:—

"That this matter be referred to the executive committee for consideration

(Continued foot of Page 35.)

Interesting Angles on Copyright Law In Book Broadcasting Case

The salient facts about "the book case" (T. S. Gurr v. 2KY Broadcasting Station) are now mostly known to the broadcasting industry as the case was heard in Sydney in November and December, 1935, but in view of the fact that the presiding Judge, Mr. Justice Davidson, presented to the jury of four such a comprehensive summing up of the case, touching upon the copyright implications referred to during the hearing, it was thought that publication here of the greater portion of His Honour's summing up would prove of general interest to the industry.

This does not purport to a complete report of the Judge's summing up, but every endeavour has been made to give those portions which, in general use, refer specifically to questions of copyright. The finding of the jury was not challenged by appeal to a higher jurisdiction.

THE case was one in which Mr. T. S. Gurr claimed £250 damages from 2KY Broadcasting Station, alleging that without his consent, he being the proprietor of the copyright of a book called "White Man, Brown Woman," the defendant station broadcast a substantial part of it as a result of which the sales of the book were diminished and its reputation injured. There was a second count that the defendant permitted a place of entertainment to be used for the performance in public of the work.

Station 2KY pleaded not guilty, and set out it was not an individual firm or corporation within the meaning of the Business Management Act, 1934, denied the plaintiff was the proprietor of the copyright as alleged, and claimed that it had no reasonable ground for suspecting that the alleged performance would be an infringement of the alleged copyright.

Regarding authorship of the work in question it was disclosed that a Mr. T. L. Richards was co-author with Mr. Gurr.

In returning a verdict on both counts for the plaintiff for £30, the jury answered specific questions.

Did the defendant perform a substantial part of the plaintiff's work in public?—The defendant performed a sufficient portion of plaintiff's work in public to constitute a breach of the Copyright Act.

Did the defendant permit for private profit to the defendant a place of entertainment to be used for the performance in public of a substantial part of the plaintiff's work?

The jury substituted "portion" for "substantial part" and answered, Yes.

If so was the defendant aware that the performance was to be an infringement of plaintiff's copyright?—No.

Had the defendant reasonable ground to suspect that the performance was to be a breach of copyright?—No.

Summing Up.

In the course of his summing up, Mr. Justice Davidson said that the cause of action which had been submitted by the plaintiff was a somewhat novel one in these Courts. It was usually tried in another jurisdiction; but the issues were important to both the parties, and he had no doubt that the jury would try them accordingly.

HIS Honor continued: The plaintiff is seeking damages from the defendant, 2KY Broadcasting Station, on the ground of what is called a breach of copyright. He put his case in two ways; first of all charging that the defendant performed a substantial part of the work in which he is the owner of the copyright; and, secondly, that the defendant permitted for private profit a place of entertainment to be used for the purpose of publishing within the meaning of the Copyright Act a substantial portion of this same book. It will be necessary for you to examine those two causes of action separately on the lines which I will indicate to you, and at the end of my summing up I will ask you if you will be good enough to find a verdict on each of the counts separately. It will be possible for you to find for the plaintiff on one or other of the counts, or only one of them, or to find both of the counts in favour of the defendant, or to find one or either of them in that way.

In the first place it is necessary for me to mention to you shortly what is the nature of a copyright. That class of property has been the subject not only of legislation but of international agreement. In order that authors might be protected in regard to the product of their brains, a convention is held from time to time amongst the various civilised nations in which they arrange that legislation shall be passed in each country in order to give effect to certain terms agreed upon. That legislation so far as it relates to Australia has been put in force by the Commonwealth Parliament, and now appears in the Act of 1912, parts of which have been referred to during the progress of the case. The person who is the author of a work is prima facie entitled to the protection of what he produces when certain conditions are complied with. You need not be bothered with any of those conditions, because the statute provides that prima facie the author is the owner of the copyright, and provision is made for assigning it if he chooses to enter into such a transaction. However, there is nothing of that kind here which need trouble you so far as ownership of the copyright is concerned. There is a provision under the Act for registration of ownership of copyright, but it is not essential. Apparently the ownership of the copyright in the book which has been mentioned in this action has been registered, although it is said the registration took place subsequently to the commencement of this action. When the author of a work complies with the provisions of the Act and is the owner of the copyright it is said by the statute that he has a proprietary right similar to that which he has in other types of property, and if anyone interferes with that right he is given certain remedies. One of those remedies is to come before you, as the plaintiff has done, to ask for damages in respect of any wrong which he complains of and is proved by him in respect of his copyright in the particular work which he submits. The statute says copyright will only exist in original work. No point has been raised here as regards the originality of this book—"White Man, Brown Woman." The law on the subject is that very little is required in order to establish originality. It has been said that only some degree of individual labour, judgment, literary skill, or taste is sufficient to provide the necessary requirements of the law as to the book being an original literary work. It seems to me as a matter of law that the book in question here does comply with those necessary requirements so far at least as to show that it is capable of being properly the subject of copyright. I do not think, therefore, that you will have much difficulty with that part of the case, nor I should think as to the ownership of copyright. Some question arose during the hearing as to whether one of two authors could maintain an action, and as a matter of law I ruled that he could. Consequently you will not be troubled with anything in that respect.

Book Broadcasting Case *(continued)*

THE matters which you will have to consider are, firstly, whether the defendant, 2KY Broadcasting Station, has wrongfully, without the consent of the plaintiff, performed a substantial part of the plaintiff's book by broadcasting it. So far as broadcasting copyright in a work is concerned, that matter was the subject also of a legal argument, and, having regard to certain authorities which were submitted to me, I ruled that the action could be maintained on the ground of performing without consent a copyrighted work if that performance were done by means of broadcasting. Consequently again you need not concern your minds with that subject.

"Substantial Part."

One of the important factors which you have to determine is whether there was a performance in breach of copyright of a substantial part of this work. Counsel for the defendant you will remember referred to circumstances to which I will have to make slightly fuller reference later on, in which one person who is not an owner of the copyright in a book may without consent criticise or review it, or quote reasonable extracts. When the amount which is so repeated, however, reaches a certain degree it may become a wrongful use of a substantial part of the copyrighted work. The test which you have to apply in that respect is that whilst the person may take use of a book by way of making a reasonable extract from it by way of quotation or by using it as an authority, if he uses so much that the value of the work is sensibly diminished or that the labours of the authors are substantially or to injurious extent appropriated, then it is sufficient to constitute a piracy or an infringement of the copyrighted work. You will have to consider then whether the defendant here during this broadcasting used such a portion of the work as to sensibly diminish the value of the work to the plaintiff, or to such an extent that the value of the labour of the author and the owner of the copyright were substantially or injuriously decreased by that performance. So far as concerns the second alleged cause of action, as set out in the second count of the declaration in which the plaintiff is compelled by law to specify what his complaints are, the plaintiff complains of the defendant permitting a place of entertainment to be used for the performance of this work. The first question that arises under that heading is whether the defendant permitted anything. You might remember that certain authorities were referred to during the course of the argument, where it was decided in effect that if a person let a public hall to somebody who was going to a perform a work, even if the lessor of the hall happened to learn that there might be an infringement of somebody's copyright by, say, the singing of a song there, nevertheless if that lessor did nothing but merely remained passive it would not be sufficient to show that he was permitting the use of the place for the performance of the work within the meaning of the Copyright Act. It appears to me, however, that under the second count of the declaration there may be a permission sufficient to satisfy the requirements of the law if a person who is allowing his room or premises or his broadcasting machinery to be used for reward actually takes part in the performance himself. But under the second count in order to succeed the plaintiff has to go considerably further and has to prove not only that the defendant permitted the use of the place of entertainment, but also that he was either aware—that is, that he knew that the matter which was being published was in breach of copyright, or he must have had reasonable grounds for suspecting that such would be the case. So far as reasonable grounds for suspecting may be concerned, what is reasonable is what would appear such to the mind of the ordinary careful and prudent man in all the circumstances. If the ordinary careful and prudent man in all the circumstances that exist in this case would have known or would have had reasonable cause for suspecting that what was being done or was going to be done in a place of entertainment being allowed to be used would be an infringement of copyright, he would bring himself within the requirements of the law and he could be made liable.

Place of Entertainment.

SO far as a place of entertainment is concerned, broadcasting by wireless is in a somewhat peculiar situation. There were various people present in the broadcasting station. It is said that there were three, I think, and that there were fifteen somewhere about the premises. There was also a loud speaker in the studio by means of which some people at least outside that room could hear. However, that is not the real matter which is complained of by the plaintiff, rather his complaint is that by the broadcast large numbers of the public who have receiving sets were placed in the position of being able to hear what took place in that studio during the broadcasting. It has been decided by the Courts that in such circumstances there may be a performing of the work in public. What happens is that certain ether waves by means of machinery and its use by the actual broadcaster are put in motion so that then they are picked up by properly tuned receiving sets used by the public. Possibly such a thing was not contemplated when leg-

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of the patents situation as far as transmitters are concerned."

Application for Increased Duties on Locally Processed Discs.

It was reported that an application had been made for increased duties on locally made dics. It was decided that the Federation should be represented at the hearing of this application by the Tariff Board, and that a case would be presented in apposition to increased duties.

1938 Convention.

It was decided that the next Convention would be held in New South Wales, the place of meeting to be left to the State executive to decide.

Election of Office Bearers.

The following office bearers were elected for the ensuing year:—

President: Mr. D. T. Worrall.

Vice-Presidents:

Senior Vice-President: Mr. C. F. Marden.

Melbourne Vice-President: Mr. S. Morgan.

Vice-President representing Country Stations: Mr. G. H. Anderson.

Eulogistic references were made to the work of Mr. Chandler as president, and Mr. Chandler responded suitably. Mr. Worrall was congratulater upon his election and thanked members for their expression of confidence in him.

Hospitality of Queensland Stations.

The following resolution was agreed to:—

"That this Convention places on record its very keen appreciation of the generous and effective manner in which the Queensland representatives have entertained delegates. The arrangements made have been greatly appreciated, not only on the part of delegates, but also by the ladies accompanying them."

It is particularly recorded that the courtesy and ability of Mr. and Mrs. Chandler be specially noted.

Mr. Robertson responded on behalf of Queensland stations.

It was also decided to write letters of appreciation to the Mayor of Southport and the manager of Condong Sugar Mills.

Secretarial Arrangements for the Convention.

A motion of appreciation for the secretarial arrangements was recorded.

Book Broadcasting Case *(continued)*

islation dealing with the matter was passed, but the authorities dealing with these matters have held that it is sufficient to constitute a public performance. Consequently, when a studio is suitably fitted up to enable these ether waves to be employed by broadcasting machinery and the use of the microphone, it seems to me it can be brought within the terms of the section. Consequently, you have to look at the matter from two points of view; firstly, was there a performance of a substantial part of this work? If so, it would appear the defendant might be liable in damages; secondly, you have to consider whether under the second form of action alleged there was a permitting without the sanction of the plaintiff by a hirer of a place of entertainment such as his studio for the performance of the work in public to the extent of allowing it to be broadcasted among members of the public. In such circumstances you would have to go further before you could make the defendant liable, and you would have to find against the defendant first of all that it either knew this copyrighted work was being performed by publication over the wireless, or it must have had reasonable ground in the sense I have mentioned of suspecting that it would be so performed. The onus or burden of proving those matters lies on the plaintiff; that expression means that he has to furnish you with just that amount of evidence which will satisfy your minds on those issues which I have mentioned. If it leaves your minds evenly balanced on the subject then he should fail, and the defendant should have a verdict. Consequently, you have to consider first of all two matters, namely, whether there was a performance, and whether that performance was a substantial part of the copyrighted work if you think that is an original work, and I should imagine you would have no difficulty on that subject.

SO far as performance is concerned, the broadcast company itself did not by any servant of its own actually speak through the microphone. They made a contract with Mr. Dempsey, who broadcasts under the name of "Good-oh," giving him rights of using their broadcasting machinery throughout certain periods. During the time so granted to him he had the power to issue advertisements for which no doubt he would have contracts with other people, and he has told you that in order to fill up the whole of his time and to get people interested so that he would have an audience for his advertisements he gave talks on various subjects. Consequently, he would not be a servant of the broadcasting station. It might then occur to your mind how the defendant, 2KY Broadcasting Station, would become liable when it was not actually setting the waves in motion by voice through a servant of its own. It appears to me that the law is that if one person assists another and takes part with another in doing something which constitutes a wrong to a third party, then the former is in the same position as if he had done it himself or by his servant; he is taking part in the actual act which does the wrong. A decision on that subject was given by the Supreme Court in Victoria dealing with this very subject of broadcasting; Cussen, J. said, "It is well settled a man is liable for wrongful acts which have been done according to his command or request. Infringement of a copyright is an infringement of a proprietary right, and the transgressor may be not only he who does the act but he who procures it to be done or assists or aids in doing it." Consequently, what is suggested to you here is, and I think correctly so far as the law is concerned, that if a broadcaster assists in the actual performance of the work by means of distribution on ether waves to the public of copyrighted matter, he is himself doing something which is a wrong and is liable to be sued in respect of it. So far as a substantial portion of the work is concerned, I have already mentioned what is the test in that respect, and I might add with regard to performing the work that there has been some evidence which is relevant to the matter. You will remember that Mr. Beaver who describes himself as a studio manager, on behalf of the station announced at the commencement of every one of these broadcasts that it was 2KY speaking, and also that "Good-oh" would continue his talks on "Cock-eyed history" or on the "South Sea Islands," as the case may be.

Invented Names.

THE plaintiff suggests to you that there are various matters which would indicate that what was spoken by Mr. Dempsey under his name "Good-oh," was a piracy of this book, because there were a number of subjects mentioned which could only have been taken from it is in part they were invention or were names of places which were within the peculiar knowledge of the author, or sometimes of men invented in order not to disclose the identity of the persons to whom he was alluding.

I think it would be useful if first of all I recall to your minds a number of these matters and the comments which were made in connection with them, and then that I should read you one or two passages from the evidence in order to indicate what the plaintiff swore was the nature of the material taken from this book, and whether it was of such a kind as to indicate whether it was a quotation of magnitude or as to a reasonable extent. As to some of the names referred to in that book, for instance, there was Dr. Olson . . . Mr. Richards said his real name was Hurdstrom, but he had called him Olson; he says that name was used during the broadcast, which would indicate it was not something which was based on the ordinary knowledge that any other person would have, seeing it was mere invention on the part of the authors. Similarly, there was "Big Bill," the character who was referred to as having taken part in the expedition to Malaita. Both those names, however, Mr. Dempsey denies having used at all. Another name used was that of Tom Wilson, and some comment was made in connection with it, because it was said that Mr. Richards was asked did he know Tom Wilson and he replied that he did not, and he was afterwards asked whether this man might not have other friends who would call him "Tom." You might remember the reply was that other friends did not call him Tom; they called him Lothario. Mr. Dempsey denies having used the name at all. Then there is the incident on the Island of Mangareva. The book speaks of a tongue of fire having shot up from the lagoon. The plaintiff and Mr. Richards said they had heard of an incident of that kind, but it did not take place in connection with the Island of Mangareva; Mr. Richards said he placed the event on that island merely by using his license as an author to put it where he liked, so long as it would afford some dramatic detail. In that connection the defendant asks you to bear in mind that in the book it says that it was a rare occurence whilst in the evidence which was given in connection with this particular incident it was said that it was stated over the wireless as happening every year. Consequently either the recollection of the witness was bad or he was not told what was read, because if it was read from the book it would appear as a rare occurence. The next instance is in connection with the Island of Atiu, where in the book there was a reference to certain caves being there which were approached by a person diving through a waterfall or through water, and then finding skeletons arranged in some peculiar form, one of the skeletons being that of a giant. Mr. Richards, who was referring to that subject, said that part of it was sheer invention, namely, the diving through the water and the skeleton of a giant. He claims again that the invention was made in order to make a readable story.

Common Knowledge.

FURTHER, the Island of Mangaia in the book is mentioned in connection with there being large steps and things of that kind, Mr. Dempsey says he did not refer to Mangareva, Atiu, or Mangaia; he said he did not know of them, but so far as the subject matter with which they are connected was concerned he was dealing with the subject of volcanic eruptions and things of that kind in the islands, and he says he may have mentioned the existence of steps because it is a matter of common knowledge in connection with many islands dotted round the Pacific. Again, in regard to the Solomon Islands, Mr. Richards said that the broadcaster had dealt with incidents which happened on that group, and the witness said so far as he dealt with the facts he had elaborated them largely from his own inventive powers. Another incident of the same kind was in connection with the Island of Victoria, which the book said sank in the sea. Mr. Dempsey, so far as that matter is concerned, said he did in some of his talks refer to an island sinking in the sea, because that also was a matter of common knowledge in regard to the South Sea Islands, but he did not know of the Island of Victoria, and did not say anything about it. A good deal more was mentioned about the punitive expedition in which one of the Australian cruisers it was said had taken part at the Island of Malaita. Mr. Dempsey admitted that he did deal with that subject during his talk. He said that all the knowledge concerning it he acquired from reading books other than the plaintiff's and from information which had been given him by an officer of the "Adelaide," and also by many friends who had information to impart on the same subject. Consequently, he said that as it was a matter of general interest he only made use of all this information he had quite apart from anything published by the plaintiff, and therefore he was quite entitled to speak about it. No doubt such a position is entirely so; Mr. Dempsey was quite entitled to speak in any manner he wished about that expedition to Malaita, so long as he did not in the process make use of extracts from this book of the plaintiff to an extent which was more than a mere reference by way of authority, or which was something in the nature of an extract of some considerable importance. Another thing is the way a man named George Randolph is said to have been mentioned. Mrs. Richards spoke of that subject and said that the broadcaster announced that this talk, as she put it, was taken from the plaintiff's book, "White Man, Brown Woman." Mr. Dempsey, on the contrary, puts it in an entirely different form. He said he was discussing the same subject as mentioned in the plaintiff's book, and he said that at one stage he announced that an authority for the proposition he was stating would be found in this book, "White Man, Brown Woman," and he read it out. If this was all he did, nobody can complain of it, if he was merely quoting this as one of the authorities he was using for his talk he would be quite entitled to do so to the extent of saying, "I am making the statement, and my authority for it is this book, and the passage which I read." Mrs. Richards, however, puts the matter from an entirely different point of view, and says that he said, "This talk is being taken from the book 'White Man, Brown Woman,'" and he then went on to read large portions of it. The name George Randolph, which is mentioned, is stated by Mr. Richards to have been really that of a man named George Randolph Hobbs, and he says he only used the two names in order not to mention the person in a form which might be recognised by the person who bought and read the book.

TENRHYN Island was another of those places complained about as having been read of in words which seemed to come directly from the book. In connection with that particular locality the witnesses said the broadcaster spoke of Tom Wilson and his visit to Auckland, where this particular identity was spending all his time riding on the trams and even on a steam roller, because he had spent all his life on the island, and had not seen them before. There was also a reference to his acting as a general factotum on the island, and that when giving advice to people who were sick he always recommended Epsom salts. Mr. Richards says those things were just sheer invention on his part.

One incident complained of was in connection with Palmerston Island. It dealt with descendants of mutineers of the "Bounty." There can be no doubt that the facts relating to the Mutiny of the "Bounty" have been dealt with in a number of other books; they are also mentioned in the plaintiff's books, but the plaintiff admitted that the broadcaster or anybody else could have got from various sources all the information about Palmerston Island and about the Mutiny of the "Bounty" which he had mentioned himself.

(At this stage his Honour dealt at some length with specific details referred to by various witnesses, and continued):—

I do not think it is necessary for me to go through any more of these specific details which were alluded to by the various witnesses. My object in quoting them again at some length was that you would be able to come to some determination, if you believed the witnesses, as to whether there were such substantial portions of the book taken as might reasonably be calculated to injure the plaintiff's work and thereby form the basis of an action; or whether on the contrary it might only have been the mention of some reasonable extract from the book as is claimed by the defendant in order to act as an authority for some of the propositions which were being stated by the broadcaster.

Place of Entertainment.

COMING to that charge again in the declaration which dealt with the subject of permitting a place of entertainment to be used without the consent of the plaintiff, there are one or two matters to which I must make reference on the subject of the defendant having knowledge of what was taking place or of his having grounds upon which it might reasonably have suspected that an infringement of copyright was occurring. As I have already mentioned to you, when there is some corporation being sued or some collection of individuals under a description such as 2KY Broadcasting Station, it must act by its servants; consequently it must only be bound by anything that was done by the manager who was there representing it, namely, Mr. Beaver, the studio manager. He was there in charge of the studio and it appears to me that in that capacity he would be representing for the purposes of the broadcast the broadcast station. He apparently was the one who had control over what was sent out, he appeared at the commencement of the broadcast, and it was he who was in a position to hear if he thought fit what came from the studio by means of the loud speaker which was set up there. Some mention has been made of two other officials of the broadcast station who took some part in the broadcasting, one was the control boy and the other the operator who seems to have been at French's Forest. You have had a look at the station and no doubt know a great deal more than I do of what takes place in connection with broadcasting. However, it did appear to me that so far as the actual checking of the material going out over the instrument was concerned, those two employees were rather connected with the matter of seeing that there was a proper volume of voice in the distribution. It may be as Mr. Beaver very frankly admitted that if required these officials could be used to check up on what was said by people who were speaking through the microphone, but their main work at all events really was the other matter of attending to the volume of sound in order to get a proper broadcast, so that unless their attention was drawn to the matter they might not have been able to recollect anything that was said by a person speaking on the instrument.

Reference to Book.

THERE were one or two other matters, however, which are material on that point; I have already referred to some of them. Mr. Beaver, who was the studio manager, said that he appeared at the commencement of the broadcast, made the announcement himself sometimes that it was 2KY speaking, and he says on one occasion he saw Mr. Dempsey

Book Broadcasting Case *(continued)*

with this book of the plaintiff's in his possession. He says that only occurred once; Mr. Dempsey himself, I think, said he did refer to the book twice. The plaintiff, however, if his evidence is believed, would have you understand that the book must have been there on several occasions; consequently it is an important matter for your consideration, that if you believe the evidence of the plaintiff and that the book was being referred to time after time, then if Mr. Beaver were there he may or must have been in the position of being able to see the book there in Mr. Dempsey's custody, and it might possibly be a matter for consideration whether you think that that is one of the circumstances which might lead him to have a suspicion reasonably that something was being done to make use of the book improperly. It is only a circumstance, but I think it is one of the relevant matters which you can take into account.

COMING to what the defendant submits as its defence on the action, it says that the book was only referred to on two occasions and then merely by way of quotation as an authority. If that were all, as Mr. Dempsey told you, undoubtedly he was quite entitled to do it. He was perfectly justified in giving an account of the Pacific Islands from information apart from the plaintiff's book, and then saying "Amongst other authorities I can refer to the book, 'White Man, Brown Woman,' as an authority for the statement I am now making." The defendant also contends that the evidence here would only amount to a criticism or a review of the plaintiff's book. Personally, I find it practically impossible to agree with such an argument. It did not purport to be a review or a criticism of the work, it purported to be a talk, as it was put, on the South Sea Islands. No doubt people who publish matter like newspapers very often do quote considerable passages from a book which they have under review, but they put it in a column where they are dealing with reviews of books, and when people read it they know they are reading what is a review or criticism and not something entirely different. However, the question is submitted to you that this may have been a criticism or review of the book, although it was only mentioned twice. Personally, I cannot see it, but after all the facts are for you and not for me.

Again, the defendant contended through counsel that there was only a selection of a reasonable passage or passages out of this book used by way of quotation as a reference. If that were so, it would be all right. It will be for you to say on the evidence whether it was that or whether it was something more, and was an unreasonable use of the book to an amount that was detrimental to the book and reasonably capable of causing it an injury.

ONE comes then to the position that you must find on one count or the other or on both for the plaintiff or for the defendant. If you decide in favour of the plaintiff you would have to deal with the subject of damages. In that connection you are left somewhat at large. Of course, there are various matters which would occur to you at once as being likely to cause considerable damage to an author whose book was improperly published if it could be proved that there was a diminution in the sales. No evidence has been offered on that subject at all. There is nothing upon which you can find that there had been any diminution of sales; on the contrary there was some evidence given on the subject of royalties. You now have before you a copy of the actual contract which is said to have been made between the plaintiff and his publishers in Great Britain and in the United States of America. It would appear those publishers were given a license to publish this work in book form, and on the terms that the plaintiff was to receive certain royalties. The accounts were put in evidence, and it appeared that the first one in 1932 showed a return of £50, the second in 1933 £40, in 1934 £2/11/-, and in 1935 up to March a sum of about £10.

The plaintiff, Mr. Gurr, also told you that by his contract with his co-author, Mr. Richards, he was only entitled to 25% of those royalties, that would be some evidence which might indicate to you that share which Mr. Gurr, the plaintiff, has in this particular work. He is suing on his own account, and on my ruling is entitled to do so, but in such circumstances naturally he cannot claim the whole of the damages, if there are any, which have been occasioned by the defendant to this work. He can only get his own share; he has said he is entitled to 25% of the royalties; consequently if he is entitled to damages in your opinion you must only give him anything he has suffered himself by way of damages, not what has been suffered by both of them.

Question of Damage.

DEALING with the subject of damages generally, I think I should refer you to a statement of the law which has been made by a very high authority: "Though I think there must be some damage to enforce an action for the infringement of the plaintiff's common law rights, it is enough to say the act complained of was done in such a way as to be likely to injure the plaintiff, though proof of substantial damage is not given." Consequently, you are entitled to look at these facts to see whether it was likely damage could have been suffered by the plaintiff as he claims. If he wanted to recover substantial damages one would think he would have to supply to you evidence from which you could collect such an impression. No evidence of that kind has been given, but there was one matter which I think is deserving of reference, namely, that if a person by the wrongful act of another is deprived of some chance of making profits which would flow in the natural course of events otherwise, he could claim he had some damage. Well, here if this broadcast was an infringement of his copyright then he may claim that he lost the chance possibly of having some negotiations made which would lead to himself and his publishers recovering some money for broadcasting. He may ask you to consider whether his book had not been, as it was put, vulgarised, that is, so brought before the minds of the public that they thought the book was not worth buying because they had heard most of it, or because it was broadcast in such a way as to be unfair to the facts appearing in the book, and therefore put people off buying the book. So far as that is concerned, you have heard Mr. Dempsey as to the manner in which he broadcasted the material, and I have no doubt you will be able to say whether he has done anything, if you think he has done it, as the plaintiff says, which would have the effect of vulgarising the book from the point of view of broadcasting, or whether he broadcasted such portion as would make it unnecessary for people to buy it. On the other hand, you have to remember if this book were mentioned in particular circumstances it might have the effect of acting as an advertisement; whether it would I do not know, but that is a matter you have to take into consideration in your knowledge of affairs. Looking at the whole of the matters and taking them into consideration you will come to a conclusion as to what is a reasonable amount for the infringement of copyright if you think it has occurred.

There was some reference made to details appearing in this book which are pornographic. I do not know how far one can deal with a subject of that kind. Many authors, even of the greatest renown, appear to make the treatment of such subjects part of their technique; however, you will have the book before you, and you can give it your consideration, and I will ask you to tell me whether your verdict is for the plaintiff or the defendant on the first count, for the plaintiff or for the defendant on the second count, dealing with them separately in that way. It makes no difference to damages on either count; if you find for the plaintiff at all you will have to assess some sum for damages. I should also add that counsel for the plaintiff in his opening address said he was not claiming heavy damages, he was not claiming something very substantial, all they wanted to show was that people could not infringe the copyright at their own free will.

THE RACING CASE

From N.S.W. Equity Court to Privy Council

No litigation in the history of Commercial Broadcasting in Australia aroused so much interest as that surrounding the case which has since become known as "The Racing Case." The outcome of the suit was from the very first destined to have a most important bearing upon broadcasting activities not only in relation to horse-racing broadcasts. The evidence produced before the courts in connection with the case, the wide field covered in the various judgments delivered, sets the case up as one which will probably long be quoted in legal circles on broadcasting matters.

No other comment seems necessary from the publishers of this Year Book. Hereunder will be found first the judgment of the Equity Court judge, Mr. Justice Nicholas, in dismissing the application by the Victoria Park Racing Club for an injunction restraining Sydney Station 2UW from broadcasting descriptions of races from outside the applicant's racecourse. Then the five judgments delivered by the High Court, of which three were for a dismissal of the racing club's appeal and two in favour of upholding the appeal.

The final appeal by the Victoria Park Racing Club was made to the Privy Council in January, 1938. It was dismissed with costs.

The Australian Federation of Commercial Broadcasting Stations fought the issue on behalf of 2UW, and the ultimate verdict of the highest tribunal in the British Empire established a vitally important principle of freedom for the broadcasting industry.

HISTORY OF CASE

In the first place the Victoria Park Racing Club instituted a suit in Equity to restrain 2UW and Mr. Cyril Angles from broadcasting descriptions of races run on the club's racecourse, and to restrain the owner of adjacent property on which an elevated platform had been erected, from allowing his property to be used for the broadcasts complained of. Mr. Justice Nicholas held, shortly, that no actionable right had been infringed by the racing broadcasts and he dismissed the suit. Against this decision the racing club appealed to the High Court of Australia, which by a majority upheld the decision of Mr. Justice Nicholas.

RACING BROADCAST LITIGATION

Justice Nicholas Refuses Injunction

In November, 1936, before Mr. Justice Nicholas, in the N.S.W. Court, the Victoria Park Racing Club was refused an injunction to restrain commercial station 2UW from erecting a high platform outside the racecourse, and broadcasting therefrom a description of the races being run.

After considerable evidence was taken, the following was the judgment which was subsequently released by Mr. Justice Nicholas.

THE JUDGMENT.

In this suit the plaintiff is a limited liability Company which carries on the business of conducting race meetings at a racecourse owned by it and situated near Sydney.

The defendant George Taylor is the owner of a cottage and piece of land fronting Dowling Street on the opposite side from the racecourse. On this land is erected a platform from which a person of average height may see the whole of the racing tracks, and amongst other appurtenances the judge's box, a semaphore on which the numbers of the placed horses are posted, and boards on which are shown the names of the starters and their positions at the starting barrier.

The defendant, The Commonwealth Broadcasting Corporation, Station 2UW, is a limited company licensed in accordance with regulations under the Wireless Telegraphy Act 1905-1919 of the Commonwealth of Australia to carry on the business of broadcasting as a "B" class station. 2UW derives the greater part of its revenue from advertisements, which are broadcast to listeners together with items of news or of entertainment.

The defendant Cyril Angles, with the permission of the defendant Taylor, observes each of the race meetings held by the plaintiff Company from the platform erected on Taylor's land, and describes each race by speaking through a microphone and communicating a description of the race, together with other information relating to the competitors, by means of a land line to the studio of 2UW, whence the descriptions and information mingled with advertisements are broadcast to listeners in Sydney and the surrounding districts.

The defendant Angles is an employee of 2UW and the defendant Taylor receives from one or other of these defendants a fee of £1 for each time that the platform is used for the purpose mentioned above.

The evidence tendered by the plaintiff Company may be classified as follows: Oral and documentary evidence relating to the racecourse and to the

The Racing Case *(continued)*

manner in which race meetings are there carried on, oral and documentary evidence relating to the descriptions of race meetings given by the defendant Angles and to other broadcast comments on races and race meetings from 2UW, oral evidence of persons who have listened to broadcast descriptions of race meetings by the defendant Angles through the defendant 2UW while the same race meetings were in progress on the plaintiff's course at Victoria Park.

The racecourse is oval in shape and has a straight of 2¾ furlongs in length which is longer than the average straight on the Sydney suburban racecourses. The finishing post, the judge's box, the semaphores and the boards on which scratchings and starting positions are posted, the grandstand and leger enclosure are situated on that portion of the course which is opposite to Dowling Street, and to the defendant Taylor's house. Portions of the course are visible from some of the houses in Dowling Street, and the whole of the course, as well as the stands, and posts mentioned above is visible from a sand hill on the further side of Epsom Road. It is probable that the whole of the course would be visible to an observer armed with a powerful field glass from the windows of one or more of the neighbouring factories.

I was satisfied, however, from a view which I had of the course that the most favourable point for observation was the platform on the defendant Taylor's land. From that position an observer could keep the whole of the tracks under observation and could follow the horses racing down the straight to the winning post, could observe the protest and weight flags and could decipher the numbers of the placed horses as well as the post positions and scratchings displayed on the boards.

On my own view of the course I was at first inclined to the opinion that Angles could not have seen these boards himself but must have been informed of what was displayed on them in some other way. It appears, however, from the specimen broadcast put in evidence that he did see these boards from his platform and was able to decipher them, though with some difficulty.

VARIETY OF WITNESSES.

A number of witnesses representing a variety of occupations and of degrees of prosperity were called to testify that they had abandoned a habit of attending race meetings at Victoria Park because they preferred to listen to simultaneous broadcast descriptions of these races through 2UW. Many of these witnesses were cross-examined with the object of inducing them to admit that they had stayed away from Victoria Park for some reason other than their preference for broadcasts, because of inability to pay the entrance fee or to bet, or because business had become unusually brisk on race days, or because some physical infirmity made it easier to sit at home in an armchair than to stand about on a racecourse. It was also suggested that what kept people away from the racecourse were the facilities for starting-price betting to be found in Sydney and its suburbs, or that any falling off that may have taken place in the attendance at Victoria Park should be attributed to defects in the surroundings of the course or in the standard of racing carried on there.

The impression that this evidence left on my mind was that there were numbers of persons who would have attended Victoria Park had it not been possible for them to listen to simultaneous broadcast descriptions of the races either in their own homes or in the homes of their friends or at a public-house, and I so hold. There appeared to be persons who took very little interest in horses and derived little enjoyment from the spectacle of a race, but who were addicted to betting and who found excitement and suspense in following broadcast descriptions.

TRIBUTE TO ANGLES.

For the purposes of which he is employed, Angles appears to be unusually gifted, and some of the witnesses found Angles' descriptions more instructive than a visit to the course, for, from his platform on Taylor's land and with his experience, he is better able to follow the different horses throughout the race than would be possible to a spectator on one of the stands. The plaintiff did not tender evidence to show to what extent, if any, the attendances at Victoria Park had fallen off since Angles began to broadcast, or since earlier broadcasters began to give simultaneous descriptions of the meetings at Victoria Park.

Evidence of this sort would not, I think, have been helpful in view of the many causes, such as bad weather or unemployment, to which a decline in attendances might have been attributed. Further, I did not attach importance to the suggestion made in cross-examination that the plaintiff had, on the whole, benefited through the activities of 2UW and other stations since the race meetings had been advertised by publication of the acceptances on the evening preceding the race, and interest had been maintained by a recording of Angles' description to be broadcast on the evening of the race day.

In my opinion, the best evidence to prove that broadcasting had had the effect which the plaintiff claims for it was the evidence of persons who swore that they themselves, and others to their knowledge, would have gone to the races had not simultaneous broadcasting descriptions been available to them elsewhere.

One of the facts admitted and proved, the plaintiff based its case for an injunction on alternative grounds: (1) That the acts of the defendants or of two of them—Angles and 2UW—amount to a tort which, on proof or presumption of damage, should be restrained; (2) that the publication by 2UW resulting from observation by Angles of information collated by the plaintiff, such, for instance, as the names and starting positions of the horses, or the results of the races, should be restrained as either an infringement of copyright, or a wrongful interference with the plaintiff in its business.

It was also argued that the conduct of the defendants was so unfair to the plaintiff that on that ground an injunction should be granted either to the effect prayed in the statement of claim or against disclosing the collated information referred to above. Plaintiff's counsel argued that the observation of their race meeting by Angles and the simultaneous broadcasting to listeners were the cause of persons staying away from the racecourse who would otherwise have attended, and was therefore actionable.

The defendant Taylor answered that he was using his land for a lawful purpose and that whatever the fate of the other defendants no order should be made against him. The defendants Angles and 2UW answered that they were carrying on a business which was as lawful as the business of the plaintiff and that there was no ground on which they should be restrained, even assuming that as a result of their activity persons stayed away from the plaintiff's racecourse who would otherwise have attended.

The main portion of the plaintiff's argument was in support of a claim for relief based on nuisance and counsel cited a large number of cases to illustrate both the variety of circumstances in which a defendant has been liable on this basis.

During the argument I asked counsel for plaintiff what was the legal right on which they relied. As I understood their answer, it was a right of immunity from the loss which the plaintiff suffered owing to the manner in which the defendants Angles and 2UW used the land of the defendant Taylor.

They claimed that the Court should restrain one party from so using his land as to cause damage to another unless there were reasonable excuse for the manner in which the defendants Angles and 2UW had used the defendant Taylor's land.

The Racing Case *(continued)*

The plaintiff cannot claim to restrain the defendants from conducting a rival entertainment and attracting some of its patrons away from it. He cannot complain of mere competition. Angles had during the progress of a race merely given a recitation through his microphone of such quality that racegoers stayed at home to listen to it, the plaintiff, as was admitted could not have restrained him from so doing, even though in doing so he was using Taylor's land for an unusual purpose, nor could the plaintiff have restrained a meeting of missionaries from using Taylor's land for the purpose of issuing a warning against the perils of horse racing.

Again the plaintiff could not complain merely because Angles looked over the racecourse and viewed the races.

The plaintiff claimed, however, that the acts mentioned, though innocent in themselves, were vitiated by certain ingredients which made them a nuisance. These were the times at which Angles carried on his observations, the use he made of them in conjunction with the defendant 2UW a the motive of these defendants, which was to injure the plaintiff, so the plaintiff maintained. The object of 2UW was to attract the maximum number of listeners and thereby to provide a satisfactory audience for the benefit of its advertisers.

If the plaintiff company were to be compelled to abandon race meetings, the defendant 2UW would lose a number of listeners, and its broadcasts would become much less valuable as a medium of advertising. The defendants had no desire to injure the plaintiff except so far as it was necessary for them to do so in order to benefit themselves. In this case, the defendants' dominant idea was to promote their own interests, in which there was no interference with the business of the plaintiff. Further, the acts done by the defendants in this case were not done with a view to preventing anyone who wished to attend from attending, nor were they acts which might reasonably be supposed to have that effect.

Counsel for the plaintiff also contended that, though they could not argue for a right of privacy, a plaintiff might claim to restrain certain kinds of observation.

Mr. Weston illustrated his argument by referring to a man who kept watch on the inmates of an inebriates' home with a view to publishing their names, or to a "peeping tom" who kept watch on the female residents of a house going about their private duties. Such observations might, no doubt, be restrained if a Court were convinced that they would reasonably prevent inebriates from resorting to a home so advertised or because they might interfere with the female inhabitants in the enjoyment of a house.

The defendants in this case make no attempt to prevent people who wish to attend Victoria Park from doing so, nor to interfere with the conduct of a race meeting, nor with the comfort of those who are present. If, as I have held, the defendants have infringed no legal rights of the plaintiff, it is in my opinion, an irrelevant consideration that the defendants Angles and 2UW are using the land of the defendant Taylor in an unusual manner, or that the platform, the microphone, and the land line may together constitute a dangerous thing. The plaintiff's counsel, however, put the case from an alternative and somewhat more general standpoint.

TWO ANSWERS.

They contended that an owner of land should be restrained if he were causing loss to his neighbour without lawful excuse, and that the defendants Angles and 2UW were without lawful excuse because they were using the land of the defendant Taylor in an unusual manner. But there are, I think, two answers to the plaintiff's case when advanced from this standpoint, either of which appears to me to be conclusive.

In the first place the loss which the plaintiff suffers is not caused directly by the acts of which plaintiff complains. The loss is caused by the choice of the listeners who decided against going to the races. It was said also on behalf of the plaintiff that the conduct of the defendants was unfair to the plaintiff because the defendant 2UW made profits for itself and caused the plaintiff to suffer loss by taking advantage of the spectacle which the plaintiff provided and it was said that conduct of this character constituted a nuisance or a wrong of some description which ought to be restrained.

It may be that this branch of the defendants' activities, in view of the additional inducement which they offer for illegal betting and of the losses which they may be thought to cause to racing clubs, should be brought under the notice of Parliament or of the authority responsible for the issue of licences. But, to my mind, the argument that the plaintiff is entitled to an injunction on the ground of unfairness is not one which can succeed in this Court. I hold, therefore, that there is no one act of the defendants which the Court would restrain, and that the same result should follow when their acts are considered in the aggregate. In the aggregate their acts consist of observation of the plaintiff's race meetings, communications of the results of this observation to a broadcasting station, and the simultaneous broadcasting of these results to listeners.

It is not claimed on this branch of the case that the defendants have committed any breach of a contract. What they have done is by the means above stated, to place at the disposal of others something they have acquired from the plaintiff in the exercise of a legal right, though without payment or express permission, and, in my opinion, they should not be restrained in doing so. The plaintiff's claim that the defendant Angles and 2UW should be restrained from using what was described as collated information was founded on a number of decisions.

The information consisted of the names of the starters and their post positions, and the numbers of the placed horses and the weight or protest flag. The claim to restrain the defendants from observing and broadcasting this information could not, I think, be founded on statutory copyright because of the evanescent character of the information, which is posted up to be pulled down after a few minutes exposure. Persons who enter the plaintiff's course contract that they will not divulge information relating to the race meeting until after the lapse of a specified time. But the plaintiff has entered into no contract with the defendants either expressly or by implication. Nor have the defendants, nor has any of them, obtained information by inducing a third party to break a contract or to violate a confidential relation. Nor can it be suggested that the defendants have stolen the information in the sense that they have misappropriated the property of another, or that they have obtained it from a person who has stolen it. In this case, the business of the plaintiff does not consist in obtaining information and disclosing it to subscribers.

The information is a subsidiary part of the entertainment provided by the plaintiff, and it cannot be said that in publishing this collated information the defendants are interfering with the plaintiff in its business of conducting race meetings. No attempt has been made to conceal their information from persons outside the course except by means of the surrounding fence. I hold, therefore, that the plaintiff is not entitled to relief on the ground that the defendants have wrongly appropriated collated information, and as I have held that it is not entitled to relief on the ground that acts of the defendants have caused plaintiff damage. I dismiss the suit with costs.

Mr. Flannery, K.C., Mr. Bonney, K.C., Mr. Weston, K.C., Mr. A. C. Gain, and Mr. T. S. McKay (instructed by Mr. F. P. Donohue), appeared for the plaintiff company; Mr. Watt, K.C., and Mr. G. B. Thomas (instructed by Messrs. C. Don Service and Co.), for Mr. George Taylor; and Mr. Abrahams and Mr. E. D. Roper (instructed by Messrs. Baldick, Asprey and Co.), for Mr. Angles and the Broadcasting Corporation,

The Racing Case *(continued)*

Racing Broadcasts Declared Legal By High Court Decision

On Thursday, August 27, 1937, the High Court of Australia, by a majority decided that the broadcasting of races as seen from outside a racecouse, did not interfere with the rights of the racing club, and therefore did not entitle the club to an injunction or damages.

This was the second occasion that Broadcasting Station 2UW had won its contention that it could erect a stand outside the course, and broadcast a description of the race as viewed by a commentator.

The High Court, in a reserved judgment, dismissed, with costs, the appeal of the Victoria Park Racing and Recreation Grounds Co. Ltd., from a judgment in the Equity Court, by Mr. Justice Nicholas, who had dismissed, with costs, a suit by the appellant, seeking to prohibit the broadcasting of races at Victoria Park.

The Chief Justice, Mr. Justice Dixon, and Mr. Justice McTiernan were of the opinion that the appeal should be dismissed, and Mr. Justice Rich and Mr. Justice Evatt were of the opinion that the appeal should be allowed.

The defendants in the case, which the company, as plaintiff, brought before Mr. Justice Nicholas, were George Taylor, Cyril Angles, and the Commonwealth Broadcasting Corporation Ltd. (Station 2UW), respondents in the appeal.

The action before Mr. Justice Nicholas was for a perpetual injunction against each of the defendants, restraining Taylor from allowing his land adjacent to the Victoria Park Racecourse to be used for broadcasting race meetings; restraining Angles, an announcer, from taking part in broadcasting race meetings there; and restraining the Commonwealth Broadcasting Corporation from making any such broadcast.

The full judgments are published herewith, as they are of paramount importance to the Broadcasting fraternity.

Judgement By The Chief Justice Of The High Court, Sir John Latham

VICTORIA PARK RACING AND RECREATION GROUNDS CO. LTD.
v.
TAYLOR AND OTHERS.

This is an appeal from a judgment for the Defendants given by Nicholas J. in an action by the Victoria Park Racing and Recreation Grounds Co. Ltd. against Taylor and others.

The Plaintiff Company carries on the business of racing upon a racecourse known as Victoria Park. The Defendant Taylor is the owner of land near the race-course. He has placed an elevated platform on his land from which it is possible to see what takes place on the racecourse and to read the information which appears on notice boards on the course as to the starters, scratchings, etc., and the winners of the races. The Defendant Angles stands on the platform and through a telephone comments upon and describes the races in a particularly vivid manner and announces the names of the winning horses. The Defendant the Commonwealth Broadcasting Corporation holds a broadcasting licence under the regulations made under the Wireless Telegraphy Act 1905-1919 and carries on the business of broadcasting from Station 2UW. This Station broadcasts the commentaries and descriptions given by Angles. The Plaintiff wants to have the broadcasting stopped because it prevents people from going to the races and paying for admission. The evidence shows that some people prefer hearing about the races as seen by Angles to seeing the races for themselves. The Plaintiff contends that the damage which it thus suffers gives, in all the circumstances, a cause of action.

The Plaintiff's case is put as an action upon the case for nuisance affecting the use and enjoyment of the Plaintiff's land. It is also contended that there is an unnatural use of Taylor's land by Angles to which the Broadcasting Company is a party and of which it takes advantage. The unnatural use is, I understand, alleged to consist in the erection of the wooden structure on Taylor's land which Angles uses and the use of the land for broadcasting purposes. It is contended that, there being this unnatural use of the land, the Defendant is liable for all the damage which may happen to any person, including the Plaintiff, as a result of such user.

The first contention is that the Plaintiff's land has been made suitable for a race-course, that by reason of the action of the Defendant it has been deprived of at least some measure of that suitability, and that therefore this is a case of nuisance—an unlawful interference with the use and enjoyment of land. No analogous case has been cited to the Court. I agree that the category of nuisance is not closed and that if some new method of interfering with the comfort of persons in the use of land emerges the law may provide a remedy. For example, the increasing use of electricity, with the possibility of the escape of electricity into an adjoining property, has provided a new possible source of interference with the use of land and the law provides a remedy in such a case.

In this case, however, in my opinion, the Defendants have not interfered in any way with the use and enjoyment of the Plaintiff's land. The effect of their actions is to make the business carried on by the Plaintiff less profitable and they do so by providing a competitive entertainment. It is unnecessary to cite authorities for the proposition that mere competition (certainly if without any motive of injuring the Plaintiff) is not a cause of action.

The facts are that the racecourse is as suitable as ever it was for use as a racecourse. What the Defendants do does not interfere with the races, nor does it interfere with the comfort or enjoyment of any person who is on the racecourse. The alleged nuisance cannot be detected by any person upon the land as operating or producing any effect upon the Plaintiff's land. It is consistent with the evidence that none of the persons on that land may, at any given moment, be aware of the fact that a broadcast is being made. The only alleged effect of the broadcast is an effect in relation to people who are not upon the land, that is, the people who listen in or have the opportunity of listening in and who therefore stay away from the land. In my opinion the Defendants have not in any way interfered with the Plaintiff's land or the enjoyment thereof.

I am unable to see that any right of the Plaintiff has been violated or any wrong done to him. Any person is entitled to look over the Plaintiff's fences and to see what goes on in the Plaintiff's land. If the Plaintiff desires to prevent this, the Plaintiff can erect a higher fence. Further, if the Plaintiff desires to prevent its notice boards being seen by people from outside the enclosure, it can place them in such a position that they are not visible to such people. At sports grounds and other places of entertainment it is the lawful natural and common practice to put up fences and other structures to prevent people who are not prepared to pay for admission from getting the benefit of the entertainment. In my opinion the law cannot by an injunction in effect erect fences which the Plaintiff is not prepared to provide. The Defendant does no wrong to the Plaintiff by looking at what takes place on the Plaintiff's land. Further, he does no wrong to the Plaintiff by describing to other persons, to as wide an audience as he can obtain, what takes place on the Plaintiff's ground. The Court has not been referred to any principle of law which prevents any man from describing anything which he sees anywhere if he does not make defamatory statements, infringe the law as to offensive language, etc., break a contract, or wrongfully reveal confidential information. The Defendants did not infringe the law in any of these respects.

The Plaintiff further contended that there was an unnatural use of land by the Defendant Taylor and that all the Defendants were liable for resulting damage to the Plaintiff's land or to the Plaintiff's business. In my opinion, this contention cannot be supported "Prima facie it is lawful to erect what one pleases on one's own land," Rogers v Bajendro Dutt 13 Moore P.C.C. 209 at p.237.

It is not suggested that Taylor has broken any building regulation. If he had done so the remedy would be found under the relevant building regulations, and not in an action of the present kind.

In truth, the Plaintiff's complaint would be the same in all material particulars if Taylor had a two storey house from the upper storey of which Angles made his broadcast. In my opinion it would be impossible to contend that there was an unnatural use of the land and house because they were used for that purpose.

If Taylor complies with any relevant provision under the Federal Post and Telegraph Acts or the Wireless Telegraphy Acts he is entitled to have a telephone and to use his premises as an originating point for broadcasting. So also the Commonwealth Broadcasting Company is entitled to broadcast under the licence granted in pursuance of the Federal regulations. I am not prepared to assent to what I regard as the surprising argument that the use of land for broadcasting is an unnatural use of land within the principle of Rylands v. Fletcher. Broadcasting of races could doubtless be prevented, either altogether or without the consent of the persons who undertake the trouble and expense of organising race meetings, by a regulation dealing with the conditions of broadcasting licences; but no such regulation has yet been made.

In reality there is no particular connection between the use of the Defendant Taylor's land as land and the wrong which the Plaintiff alleges that it suffers. The position in all material particulars would be exactly the same if the broadcasting were done from a motor car on a road from which the racecourse could be seen or by a man standing on high land of which he was not the owner or the occupier. Reference to Taylor's land in the argument is introduced only for the purpose of relying upon an alleged unnatural use of that land. As I have already said, in my opinion, there is no such use.

The claim under the head of nuisance has also been supported by an argument that the law recognises a right of privacy which has been infringed by the Defendants. However desirable some limitation upon invasions of privacy might be, no authority was cited which shows that any general right of privacy exists. The contention is answered, in my opinion, by the case of Chandler v. Thompson 3 Camp. 80. See also Turner v. Spooner 30 L.J.Ch. 803—"With regard to the question of privacy, no doubt the owner of a house would prefer that a neighbour should not have the right of looking into his windows or yard, but neither this Court nor a Court of Law will interfere on the mere ground of invasion of privacy; and a party has a right even to open new windows, although he is thereby enabled to overlook his neighbour's premises, and so interfering, perhaps, with his comfort." See also Tapling v. Jones, 11 H.L.C. 296 at pp. 305 and 311.

It has been argued that by the expenditure of money the Plaintiff has created a spectacle and that he therefore has what is described as a quasi-property in the spectacle which the law will protect. The vagueness of this proposition is apparent upon its face. What it really means is that there is some principle (apart from contract or confidential relationship) which prevents people in some circumstances from opening their eyes and seeing something and then describing what they see. The Court has not been referred to any authority in English law which supports the general contention that if a person chooses to organise an entertainment or to do anything else which other persons are able to see he has a right to obtain from a court an order that they shall not describe to anybody what they see. If the claim depends upon interference with a proprietary right it is difficult to see how it can be material to consider whether the interference is large or small—whether the description is communicated to many persons by broadcasting or by a newspaper report or only to a few persons in conversation or correspondence.

Similarly, as I have already said, the mere fact that damage results to a Plaintiff from such a description cannot be relied upon as a cause of action.

I find difficulty in attaching any precise meaning to the phrase "property in a spectacle." A "spectacle" cannot be "owned" in any ordinary sense of that word. Even if there were any legal principle which prevented one person from gaining an advantage for himself or causing damage to another by describing a spectacle produced by that other person, the rights of the latter person could be described as property only in a metaphorical sense. Any appropriateness in the metaphor would depend upon the existence of the legal principle. The principle cannot itself be based upon such a metaphor.

Even if, on the other hand, a spectacle could be said to exist as a subject matter of property it would still be necessary, in order to provide the Plaintiff in this case with a remedy, to show that the description of such property is wrongful or that such description is wrongful when it is widely disseminated. No authority has been cited to support such a proposition.

The Plaintiff also argued, though he did not plead, that the defendants were guilty of some infringement of copyright. This argument lacked precision in every respect. If an attempt had been made to plead this claim I think that the difficulties in the way of establishing it would at once have become apparent. It has not been proved that the Plaintiff has copyright in anything. There may possibly be copyright in a race book, but it is not shown that the Plaintiff has such copyright in this case, or, if the Plaintiff has copyright, that the Defendant has infringed it. Even if the Defendant Angles used the race book for the purpose of obtaining information he did no more than state facts which were recorded in the race book. The contention that the names or numbers of the starting horses and of the scratched horses and the numbers of the winners, etc., placed upon boards in the racecourse constituted original literary works so as to be possible subjects of copyright does not appear to me to require any detailed answer. A race result is ordinarily announced by reference to the num-

The Racing Case *(continued)*

The Racing Case *(continued)*

bers of horses in some such form as the following:—

3.
12.
4.

Copyright, where it exists, exists for fifty years from the death of the author (Copyright Act 1912-1935 Schedule sec. 3). Much more argument than has been produced in this case would be required to convince me that because the Plaintiff caused those numbers to be exhibited for a few minutes upon a notice board, everybody in Australia was thereafter for a term of fifty years from somebody's death precluded from reproducing them in any material form (Copyright Act Schedules 1 (2) and 2 (1)). The law of copyright does not operate to give any person an exclusive right to state or to describe particular facts. A person cannot by first announcing that a man fell off a 'bus or that a particular horse won a race prevent other people from stating those facts. The Copyright Act 1912-1935 gives protection only to "original" literary dramatic musical and artistic works" (see Schedules Sec. 1). What the law of copyright protects is some originality in the expression of thought (Laws of England 2nd Ed. Vol. 7, p. 521). The Plaintiff has no rights by virtue of the statute, and common law rights to copyright are abrogated by Sec. 31 of the Schedule to the Act. In my opinion, the Claim based upon copyright fails.

I agree with the judgment of Nicholas J. and with the reasons which he gave for it. In my opinion the appeal should be dismissed.

Assenting Judgement by Justice J. Dixon

The foundation of the plaintiff (The Victoria Park Racing and Recreation Grounds Company Ltd.) Company's case is no doubt the fact that persons who otherwise would attend race meetings stay away because they listen to the broadcast made by the Defendant Angles from the tower overlooking the course. Beginning with the damage thus suffered and with the repetition that may be expected, the Plaintiff company says that, unless a justification for causing it exists, the Defendants or some of them must be liable inasmuch as it is their unauthorised acts that inflict the loss.

It is said that to look for a definite category or form of action into which to fit the Plaintiff's complaint is to reverse the proper order of thought in the present stage of the law's development. In such a case it is for the Defendants to point to the ground upon which the law allows them so to interfere with the normal course of the Plaintiff's business as to cause damage.

There is, in my opinion, little to be gained by enquiring whether in English law the foundation of a delictual liability is unjustifiable damage or breach of specific duty. The law of tort has fallen into great confusion, but, in the main, what acts and omissions result in responsibility and what do not are matters defined by long established rules of law from which judges ought not wittingly to depart and no light is shed upon a given case by large generalisations about them. We know that, if upon such facts as the present the Plaintiff could recover at common law, his cause of action must have its source in an action upon the case and that in such an action, speaking generally, damage was the gist of the action.

There is, perhaps, nothing wrong either historically or analytically in regarding an action for damage suffered by words, by deceit, or by negligence as founded upon the damage and treating the unjustifiable conduct of the Defendant who caused it as matter of inducement. But whether his conduct be so described or be called more simply a wrongful act or omission, it remains true that it must answer a known description, or, in other words, respond to the tests or criteria laid down by established principle.

The Plaintiff's Counsel relied in the first instance upon an action on the case in the nature of nuisance. The premises of the Plaintiff are occupied by it for the purpose of a racecourse. They have the natural advantage of not being overlooked by any surrounding heights or raised ground. They have been furnished with all the equipment of a racecourse and so enclosed as to prevent any unauthorised ingress or, unless by some such exceptional devices as the Defendants have adopted, any unauthorised view of the spectacle. The Plaintiff can thus exclude the public who do not pay and can exclude them not only from presence at, but also from knowledge of, the proceedings upon the course. It is upon the ability to do this that the profitable character of the enterprise ultimately depends. The position of the improvements to the land thus fit it for a racecourse and give its occupation a particular value. The Defendants then proceed by an unusual use of their premises to deprive the Plaintiff's land of this value, to strip it of its exclusiveness. By the tower placed where the race will be fully visible and equipped with microphone and line, they enable Angles to see the spectacle and convey its substance by broadcast. The effect is, the Defendants say just as if they supplied the Plaintiff's customers with elevated vantage points round the course from which they could witness all that otherwise would attract them and induce them to pay the price of admission to the Course. The feature in which the Plaintiff finds the wrong of nuisance is the impairment or deprivation of the advantages possessed by the Plaintiff's land as a racecourse by means of a non-natural and unusual use of the Defendants' land.

This treatment of the case will not, I think, hold water. It may be conceded that interferences of a physical nature, as by fumes, smell and noise, are not the only means of committing a private nuisance. But the essence of the wrong is the detraction from the occupier's enjoyment of the natural rights belonging to, or in the case of easements, of the acquired rights annexed to, the occupation of land. The law fixes those rights. Diversion of custom from a business carried on upon the land may be brought about by noise, fumes, obstruction of the frontage or any other interference with the enjoyment of recognised rights arising from the occupation of property and. if so, it forms a legitimate head of damage recoverable for the wrong; but it is not the wrong itself. The existence or the use of a microphone upon neighbouring land is, of course, no nuisance. If one, who could not see the spectacle, took upon himself to broadcast a fictitious account of the races he might conceivably render himself liable in a form of action in which his falsehood played a part, but he would commit no nuisance. It is the obtaining a view of the premises which is the foundation of the allegation. But English law is, rightly or wrongly, clear that the natural rights of an occupier do not include freedom from the view and inspection of neighbouring occupiers or of other persons who enable themselves to overlook the premises. An occupier of land is at liberty to exclude his neighbour's view by any physical means he can adopt. But while it is no wrongful act on his part to block the prospect from adjacent land, it is no wrongful act on the part of any person on such land to avail himself of what prospect exists or can be obtained. Not only is it lawful on the part of those occupying premises in the vicinity to overlook the land from any natural vantage point but artificial erections may be made which destroy the privacy existing under natural conditions. In Chandler v. Thompson 1811 3 Camp

81 at p. 82 le Blanc J. said that, although an action for opening a window to disturb the Plaintiff's privacy was to be read of in the books, he had never known such an action maintained, and when he was in the Common Pleas he had heard it laid down by Eyre L.C.J. that such an action did not lie and that the only remedy was to build on the adjoining land opposite to the offensive window. After that date there is, I think, no trace in the authorities of any doctrine to the contrary. In Johnson v. Wyatt, 1863, 2 De J. and S. 18 at p.27 Turner L.J. said: "That the windows of the house may be overlooked, and its comparative privacy destroyed, and its value thus diminished, by the proposed erection—are matters with which, as I apprehend we have nothing to do."

That is they afforded no ground for an injunction . . . . In re Penny and S. E. Ry Co. 1857—7 El and Bl 660 the Court of Queen's Bench set aside an award of compensation to a landowner for injurious affection by the construction of a railway because in the compensation awarded there was included the depreciation of the land owing to its now being overlooked.

Erle J. said (at p.670):

"The comfort and value of the property may have been diminished but no action would have lain for the injury before the statutory authority was conferred on the company."

This principle formed one of the subsidiary reasons upon which the decision of the House of Lords was based in Tapling v. Jones 1865 11 H.L.C. 290. Lord Chelmsford said:

"That the owner of a house has a right at all times to open as many windows in his own house as he pleases. By the exercise of the right he may materially interfere with the comfort and enjoyment of his neighbour, but of this species of injury the law takes no cognizance. It leaves everyone to his self defence against an annoyance of this description; and the only remedy in the power of the adjoining owner is to build on his own ground and so to shut out the offensive windows" (at p.317)

When this principle is applied to the Plaintiff's case it means, I think, that the essential element upon which it depends is lacking. So far as freedom from view or inspection is a natural or acquired physical characteristic of the site, giving it value for the purpose of the business or pursuit which the Plaintiff conducts, it is a characteristic which is not a legally protected interest. It is not a natural right for breach of which a legal remedy is given, either by an action in the nature of nuisance or otherwise. The fact is that the substance of the Plaintiff's complaint goes to interference, not with its enjoyment of the land, but with the profitable conduct of its business.

The Racing Case *(continued)*

If English law had followed the course of development that has recently taken place in the United States the "broadcasting rights" in respect of the races might have been protected as part of the quasi property created by the enterprise, organisation and labour of the Plaintiff in establishing and equipping a racecourse and doing all that is necessary to conduct race meetings. But Courts of Equity have not in British Jurisdiction thrown the protection of an injunction around all the intangible elements of value, that is value in exchange, which may flow from the exercise by an individual of his powers of resources whether in the organisation of a business or undertaking or the use of ingenuity, knowledge, skill or labour. This is sufficiently evidenced by the history of the law of copyright and by the fact that the exclusive right to inventions, trade marks, designs, trade name and reputation are dealt with in English law as special heads of protected interests and not under a wide generalisation.

In dissenting from a judgment of the Supreme Court of the United States by which the organised collection of news by a news service was held to give it in equity a quasi property protected against appropriation by rival news agencies, Brandeis J. gave reasons which substantially represent the English view and he supported his opinion by a citation of much English authority; International News Service v Associated Press 1918 248 U.S. 215; 63 L.Ed. 211.

His judgment appears to me to contain an adequate answer both upon principle and authority to the suggestion that the Defendants are misappropriating or abstracting something which the Plaintiff has created and alone is entitled to turn to value. Briefly, the answer is that it is not because the individual has by his efforts put himself in a position to obtain value for what, he can give that his right to give it becomes protected by law and so assumes the exclusiveness of property, but because the intangible or incorporeal right he claims falls within a recognised category to which legal or equitable protection attaches. Brandeis J. cites with approval Sports and General Press Agency v Our Dogs Publishing Co. 1916 2 K.B. 880 a decision of Horridge J. affirmed by the Court of Appeal 1917 2 K.B. 125 which he described as follows:

"The Plaintiff, the assignee of the right to photograph the exhibits at a dog show, was refused an injunction against the Defendant, who had also taken pictures of the show and was publishing them. The Court said that, except in so far as the possession of the land occupied by the show enabled the proprietors to exclude people or permit them on conditions that they agree not to take photographs (which condition was not imposed in that case) the proprietors had no exclusive right to photograph the show and could therefore grant no such right. And it was further stated that, at any rate, no matter what conditions might be imposed upon those entering the grounds, if the Defendant had been on top of a house or in some position where he could photograph the show without interfering with the physical property of the Plaintiff, the Plaintiff would have no right to stop him." (63 L.Ed at p.227.)

In my opinion, the right to exclude the defendants from broadcasting a description of the occurrences they can see upon the Plaintiff's land is not given by law. It is not an interest falling within any category which is protected in law or equity. I have had the advantage of reading the judgment of Rich J., but I am unable to regard the considerations which are there set out as justifying what I consider amounts not simply to a new application of settled principle but to the introduction into the law of new doctrine.

Apart from the matters with which I have dealt, the Plaintiff claimed that the Defendants or some of them had been guilty of infringement of copyright. Copyright in two forms of production was set up. One was the board affording information of the scratchings and places at the barrier. The other was the race book. It may at once be conceded that copyright subsisted in the latter. Perhaps from the fact a presumption arises that the Plaintiff company is the owner of the copyright but, as corporations must enlist human agencies to compose literary, dramatic, musical and artistic works, it cannot found its title on authorship. No proof was offered that the author or authors was or were in the employment of the Company under a contract of service and that the book was compiled or written in the course of such employment. See Sec. 5 (2) of the British Copyright Act 1911, scheduled to the Commonwealth Act of 1912. Perhaps these facts are to be presumed. But the reason for the absence of proof of ownership is that the book was not relied upon at the hearing of the suit in support of the claim for infringement of copyright. In my opinion, the Plaintiff was right in not relying upon it. For to establish infringement it would be necessary to show that the broadcast included such a use of the contents of the book as to amount to a "performance" of a

The Racing Case *(continued)*

substantial part of the "work" which it constitutes. No doubt the Defendant Angles made much use of the information contained in the racebook to enable him to give an account of the proceedings upon the course.

But it is not information that is protected in the case of literary works but the manner in which ideas and information are expressed or used. "Performance" is defined to mean any acoustic representation of a work and any visual representation of any dramatic work, including such a representation made by means of any mechanical instrument. I do not think that any "acoustic representation" of a substantial part of the race book was given through the microphone.

The board contained a list of positions at the barrier which was, in effect, repeated, but I should not have thought that, if the list was the subject of copyright, to repeat the order of positions actually assigned to the horses amounted to an infringement. I am, however, quite unable to suppose that, when the names of the starters, their positions, jockeys, and so on are exhibited before a race, doing so amounts to publishing a literary work which becomes the subject of copyright. No doubt the expression "literary work" includes compilation. The definition section says so; Sec. 35 (1). But some original result must be produced. This does not mean that new or inventive ideas must be contributed. The work need show no literary or other skill or judgment. But it must originate with the author and be more than a copy of other material. The material for the board consists in the actual allotment of places and other arrangements made by the Plaintiff company's officers in respect of the horses. To fit in on the notice board the names and figures which will display this information for a short time does not appear to me to make an original literary work.

In my opinion the judgment of Nicholas J. is right and the appeal should be dismissed.

"Appeal Should Be Dismissed"

Judgement By Justice McTiernan

In my opinion the appeal should be dismissed. The facts upon which the Plaintiff grounds its claim to restrain the broadcasting of descriptions of the races on its racecourse from the platform on the land of the Defendant Taylor commence with the steps which it took, namely, fencing and the imposition of conditions on the right to enter the racecourse, to make the enjoyment of the races exclusive to persons whom it admitted to the racecourse.

The platform on Taylor's land was erected high enough to enable a person standing on it to see the races and the information posted by the Plaintiff on its notice boards on the course for the benefit of its patrons. The platform was equipped with a telephone communicating with the broadcasting apparatus of the defendant company. Even if upon a comparison with other buildings in the locality the structure holding this platform with its broadcasting equipment might be regarded as peculiar or unusual, Taylor had a right to have it erected and it was not actionable for Taylor or his licensee to invade the privacy of the racecourse by looking at the races from this vantage ground. Tapling v Jones 11 H.L.C. 290. So much indeed appears to have been conceded by the Plaintiff, for it does not claim a mandatory injunction for the removal of the platform from Taylor's land or for removing the broadcasting equipment from it. The relief which the Plaintiff claims is in effect limited to an injunction restraining the broadcasting of any description of the races.

The only consequence detrimental to the Plaintiff which the broadcasting of which it complains was proved to bring about was that a number of persons who would have paid for admission to the race meetings preferred to remain away from the racecourse while the race meetings were being held, and to listen to the vivid descriptions of them given by the Defendant Angles from the raised platform on Taylor's land as they were being broadcast by the Defendant company. The fact that so many people prefer radio entertainment producing the excitement of the spectacle to seeing the spectacle at first hand has, it is true, resulted in the Plaintiff losing profits which it would otherwise have made from conducting the race meetings. And if the drop in the number of persons who are willing to pay for admission has been reflected in a fall in the value of the land, this must be because the broadcasting affects the goodwill of the racecourse and not because it damages the land. It is not shown that the broadcasting interferes with the use and enjoyment of the land or the conduct of the race meetings or the comfort or enjoyment of any of the Plaintiff's patrons.

Indeed it appears quite impossible that any such result should be caused by the action of Angles in standing on this platform aloof from the racecourse, observing the races and talking into a microphone or telephone. The principle upon which liability for acts in the nature of nuisance is founded is not to be restrained by the instances in which that liability has been found to exist. The list of acts which may give rise to an action on the case in the nature of nuisance is not closed against broadcasting. But to broadcast a lawful description of what is happening on premises cannot be an actionable nuisance at least unless it causes substantial interference with the use and enjoyment of the premises. It is conceivable that broadcasting may be made an adjunct to conduct constituting the actionable nuisance of watching and besetting premises, the nature of which is discussed in Lyons v Wilkins 1896, 1 Ch. 828. But no facts are proved to bring the broadcasting of which the Plaintiff complains within the scope of the principle which was applied in that case.

"It is essential to an action in tort that the act complained of should under the circumstances be legally wrongful as regards the party complaining, that is, it must prejudicially affect him in some legal right, merely that it will however directly, do him harm in his interests is not enough." Rogers v Rajendro Dutt 13 Moore P.C. 209 at 241.

No allege simply that the defendants broadcasted a description of a spectacle undertaken to the Plaintiff on land in the sole possession of the Plaintiff, and that the Plaintiff thereby lost profits which it would otherwise have made from the undertaking and that the value of the land was diminished, does not state a cause of action in tort. There is no averment of a wrongful act any more than if the Plaintiff were to allege that the Defendants saw the spectacle and described it to a gathering of bystanders. It is essential to an action on the case in the nature of nuisance to prove that the acts complained of infringe a legal right of the Plaintiff. The loss of profits and the diminution in the value of the land are set up here by the Plaintiff both as the injuria and the damnum.

In Soltau v de Held 2 Sim (N.S.) 133, 61E.R. 301 Kindersley V.C., made these observations: "Then it is said that part of what is alleged by the Plaintiff as the mischief arising to him is the diminution in value of his house; and it is said, and with perfect truth, by the Defendant's Counsel, that diminution in value does not

constitute nuisance, and is no ground for the Court's interfering." To the like effect was the statement of Bacon V.C. in Harrison v Good L.R. 11 Eq. at 353:

"I would not have it supposed that I am not perfectly sensible of the great disadvantage which will happen to the Plaintiff, Mr. Dangerfield. If this school should be established in the place where it is proposed, I have no doubt that the value of his property will be depreciated. But the case which was referred to, and very properly referred to, is by no means an authority for the proposition that, because a depreciation in value would take place, the owners of adjoining property suffering depreciation have therefore a right to call that a 'nuisance.' In Hammerton v. Dysart 1916 1 A.C. at 84 Lord Parker said: "Nuisance, then, involves dam age, but damage alone is not sufficient to give rise to a right of action.' "

It was not a legal right of the plaintiff always to be able to carry on its undertaking without loss of profits or not suffer any diminution in the value of its land. The Plaintiff took steps to secure that the entertainment to be got from following the fate of the horses running on its racecourse should be restricted to persons whom it admitted. In the circumstances existing before the parasitical substitute of which it complains was transmitted from the platform on Taylor's land, the racecourse had apparently enjoyed a measure of exclusiveness such as was conducive to the profitable conduct of the business. But the Plaintiff took the risk of a change in those circumstances. Cf. Hopkins v Great Northern Railway Co. Q.B.D. at 234.

The Plaintiff laid great stress on the maximum sic utere tuo ut alienum non laedas. The principle underlying the action on the case in the nature of nuisance is the same as that embodied in this maxim.

Hammerton v Dysart 1916, 1 A.C. at 84. It is essential for the application of this maxim that both injury and damage are sustained. "Alienum" must be taken to mean "The rights of the neighbouring owner." Gale on Easements 8th Ed. at 416/7: "If a man sustains damage by the wrongful act of another, he is entitled to a remedy; but to give him that title these two things must concur, damage to himself and a wrong committed by the other. That he has sustained damage is not of itself sufficient." Rex v Commissioners of the Ragham Level 1828, 8 B. and C. 355. Referring to the maxim sic utere tuo ut alienum non laedas in West Cumberland Iron and Steel Co. v Kenyon 11 Ch.D. at 787 Brett L.J. said: "The cases have decided that where that maxim is applied to landed property, it is subject to a certain modification, it being necessary for the Plaintiff to show not only that he has sustained damage, but that the Defendant has caused it by going beyond what is necessary in order to enable him to have the natural user of his own land. If the Plaintiff only shows that his own land is damaged by the Defendant's using his land in the natural manner, he cannot succeed. So he must fail if he only proves that the Defendant has used his land otherwise than in the natural way, but does not prove damage to himself." The use which Taylor and his licensee are making of Taylor's land may be quite impudent. But it was in the course of the natural user of his land for Taylor to have the platform erected on his land from which Angles speaks. And I cannot think that Taylor is going beyond the natural use of the land in allowing his licensee Angles to talk into the telephone or microphone on the platform and give a description of the races and the information exhibited on the racecourse to the members of the public who wish to listen.

Cf. Chasmore v Richards 7 H.L.C. 349. Upon the facts proved none of the Defendants is liable to be sued in an action on the case for nuisance. The Plaintiff has failed to establish its claim to an injunction on the ground of an alleged nuisance or a breach of the legal relation of neighbourliness expressed by the maxim sic utere tuo ut alienum non laedas. In Soltau v de Held (supra) Kindersley V.C. said: "Now it is true that equity will only interfere in case of nuisance where the thing complained of is a nuisance at law; there is no such thing as an equitable nuisance."

Passing from the question of nuisance the Plaintiff would, of course, be entitled to redress if the broadcasting violated any right residing in it. In Hannum v Mockett 2 B. and C. at 937:107 E.R. 630 Bayley J. said: "To maintain an action the Plaintiff must have had a right and the Defendant must have done a wrong. A man's rights are the rights of personal security, personal liberty and personal property. Private property is either property in possession, property in action or property that an individual has a special right to acquire. A man in trade has a right in his fair chances of profit and he gives up time and capital to obtain it. It is for the good of the public that he should." But the element of exclusiveness is missing from the Plaintiff's right in the knowledge which the defendants participate in broadcasting. It was competent for the Plaintiff to impose a condition on the right it granted to any patron to enter the racecourse that he would not communicate to anyone outside the racecourse the knowledge about the racing which he got inside. It would be actionable for a patron to break this condition or for any person to induce him to break his contract by disclosing the knowledge with a view to it being broadcast. Exchange Telegraph Co. v Central News 1897 2 C. 48. But where the communication is not in breach of contract and there is no proof that what is communicated comes "From a source which could not honestly be made use of" its dissemination is not a matter in respect of which the Court can give any relief. Angles got the information first hand from a position of vantage outside the racecourse.

The law does not reserve to the Plaintiff the exclusive right to broadcast or otherwise disseminate that which formed the subject matter of the broadcasting complained of. The case of Sports and General Press Agency v. Our Dogs Publishing Co. 1916 2 K.B. 880 approved on appeal in 1917 2 KB. 125 illustrates the limits of the Plaintiff's rights in the present case. "It is quite true that, as they were in possession of the spot where it would probably have been convenient to place the camera for the purpose of photographing, they had the advantage, so far as the land in their possession was concerned, of being the only persons who could conveniently take photographs, but that is a very different thing from saying that they had the sole right to photograph anything inside the show. If any person were in a position, for example, from the top of a house, to photograph the show from outside it, the association would have had no right to stop him." 1916 2 K.B. at 884.

There is no substance in the contention that what is done by any of the Defendants is an infringement of copyright.

In my opinion there are no legal principles which the Court can apply to protect the Plaintiff against the acts of the Defendants of which it complains.

The judgment of Nicholas J. should, I think, be affirmed.

The Racing Case *(continued)*

Judgement by Justice J. Evatt

Says Appeal Should be Allowed.

The Appellant, who is the Plaintiff in the suit, is the owner and occupier of a well-known Sydney racecourse, duly licensed as such under the law of New South Wales. It there carries on the business of conducting race meetings. The land has been specially laid out and improved as a racecourse, and the fence which surrounds the course is sufficiently high to ensure privacy for all practical purposes, although it is possible to obtain some sort of view of the course and the races from certain vantage points outside. The Respondents, who are the Defendants to the suit, are three in number, viz.: (1) The owner and occupier of a residence situated outside the Plaintiff's course; (2) a company which carries on the business of broadcasting for profit; and (3) one of its announcers who broadcasts to the public descriptions of the Plaintiff's races as and when each race is being run. As the land and residence of the first Defendant did not include any position which afforded a sufficiently advantageous view over the plaintiff's fence, a special observation tower was erected by the Broadcasting Company on the land, and, from a platform on this tower, the simultaneous broadcast description of all races is given.

As a result of the conjoint actions of the three defendants, it is established that persons who would otherwise attend the races, paying for admission, are induced to listen in to the broadcasts either at public houses or other places supplied with radio receiving sets; the reason for the abstention of such persons is plain; they obtain all the practical advantages of viewing the plaintiff's races without having to pay to enter, and they make their bets off the course.

The law of New South Wales prohibits the business of betting at all places except licensed courses, but systematic broadcasting of races such as that conducted by the Defendant makes it almost impossible to police such gaming legislation. While it is plain that either the Commonwealth Parliament by its control of broadcasting, or the State Parliament by virtue of its general legislative powers, could end or minimise illegal "off the course" betting by prohibiting simultaneous broadcasting of races, it is of course erroneous to infer that, in the absence of such legislation, such broadcasting is necessarily lawful.

The Defendant's broadcast descriptions are invariably followed by an announcement of the starting prices of the winning horses. This information, although essential for the payment over of winning bets at hotels or other places where there is listening-in, can only be obtained from persons who have been admitted to the racecourse; so that an important, if brief, part of the information broadcast by the defendants either involves, or could be made to involve, a series of breaches of the contract of admission entered into between the plaintiff and those attending the course. Further, it is obvious from the Defendant's broadcast descriptions that the announcer makes frequent use of the Plaintiff's official programmes as well as the results posted on the board at the entrance. As a result of this use of the material brought into existence by the Plaintiff, it was faintly suggested that there had been an infringement of copyright by the Defendants. I need not elaborate further on these minor aspects of the case, for I have reached the conclusion that, on the main part of the case, the Plaintiff is entitled to succeed.

It is quite unnecessary to cite or discuss authorities which repeat or illustrate the well-known principle that the Plaintiff must affirmatively establish that the Defendants have been guilty of a tort, and that the damage which they have caused to be inflicted upon the Plaintiff may be **damnum abseque injuria.** At the same time, it is practically conceded that, if a legal wrong has been committed, the case is one for the application of the remedy of injunction.

The Defendants have argued that the damage and loss of the Plaintiff have been sustained by it rather in its character as racing entrepreneur than as occupier of land. But the plaintiff's profitable conduct of its business cannot be dissociated from its occupation of the land, and damage to the Plaintiff's business is necessarily reflected by some diminution in the value of the land of the Plaintiff. It has been said with accuracy that:

> "Nuisance does not convey the idea of injury to the realty itself. It means rather an interference with some right incident to the ownership or possession of realty. The law of nuisance is an extension of the idea of trespass into the field that fringes property. It is associated with those rights of enjoyment which are, or may become, attached to realty. Ownership or rightful possession necessarily involves the right to the full and free enjoyment of the property occupied. (Street-Foundations of Legal Liability (Tort), Vol. 1, p. 211.)"

The Defendants have not been content with a mere denial that a tort has been committed. They have ventured upon general reasoning in defence of their conduct, and Mr. Watt in his able argument said that the broadcasting company was a competitor of the Plaintiff in the business of entertainment, and was equally "entitled to be protected in the legitimate exercise of their trade." This phrase is taken from the well-known judgment of Bowen L. J. in **Mogul Steamship Co. v. McGregor Gor and Co.** (23 Q.B.D. at p. 611), a case which has occupied some prominence in the judgment of Nicholas J. In the **Mogul Case,** ship owners, in order to force a rival ship owner out of business, combined for that purpose, but employed no unlawful means. But, in the present case, what the broadcasting company is doing is, by means of broadcasting, to incorporate in its own entertainment, simultaneously with the plaintiff's entertainment, precisely so much of the latter as an expert verbal representation can give, the Plaintiff having to expend capital and labour in providing its entertainment, and the company contributing nothing and taking everything. I cannot imagine a case which is further removed, from the facts of the **Mogul case** or other cases where individuals or groups, being in the same field of commercial enterprise, choose to engage in fierce competition for custom by making special offers or concessions in return for promises to give exclusive custom. The implied basis of all such competition is that each competitor is providing goods or services to the customer which are entirely the result of its own efforts, and that there is no "appropriation" or "borrowing" of the goods or services of the other.

In the **Mogul Case** Bowen L. J. gave some illustrations of the type of conduct which is not permissible as between trade rivals. It is a profound mistake to suppose that the list was intended to be exhaustive. The classical example of the setting up of a new school the competition of which causes loss and damage to an old school in the neighbourhood only illustrates the principle that mere trade competition does not give rise to liability for tort. The facts of the present case might be analogous to the illustration of the rival schools if it were shown that, by means of broadcasting, television and the like, those conducting the new school listened in to the lessons or lectures delivered at the old school, and, by reproducing them as near as may be, caused damage to those conducting the old school. The attempt of the Defendants to justify their conduct by reference to the cases on trade competition breaks down.

The Racing Case *(continued)*

It is not enough for the Plaintiff to destroy the argument that the Defendants are only engaged in normal trade competition with the Plaintiff. The Plaintiff must establish his cause of action. But in analysing the validity of the Plaintiff's attempt to establish his cause of action, we must recognise certain fundamental principles recently summarised by the House of Lords in Donoghue v. Stevenson (1932 A.C. 562). There, Lord Atkin said:

> "I venture to say that in the branch of the law which deals with civil wrongs, dependent in England at any rate entirely upon the application by judges of general principles also formulated by judges, it is of particular importance to guard against the danger of stating propositions of law in wider terms than is necessary, lest essential factors be omitted in the wider survey and the inherent adaptability of English law be unduly restricted. For this reason, it is very necessary in considering reported cases in the law of torts that the actual decision alone should carry authority, proper weight, of course, being given to the dicta of the judges" (at pp. 583-584).

In the same case, Lord Macmillan said in particular reference to the tort of negligence:

> "The grounds of action may be as various and manifold as human errancy, and the conception of legal responsibility may develop in adaption to altering social conditions and standards. The criterion of judgment must adjust and adapt itself to the changing circumstances of life. The categories of negligence are never closed" (at p. 619).

Here the Plaintiff contends that the Defendants are guilty of the tort of nuisance. It cannot point at once to a decisive precedent in its favour, but the statements of general principle in **Donoghue v. Stevenson** are equally applicable to the tort of nuisance.

A definition of the tort of nuisance was attempted by Sir Frederick Pollock, who said:—

> "Private nuisance is the using or authorising the use of one's property, or of anything under one's control, so as to injuriously affect an owner or occupier of property:
>
> (a) By diminishing the value of that property.
> (b) By continuously interfering with his power of control or enjoyment of that property.
> (c) By causing material disturbance or annoyance to him in his use or occupation of that property.
>
> What amounts to material disturbance or annoyance is a question of fact to be decided with regard to the character of the neighbourhood, the ordinary habits of life and reasonable expectations of persons there dwelling, and other relevant circumstances. (Indian Civil Wrongs Bill, cV11, Section. 55)."

But, at an earlier period, Chief Baron Pollock indicated the danger of too rigid a definition of nuisance. He said:—

> "I do not think that the nuisance for which an action will lie is capable of any legal definition which will be applicable to all cases and useful in deciding them. The question so entirely depends on the surrounding circumstances—the place where, the time when, the alleged nuisance, what the mode of committing it, how, and the duration of it, whether temporary or permanent."
>
> **(Bamford v. Turnley (3, B & C, 79)).**

In the present case, the Plaintiff relies upon all the surrounding circumstances. Its use and occupation of land is interfered with, its business profits are lessened, and the value of the land is diminished or jeopardised by the conduct of the Defendants. The Defendant's operations are conducted to the Plaintiff's detriment, not casually, but systematically, not temporarily, but indefinitely, they use a suburban bungalow in an unreasonable and grotesque manner, and do so in the course of a gainful pursuit which strikes at the plaintiff's profitable use of its land, precisely at the point where the profit must be earned, viz., the entrance gates.

Many analogies to the Defendant's operations have been suggested, but few of them are applicable. The newspaper which is published a considerable time after a race has been run competes only with other newspapers, and can have little or no effect upon the profitable employment of the Plaintiff's land. A photographer overlooking the course and subsequently publishing a photograph in a newspaper or elsewhere does not injure the Plaintiff. Individuals who observe the racing from their own homes or those of their friends could not interfere with the Plaintiff's beneficial use of its course. On the other hand, the Defendant's operations are fairly comparable with those who, by the employment of moving picture films, television and broadcasting would convey to the public generally, (i) from a point of vantage specially constructed; (ii) simultaneously with the actual running of the races; (iii) visual, verbal or audible representations of each and every portion of the races.

If such a plan of campaign were pursued, it would result in what has been proved here, viz., actual pecuniary loss to the occupier of the racecourse and a depreciation in the value of his land, at least so long as the conduct is continued. In principle, such a plan may be regarded as equivalent to the erection by a landowner of a special stand outside a cricket ground for the sole purpose of enabling the public to witness the cricket match at an admission price which is lower than that charged to the public by bodies who own the ground, and, at great expense, organise the cricket.

In concluding that, in such cases, no actionable nuisance would be created, the Defendant insists that the law of England does not recognise any general right of privacy. That is true, but it carries the Defendant no further, because it is not merely an interference with privacy which is here relied upon and it is not the law that every interference with privacy must be lawful. The Defendant also says that the law of England does not forbid one person to overlook the property of another. That also is true in the sense that the fact that one individual possesses the means of watching and sometimes watches what goes in his neighbour's land, does not make the former's action unlawful.

But it is equally erroneous to assume that under no circumstances can systematic watching amount to a civil wrong, for an analysis of the case of **Lyons v. Wilkins** (1889 1 Ch. 255) and the **Ward Lock** case indicates that, under some circumstances, the common law regards "watching and besetting" as a private nuisance, although no trespass to land has been committed.

The defendant relied strongly upon the decision in **Sports and General Press Agency v. "Our Dogs" Publishing Co.** (1916 2 K.B. 880).

The case decides that, if an exhibition of animals is conducted at a sports ground, the occupier cannot, by purporting to confer upon A the exclusive right of taking of photographs, prevent B, who is also a spectator lawfully in attendance from taking photographs.

The Court considered that the occupier should have protected himself by regulating the terms of the contract of admission and so preventing the use of photographs by unauthorised persons. In one judgment there was an **obiter dictum** as to the right of taking a photograph from outside the ground. But the case does not anywhere suggest that there exists an absolute and unqualified right to photograph from outside a ground the spectacle which is being conducted inside.

In the United States in the case of **International News Service v. Associated Press** (248 U.S. 215). Brandeis J. regarded the "Our Dogs" case as illustrating a principle that "news" is not property in the strict sense, and that a person who creates an event or spectacle does not thereby entitle himself to the exclusive right of first publishing the "news" or photograph of the event or spectacle (at p. 255).

But it is an extreme application of the English cases to say that because

The Racing Case *(continued)*

some overlooking is permissible, all overlooking is necessarily lawful. In my opinion, the decision in the International News Service case evidences an appreciation of the function of law under modern conditions and I believe that the judgment of the majority and of Holmes J. commend themselves as expositions of principles which are not alien to English law.

If I may borrow some phrases from the majority decision, I would say that in the present case it is indisputable that the defendant broadcasting company has endeavoured "to reap where it has not sown," and that it has enabled all its listeners to appropriate to themselves "the harvest of those who have sown." Here, too, the interference with the Plaintiff's profitable use of its land takes place "precisely at the point where the profit is to be reaped, in order to divert a material portion of the profit from those who have earned it to those who have not." (248 U.S. at p. 240.) For here, not only does the broadcasting company make its own business profits from its broadcasts of the Plaintiff's races; it does so in part at least, by conveying to its patrons and listeners the benefit of being present at the racecourse without payment.

Indeed, its expert announcer seems to be incapable of remembering the fact that he is not on the Plaintiff's course nor broadcasting with its permission, for over and over again, he suggests that his broadcast is coming from within the course. (Appeal Book, pp. 272, 278, 282, 286, 287). The fact that here, as in the International News Service Case, the conduct of the Defendants cannot be regarded as honest should not be overlooked if the statement of Lord Esher is still true that "Any proposition the result of which would be to show that the common law of England is wholly unreasonable and unjust, cannot be part of the common law of England." Quoted in Donoghue v. Stevenson. 1932 A.C. at pp. 608-609).

The fact that there is no previous English decision which is comparable to the present does not tell against the plaintiff because, not only is simultaneous broadcasting or television quite new, but so far as I know, no one has as yet constructed high grandstands outside recognised sports grounds for the purpose of viewing the sports and of enriching themselves at the expense of the occupier.

In the United States, no such practice has ever been commenced. The only case which can be regarded as comparable is **Detroit Baseball Club v. Deppert,** decided by the Supreme Court of Michigan in 1886 (61 Mich. 63). There the defendant resided upon his own land which was situated near the recreation ground of the plaintiff company which conducted baseball games for profit as a member of the National Baseball League. A high fence enclosed the ground, but the defendant, who had a barn on his land, erected a stand on the roof of his barn solely for the accommodation of persons who wished to view the games played on the plaintiff's ground. The defendant charged less for the accommodation provided by him than was ordinarily charged for admission to the recreation ground.

Apparently the plaintiff failed to establish the fact that persons who visited the defendant's stand would otherwise have paid the admission fee to the plaintiff's ground. The Court refused an injunction, but upon the ground that the plaintiff's remedy at law was "entirely adequate." Campbell C.J. dissented, stating that "The Law never defined nuisance in such a way as to be exhaustive, for the plain reason that perverse ingenuity can readily devise new means of harm." (At p. 69).

He added: "All the rules of law made to redress offensive invasions of private property and rights, short of trespass, go upon the theory that conduct tending to great provocation, unless checked by civil remedies, may lead to disturbance. The present case does not differ in principle from any other where exhibitions are profitable and the profits are secured to the owners. This nuisance is one which is chiefly obnoxious from its repetition and continuance, and I think should be restrained by injunction." (At p. 69).

So far as it goes, the decision supports the claim of the present plaintiff, for the reasoning of the majority of the Court was that the plaintiff possessed an adequate remedy at law for the private nuisance of which he complained. In the present case, damage to the plaintiff has been established and found. I can see no difference in principle between the present defendant's broadcasting of the races observed from their specially erected observation tower, and the special erection outside the plaintiff's racecourse of a grandstand solely for the purpose of charging the public for the right to overlook the plaintiff's entertainment.

In each case, the price charged, or the absence of any charge, may be shown to have caused or induced persons, who would otherwise attend the ground, to stay away, but at the same time enabled them to observe or listen to a running description of the race.

It should be appreciated that the plaintiff does not question the general principle that it is a legitimate use of property to erect and extend homes for the purpose of obtaining or improving favourable prospects or "Views". A number of cases bearing upon such questions have been collected and discussed by Professor Winfield in a learned article on "privacy" published in the Law Quarterly Review in 1931. The Balham case there discussed illustrates not only what Paley called the "competition of opposite analogies," but also in my opinion, how the competition might fairly be resolved.

It appeared that, by an arrangement of large mirrors, "neighbours" succeeded in observing all that went on in the surgery of a nearby dentist. Professor Winfield rightly asks, "Why should it not have been actionable as a nuisance? . ." In my opinion, such conduct certainly amounted to a private nuisance and should have been restrained by injunction, although the sole object of the "peeping Toms" of Balham was to satisfy their own degraded curiosity and not to interfere with the dentist's liberty of action. In truth, no normally sensitive human being could have pursued his profession or business under so intolerable an espionage, and the result would have been to render the business premises practically uninhabitable.

The motive of the wrongdoers at Balham was to satisfy their curiously perverted instincts. But let us suppose that, by such devices as broadcasting and television, the operating theatre of a private hospital was made inspectable, so that a room outside the hospital could be hired in order that the public might view the operations on payment of a fee. It would not be any the less a nuisance because in such a case the interference with the normal rights of using and enjoying property was accentuated and aggravated by the wrongdoers making a profit out of their exhibition.

Let it be also supposed that medical students, who would otherwise pay a fee to the hospital in order to witness the operations, stayed away because they were able to see them performed elsewhere but simultaneously for a smaller fee, the result being that damage is sustained by the hospital.

My opinion is that an action would lie, not only in the Balham case, but in the instances I have suggested, and that a Court of Equity would grant the additional remedy of an injunction. If this conclusion is right, the following propositions may be suggested: (1) Although there is no general right of privacy recognised by the common law, neither is there an absolute and unrestricted right to spy on or to overlook the property of another person.

(2) A person who creates or uses devices for the purpose of enabling the public generally to overlook or spy upon the premises of another person will generally become liable to an action of nuisance, providing appreciable damage, discomfort or annoyance is caused.

(3) As in all cases of private nuisance, all the surrounding circumstances will require examination.

(4) The fact that in such cases the defendant's conduct is openly pursued, or that his motive is merely that of profit making, or that he makes no direct charge for the privilege of overlooking or spying will provide no answer to an action.

The above suggested statement of principle may require either extension or qualification, but in essence I think that it is in accordance with the principles of the common law of England, the "inherent adaptability" of which is as essential to-day as ever it was, having regard to our "altering social conditions and standards" . . . These phrases of Lord Atkin and Lord Macmillan, though applied to another branch of the common law, are equally applicable to the problem which has arisen in this case. I can see nothing in the statement of principle to which reasonable objection would be taken in practice. Indeed, no one who recognises the existence of any duties towards his neighbour could ever thing of acting in contravention of the principles.

Only an insufficiently disciplined desire for business profit and an almost reckless disregard, not so much of the legal rights as of the ordinary decencies and conventions which must be observed as between neighbours, could have induced the broadcasting company to cause the loss to the plaintiff which has been proved in this case. The argument that the plaintiff might have protected itself from intrusion and loss by increasing the height of its boundary fence comes with ill-grace from the defendants, whose reply would probably have been to disfigure further the Taylor bungalow by increasing the height of the broadcasting tower. In such a way, reprisals might go on indefinitely.

However, in the circumstances proved, I am of opinion that the plaintiff should not be remitted either to self-help or to legislative aid, but that he is entitled to redress from the law by the application of the principles which I have suggested are embodied in the common law. Thus the plaintiff is entitled to maintain an action for damages for private nuisance, and, if so, it is indisputable that he is also entitled to an injunction against all three defendants. In my opinion, the appeal should be allowed.

Judgement By Justice J. Rich

Thinks Appeal Should be Allowed.

THE Plaintiff company is the owner and occupier of certain land near Sydney which is laid out and equipped as a race-course. The locality is eminently suited for such purpose. There are two or three similar courses in the vicinity—and the land is being put to its best use and that use is natural and legitimate. The Plaintiff company at frequent intervals holds meetings on this course. Its privacy or exclusiveness is guarded by suitable fences and gates.

The result is that no one, unless entrance is permitted, can under ordinary conditions, view the races or obtain the information which is only published on the course. That information is shown on boards and semaphores and consists in the scratchings of horses, the position at the barrier of the horses running, the names of the jockeys, the protest flag and the results of the races. The Defendants, on the other hand, are using their premises in a non-natural way which curtails or impairs the use and enjoyment of the plaintiff company's land and detracts from its value. The Defendant Taylor owns and occupies a cottage and land opposite the racecourse. On the land at the side of this cottage he has erected a tower and platform.

An observer standing on the platform is enabled to view the whole of the racing tracks and obtain the collated information to which I have referred. The relation of the Defendant corporation and of the Defendant Angles to the Defendant Taylor is stated by the learned primary Judge as follows:

"The Defendant the Commonwealth Broadcasting Corporation referred to in the evidence as '2UW,' is a limited liability company licensed in accordance with regulations under the Wireless Telegraphy Act 1905-1919 of the Commonwealth of Australia to carry on the business of broadcasting as a 'B' class station. 2UW derives the greater part of its revenue from advertisements, which are broadcast to listeners together with items of news or of entertainment.

"The Defendant Cyril Angles, with the permision of the Defendant Taylor, observes each of the race meetings held by the Plaintiff company from the platform erected on Taylor's land, and describes each race by speaking through a microphone and communicating a description of the race, together with other information relating to the competitors, by means of a land line to the studio of 2UW, whence the descriptions and information mingled with advertisements are broadcast to listeners in Sydney and the surrounding districts.

"The Defendant Angles is an employee of 2UW, and the Defendant Taylor receives from one or other of these defendants a fee of £1 for each time that the platform is used for the purpose mentioned above."

"I was satisfied," his Honor said, from a view which I had of the course that the most favourable point for observation was the platform on the Defendant Taylor's land. From that position an observer could keep the whole of the tracks under observation and could follow the horses racing down the straight to the winning post, could observe the protest and weight flags and could decipher the numbers of the placed horses as well as the post positions and scratchings displayed on the boards."

Evidence was led as to the falling off of attendance at the course. The impression that this evidence left on his Honor's mind was "that there were numbers of persons who could have attended Victoria Park had it not been possible for them to listen to simultaneous broadcast descriptions of the races either in their homes or in the homes of friends or at a public house, and I so hold.

"These appeared to be persons who took very little interest in horses and derived little enjoyment from the spectacle of a race, but who were addicted to betting and who found excitement and suspense in following broadcast descriptions. Possibly no other broadcast would have lured away so many racegoers as those for which the Defendant Angles was responsible. For the purposes for which he is employed, Angles appears to be unusually gifted. Besides giving exceptionally vivid descriptions of the races in progress, he is a critic of form, and his advice on the prospects of the competing horses is highly valued by his listeners.

"Some of the witnesses found Angles' descriptions more instructive than a visit to the course, for from his platform on Taylor's land, and with his experience, he is better able to follow the different horses throughout the race than would be possible to a spectator on one of the stands."

In these circumstances the learned Judge held that the case was one of damnum sine injuria. The question to be solved is "How far can one person restrain another from invading the privacy of land which he occupies, when such invasion does not involve actual entry on the land?" (Professor Winfield, L.Q.R., Vol. XLVII, p. 24).

The defendants contended that the law provides no remedy as their action did not fall within

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any classification of torts and that the plaintiff's remedy lay either in self defence (e.g., raising the height of the fences round the course, or in an application to the legislature). It does not follow that because no precedent can be found a principle does not exist to support the plaintiff's right. Nuisance covers so wide a field that no general definition of nuisance has been attempted, but only a classification of the various kinds of nuisance. Courts have always refrained from fettering themselves by definitions. "Courts of equity constantly decline to lay down any rule, which shall limit their power and discretion as to the particular cases in which such injunctions shall be granted or withheld. And there is wisdom in this course; for it is impossible to foresee all the exigencies of society which may require their aid and assistance to protect rights, or redress wrongs. The jurisdiction of these courts, thus operating by way of special injunction, is manifestly indispensable for the purposes of social justice in a great variety of cases, and therefore should be fostered and upheld by a steady confidence."

Story Equity Jurisprudence First English Edition. "The common law has not proved powerless to attach new liabilities and create new duties when experience has proved that it is desirable. That this was so in the older days was due to the wide scope of the action upon the case. The action upon the case was elastic enough to provide a remedy for any injurious action causing damages." Salmond on Torts 9th Ed.

(Stallybrass pp. 88, 19 of Pollock (Torts) 13th Ed. 22). An action on the case in the nature of nuisance was one of the flexible remedies capable of adaptation to new circumstances falling within recognised principles.

This case presents the peculiar features that by means of broadcasting—a thing novel both in fact and law—the knowledge obtained by overlooking the plaintiff's racecourse from the defendants' tower is turned to account in a manner which impairs the value of the plaintiff's occupation of the land and diverts a legitimate source of profit from its business into the pockets of the defendants. It appears to me that the true issue is whether a non-natural use of a neighbour's land made by him for the purpose of obtaining the means of appropriating in this way part of the profitable enjoyment of the plaintiff's land to his own commercial ends—a thing made possible only by radio—falls within the reason of the principles which give rise to the action on the case in the nature of nuisance. There is no absolute standard as to what constitutes a nuisance in law. But all the surrounding circumstances must be taken into consideration in each case. As regards neighbouring properties their inter dependence is important in arriving at a decision in a given case. An improper or non-natural use or a use in excess of a man's right which curtails or impairs his neighbour's legitimate enjoyment of his property is "tortious and hurtful" and constitutes a nuisance.

A man has no absolute right "within the ambit of his own land to act as he pleases. His right is qualified and such of his acts as invade his neighbour's property are lawful only in so far as they are reasonable having regard to his own circumstances and those of his neighbour." L.Q.R. Vol. XLVII, p. 460, Vol. LIII, p. 3. The plaintiff's case must, I am prepared to concede, rest on what is called nuisance. But it must not be overlooked that this means no more than that he must complain of some impairment of the rights flowing from occupation and ownership of land.

One of the prime purposes of occupation of land is the pursuit of profitable enterprises for which the exclusion of others is necessary either totally or except upon conditions which may include payment. In the present case in virtue of its occupation and ownership, the plaintiff carries on the business of admitting to the land for payment patrons of racing. There it entertains them by a spectacle, by a competition in the comparative merits of racehorses, and it attempts by all reasonable means to give to those whom it admits the exclusive right of witnessing the spectacle, the competition and of using the collated information in betting while that is possible on its various events. This use of its rights as occupier is usual, reasonable and profitable. So much no one can dispute. If it be true that an adjacent owner has an unqualified and absolute right to overlook an occupier whatever may be the enterprise he is carrying on and to make any profitable use to which what he sees can be put, whether in his capacity of adjacent owner or otherwise, then to that extent the right of the occupier carrying on the enterprise must be modified and treated in law as less extensive and ample than perhaps is usually understood.

But can the adjacent owner, by virtue of his occupation and ownership use his land in such an unusual way as the erection of a platform involves, bring mechanical appliances into connection with that use, i.e., the microphone and land line to the studio, and then by combining regularity of observation with dissemination for gain of the information so obtained give the potential patrons a mental picture of the spectacle, an account of the competition between the horses and the collated information needed for betting, for all of which they would otherwise have recourse to the racecourse and pay?

To admit that the adjacent owner may overlook does not answer this question affirmatively. **The Silver Fox Case** (1936) 2 K.B. shows that an adjoining owner may not fire a gun in the breeding season so as to interfere with his neighbour's usual or normal use of his land. The besetting cases indicate that at Common Law the concert of others is a material factor. Eavesdropping suggests that at Common Law calculated overhearing differs from the casual sort. The steward of a Court-Leet in charging the jury, was wont to charge them . . . "You shall enquire of and present" (among other evil members and persons of ill-behaviour) . . .

"The eavesdropper, i.e., he that doth hearken under windows and the like, to hear and then tell news to breed debate between neighbours . . .

"All these may be amerced, and be bound to the good behaviour by a Justice of Peace." The Court-Keepers' Guide, William Sheppard (1649); pp., 47-49; see also Blackstone, 4th Ed. Bk. IV 13, p. 169.

There can be no right to extend the normal use of his land by the adjoining owner indefinitely. He may within limits make fires, create smoke and use vibratory machinery. He may consume all the water he finds on his land, but he has no absolute right to dirty it. Defendant's rights are related to plaintiff's rights, and each owner's rights may be limited by the rights of the other. Sic utere tuo is not the premise in a syllogism, but does indicate the fact that **damnum** may spring from **injuria** even though the defendant can say, "I am an owner." All the nuisance cases including in that category (Rylands v. Fletcher) are mere illustrations of a very general principle. I adapt Lord Macmillan's words and say, "The categories of 'Nuisance' are not closed. Donoghue v. Stevenson (1932), A.C. 562 at p. 619. Nuisance is not trespass on the case, and physical or material interference is not necessary."

The vibration cases and the besetting and eavesdropping cases are certainly against such a contention. What appears to me to be the real point in this case is that the right of view or observation from an adjacent land has never been held to be an absolute and complete right of property incident to the occupation of that land and exercisable at all hazards notwithstanding its destructive effect upon the enjoyment of the land overlooked. In the absence of any authority to the contrary, I hold that there is a limit to this right of overlooking, and that the limit must be found in an attempt to reconcile the right of free

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prospect from one piece of land with the right of profitable enjoyment of another. The unreported case of the Balham dentist mentioned by Professor Kenny in his cases on the law of Tort 4th Edition, p. 367 would, if correctly decided, be discreditable to English Law. This is what Professor Winfield in an Article on Privacy 47, L.Q.R. says:—

"A curious invasion of privacy, recorded by the late Professor Kenny, was a case of 1904 in which a family at Balham, by placing in their garden an arrangement of large mirrors, were enabled to observe all that passed in the study and operating room of a neighbouring dentist, who sought in vain for legal protection against 'the annoyance and indignity to which he was thus subjected.' This is all that is given of the case and, as there is no further reference, it is worthless as an authority.

"Why should it not have been actionable as a nuisance? . . . It was something very like watching and besetting the dentist's house so as to compel him to do or not to do something which he was lawfully entitled not to do or to do; and this was held to be a common law nuisance in Lyons and Sons v. Wilkins (1889), 1 Ch. 225. Subsequent trade union legislation may have affected the decision in that case, but not the principle underlying it, which is that such conduct seriously interferes with the ordinary comfort of human existence and the ordinary enjoyment of the house beset. Indeed, the Balham family behaved worse than the defendants in Lyons' case, for there was some economic excuse for the acts of the trade union officials there, while none whatever existed in the Balham case."

In 1904 the unneighbourly neighbours of Balham were forced to adopt an elaborate system of mirrors to vent their ill-feeling. But it is easy to believe that half a century later they would be able to do all they desire by means of television. Indeed the prospects of television make our present decision a very important one, and I venture to think that the advance of that art may force the Courts to recognise that protection against the complete exposure of the doings of the individual may be a right indispensable to the enjoyment of life. For these reasons **I am of the opinion that the plaintiff's grievance, although of an unprecedented character, falls within the settled principles upon which the action for nuisance depends. Holding this opinion it is unnecessary for me to discuss the question of copyright raised in the case.**

I think that the appeal should be allowed.

Mr. G. B. Thomas (instructed by C. Don Service and Co.) appeared for Taylor; Mr. L. S. Abrahams, K.C., and Mr. E. W. Street (by Baldick Asprey and Co.) for Cyril Angles and 2UW; Mr. Gain and Mr. T. S. McKay (instructed by F. P. Donoghue) appeared for the plaintiff company.

THE APPPEAL TO THE PRIVY COUNCIL.

Following the decision of the High Court of Australia, the Victoria Park Racing Club appealed to the Privy Council, but the Privy Council agreed with the High Court majority verdict upholding the right of broadcasting companies to describe horse races from positions outside the course. Lord Russell, Lord Romer, and Sir George Rankin heard the application which was dismissed with costs.

CLAIM BY MUSIC PUBLISHERS

Among the several important court cases during 1937 having a bearing on, or directly associated with broadcasting, was a claim made against the Australian Broadcasting Commission by an English firm of music publishers, Wright and Round, of Liverpool, England, who allege breach of copyright in the broadcasting of certain band music.

The case occupied a lengthy hearing in the Sydney Equity Court, and towards the end of the year Mr. Justice Nicholas delivered a reserved judgment in which he dismissed with costs the music publishers' suit.

The breach of copyright complained of was in the broadcasting of plaintiff's music from the Commission's studios where it was played by bands. The relief asked for by the plaintiffs was in respect of broadcasts prior to October 17, 1933.

During 1932-33-34-35, the plaintiffs published and circulated to bands and music sellers throughout the Commonwealth pamphlets relating to their music. These bore in a prominent position across the front page the words: "Please note: All our music is free for public performance." On the same page was a half-column headed: "To the bands of the British Empire." This contained a passage: "All our subscribers should note especially that all our music is free for public performance anywhere. See our guarantees below. Show them to your patrons so that they may rest assured that none of our publications will bring them any trouble over performing fees."

The guarantees included the following:—"Every piece published in 'Wright and Round's Liverpool Brass and Military Band Journal' can be played anywhere by anyone without fear that any composer or society will pounce upon any band for performing fees."

His Honor said that the right of free performance referred to in plaintiff's pamphlets did not mean only performance by a band, but meant any performance in which one of the pieces of plaintiff's music was rendered. The broadcasting of the music from a studio or concert hall was not an infringement of the copyright, plaintiffs, by their pamphlets, having, it appeared to him, given that consent if not expressly at least by implication. Even if no consent had been given expressly or by implication to the Broadcasting Commission, this is not a case in which I should grant an injunction. Consent is undoubtedly given to the band and is part of what it buys when it purchases the music, his Honor went on.

"Performances for broadcasting purposes are among the performances which a band expects to give and which it habitually gives. If the Commission were restrained from using these compositions in its broadcasts, the band would be unable to perform them for broadcasting purposes and the right of free performance would be of less value to the band than it would otherwise be."

Fifth Annual Report of the Australian Broadcasting Commission

YEAR ENDED JUNE 30, 1937

To the Honourable,
His Majesty's Postmaster-General to the
Commonwealth of Australia.

Sir:

We, the members of the Australian Broadcasting Commission, have the honour to present to you this, the Fifth Annual Report and Balance Sheet of the Commission, in respect of the fiscal year from 1st July, 1936, to 30th June, 1937.

During that year the Commission has provided and rendered broadcast programmes from the "A" Class (Australian National Broadcasting) Stations and has discharged in all respects the duties assigned to it by the Australian Broadcasting Commission Act of 1932.

EXTENT OF SERVICE:

Stations:

During the year the number of stations comprising the National Network was substantially increased by the addition of Stations 2NR Northern Rivers Regional (New South Wales), in July, 1936; 4QN North Queensland Regional, in November, 1936; 6GF Goldfields Regional, and 6WA South-West Regional (Western Australia), in December, 1936; 3WV Western Victorian Regional, in February, 1937, and 2CR Central Regional (New South Wales), in April, 1937. These additions bring the total number of National stations to twenty, apart from the short-wave station, 3LR, Lyndhurst. The following table gives the operating frequency and approximate wavelength of each of these stations:—

Stations:

		Frequency (wavelength)
New South Wales:		
2FC	Sydney National	610 KC. (492 m.)
2BL	Sydney National	740 KC. (405 m.)
2NC	Newcastle Regional	1,230 KC. (244 m.)
2NR	Northern Rivers Regional	700 KC. (429 m.)
2CR	Central Regional	550 KC. (545 m.)
2CO	Corowa Regional	670 KC. (448 m.)
Victoria:		
3LO	Melbourne National	770 KC. (390 m.)
3AR	Melbourne National	620 KC. (484 m.)
3GI	Gippsland Regional	830 KC. (361 m.)
3WV	Western Victorian Regional	580 KC. (517 m.)
Queensland:		
4QG	Brisbane National	800 KC. (375 m.)
4RK	Rockhampton Regional	910 KC. (330 m.)
4QN	Northern Queensland Regional	630 KC. (476 m.)
South Australia:		
5CL	Adelaide National	730 KC. (411 m.)
5CK	Crystal Brook Regional	640 KC. (469 m.)
Western Australia:		
6WF	Perth National	690 KC. (435 m.)
6GF	Goldfields Regional	720 KC. (417 m.)
6WA	South-west Regional	560 KC. (536 m.)
Tasmania:		
7ZL	Hobart National	600 KC. (500 m.)
7NT	Northern Tasmania Regional	710 KC. (423 m.)
Short-Wave Station:		
3LR	Lyndhurst	9580 KC. (31.32 m.)

The Commission has been glad to learn that the Postmaster-General's Department intends shortly to open a second transmitter in Adelaide—Station 5AN—for the broadcasting of National programmes and that similar second stations are soon to be provided in Brisbane, Perth and Hobart. These additional transmitters will greatly extend the scope of the Commission's service to listeners, since it will then be possible to provide alternative programmes in the cities mentioned.

Broadcasting Hours:

The total programme time of the above-mentioned stations during the year under review amounted to 84,299 hours—an advance of 20,251 hours on the previous year's total.

This increase was occasioned not only by the addition of new stations, but also by the extending of the broadcasting schedules in all States, principally to allow for the earlier commencement of the daily programmes. At the end of June, 1937, the regular hours of the respective stations were included in the report.

LICENCES:

(a) Australian Statistics:

The increase in licences for the year was again very satisfactory, the total in force in Australia advancing from 825,136 to 940,068. This increase is the third largest ever recorded in the Commonwealth and raised the percentage of licences to population from 12.22 to 13.78

The increases were as follow:—

Western Australia	11,184	(2.35% of population)
Tasmania	5,662	(2.28% „ „)
South Australia	11,709	(1.91% „ „)
Queensland	18,360	(1.75% „ „)
New South Wales	42,636	(1.43% „ „)
Victoria	25,381	(1.27% „ „)
Commonwealth	114,932	(1.56% „ „)

South Australia maintained its position as the State where the licence ratio is highest, and now shows the remarkable figure of 16.71 licences to each 100 residents. Victoria follows closely with 15.58 per cent., Western Australia has 13.53 per cent., New South Wales 13.3 per cent., Tasmania 12.78 per cent., and Queensland 10.31 per cent.

By a comparison with other countries the Commission finds no reason to suppose that "saturation point" in the growth of licences has been reached, and confidently anticipates that the total will pass the one million mark before the end of 1937. At the same time it is not reasonable to expect that the same rate of advancement can long be maintained.

The report then included tables showing growth of licences which are already printed in this annual.

(b) World Statistics:

There has been little change in licence distribution throughout the world during the past year. The majority of countries in which the ratio of licences to population is highest showed further advances of between one and two licences per 100 inhabitants. Australia's position on the list, namely sixth, remains unaltered.

The following table, compiled from figures supplied by L'Union Internationale de Radiodiffusion, gives full details in respect of countries where broadcasting is most highly developed.

Australian Broadcasting Commission Annual Report (continued)

World Licence Distribution
As at December 31, 1936.

Country	Population	Licences Total	Licences Per 100 of Popln.
1. United States of America	128,429,000	24,269,000‡	18.9
2. Denmark	3,706,349	652,255	17.6
3. Great Britain	46,189,445	7,914,506	17.13
4. Sweden	6,249,489	944,487	15.11
5. New Zealand	1,584,653	231,364	14.6
6. Australia	6,775,360	887,015	13.09
7. Canada	11,280,000	1,380,500†	12.24
8. Germany	66,840,000	8,167,957	12.22
9. Netherlands	8,351,117	989,115	11.84
10. Switzerland	4,066,400	464,332	11.42
11. Belgium	8,299,940	890,323	10.73
12. South Africa	1,730,000*	160,000	9.25
13. Austria	6,760,000	593,815	8.81
14. Norway	2,897,000	240,251	8.29
15. Argentine	12,200,000*	950,000‡	7.79
16. France	41,905,968	3,218,541	7.68
17. Czecho-Slovakia	14,726,158	928,112	6.3
18. Latvia	1,904,000	96,331	4.9
19. Finland	3,750,000	177,376	4.73
20. Hungary	8,993,629	365,354	4.06
21. Estonia	1,130,155	37,800	3.35
22. Irish Free State	2,965,854	98,949	3.34
23. Japan	97,800,092	2,870,986‡	2.93
24. U.S.S.R.	170,000,000	3,760,400	2.21
25. Poland	33,600,000	677,404	2.02
26. Palestine	1,300,000	20,388	1.57
27. Mexico	16,800,000*	250,000	1.49
28. Italy	43,286,000	625,350	1.44

‡Listeners are not licensed and the totals shown are merely estimates of the numbers of receiving sets in operation.
*Excluding natives.
†As at March 31, 1937.

PROGRAMMES:

General:

Broadly stated, the Commission's programme-policy is to reflect as accurately as possible the many interests of the Australian people, in so far as those interests can provide material suitable for broadcasting; to raise standards of both performances and appreciation by the judicious encouragement and carefully planned development of local talent, and by the introduction each year of a small number of artists of world-reputation; and to co-operate with and where necessary to assist organisations already in existence, such as educational bodies, conservatoria, churches, repertory societies and sporting associations, which are performing similar work in any particular sphere.

This policy has been carefully applied to the Commission's activities during the year under review and its fruits are already apparent in the development of public taste and appreciation, on the one hand, and the rise in the standards of artistic performance, on the other.

ARTISTS:

It has already been stated that the Commission's total broadcasting time from all stations for the year 1936-37 amounted to 84,229 hours.

This period contained 548,970 programme items, including recordings. The latter items absorbed only 29.1 per centum of the total time as compared with 34.18 per centum for the previous year.

"Live" performances gave employment to no fewer than 22,118 separate people, of whom the vast majority were Australians.

Of these, 18,525 were musicians, 2,446 soloists, and 16,079 associated with one or other of the 662 musical combinations whose performances were broadcast.

Of the remainder, 2,938 gave talks and 655 took part in various dramatic productions.

In addition, full-time employment was given to 155 Australian orchestral players, and 164 bandsmen and choristers, engaged in the Commission's orchestras and other combinations.

The following table shows the manner in which the total programme-time of all national stations was apportioned among the principal types of item.

As in previous years, musical items accounted for more than half the total broadcasting hours, varying by only 2.2 per cent. from the previous year's figure.

Slightly more time than previously was given to so-called "classical" items. This was due partly to the number of first-class artists who visited Australia under the Commission's management and partly to increased public interest in orchestral concerts.

Rather more time than previously was also given to modern dance music. For the greater part of the year the Commission has made regular use of the services of two highly popular dance bands—one employed on a full-time basis and the other engaged on long-term contract.

The proportion of dramatic work broadcast remained practically unchanged, although more time than before was given to plays—and in particular to locally written plays—and less to grand opera and musical comedy.

There was a slight reduction in the time given to broadcasts of talks. More emphasis was placed on broadcasts to schools and on general rather than technical talks.

More time was given to sporting descriptions and commentaries—due principally to the number of international football and cricket matches played in Australia during the period under report.

Little change occurred in the proportion of time allotted to the remaining items in the programmes.

Programme Analysis.

Item.	Hours	Group Total Hours	Percentage of Grand Tot. Hrs. Section	Group
MUSICAL:				
Classical	14,384		17.06	
Popular	22,076		26.19	
Modern Dance	6,256		7.42	
Old-Time Dance	207		.23	
Community Singing	661		.78	
		43,584		51.68
DRAMATIC:				
Operatic	272		.32	
Musical Comedy, Revue	1,505		1.79	
Plays, Dramatised Stories	3,149		3.74	
		4,926		5.85
TALKS:				
General	6,991		8.29	
Technical (farming, etc.)	312		.37	
School	1,745		2.07	
Descriptive	535		.64	
		9,583		11.37
SPORTING:				
Running Descriptions	6,115		7.25	
Results, Commentaries, Notes	3,379		4.03	
		9,494		11.28
ESSENTIAL SERVICE:				
News, News Commentaries	5,029		5.96	
Reports (weather, markets, etc.)	4,649		5.52	
Announcements	1,372		1.62	
		11,050		13.1
DEVOTIONAL:				
Church Services	2,250		2.67	
Studio Broadcasts	1,155		1.37	
		3,405		4.04
CHILDREN'S SESSIONS:	2,257	2,257	2.68	2.68
Grand Totals		84,299		100

Feature Programmes:

During the year under review, the Commission devoted increasing attention to "feature programmes," written specially for broadcasting. Such programmes are not only more attractive, but also make possible fuller use of Australian artists, who can, as a result, frequently be featured in other than recital or concert work.

(Continued overleaf.)

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"Continental Nights," a series of musico-dramatic productions centred around life in different European cities, was a production of this class.

National Programmes:

When each capital city possesses two transmitters, the policy of the Commission will be to broadcast one national programme throughout Australia, and a contrasting regional programme in each city. This is already done in Sydney and Melbourne, where two transmitters exist. This will give increased opportunities to artists and musical organisations of adequate standards, and also enable each State to contribute its quota to a truly national programme.

Already during the current year Queensland, South Australia and Tasmania have been featured more frequently on national relay than previously. It is the Commission's policy, subject to the preservation of satisfactory standards, to make still more use of the programme-items which the smaller States are able to provide. The instrumental and choral groups established by the Commission in all capital cities will facilitate this.

MUSIC:

The musical programmes of the year under review have embraced the full range of types and of musical combinations. Music has occupied by far the largest percentage of broadcasting time, and has required the greatest number of artists.

A feature of the past year has been the increased interest shown by listeners in the higher forms of music. There has been an unprecedented year of orchestral concerts, chamber music programmes, and notable vocal and instrumental recitals by both overseas and Australian artists. The high standards of performance and of presentation of this type of music have undoubtedly raised the standard of appreciation among listeners.

Corresponding progress on the lighter side of the Commission's musical programmes has been achieved by the Military and Dance Bands, and the various instrumental and vocal ensembles.

Engagements of Overseas Artists:

The Commission continued its policy of engaging world-famous artists, including Australians who have achieved success abroad, to visit Australia. In every case, careful consideration was given not only to their likely acceptability to listeners and to their suitability for both the microphone and concert platform, but also to the potential value of their influence on local musicians.

Included among these visitors were such outstanding artists as Lotte Lehmann, soprano; Professor Georg Schneevoigt, Director and Conductor of the Finnish National Orchestra: The Budapest String Quartet (on a return visit); Bronislaw Huberman, violinist; Elizabeth Rethberg, soprano, and Ezio Pinza, bass; Dr. Malcolm Sargent, the English conductor, who presented both orchestral and choral concerts; Edmund Kurtz ('cellist); and Paul Schramm (pianist) were also broadcast. Several recitals by Benno Moiseiwitsch, the Russian pianist, were also broadcast.

Among Australian artists brought out by the Commission were Dorothy Helmrich, soprano, and Essie Ackland, contralto. Tours were also arranged for Victoria Anderson and Viola Morris, who have been on a visit to Australia.

It may also be remarked that foreign artists touring for the Commission have taken a keen interest in our local musicians. For example, Professor Schneevoigt was so impressed with the voice and talents of a young Perth soprano, who was associated with him in an orchestral concert, that he made arrangements for Madame Lehmann to hear her. Madame Lehmann shared the Professor's high opinion of this young Australian singer, and arranged for her to study in Europe as her (Madame Lehmann's) protege. A young Adelaide pianist was also encouraged to go abroad after being heard by Dr. Malcolm Sargent.

Programmes of Overseas Artists:

The programmes of these distinguished visitors have contained many works of great artistic importance, the Commission having assured the artists that Australian audiences would wish to hear programmes equal in standard to those presented to audiences overseas. Notable features were the song-cycles—"Dichterliebe" (Schumann) "Brautlieder" (Cornelius), "Frauenliebe und Leben" (Schumann); many major works by Sibelius and other composers of distinction, introduced to Australian audiences for the first time; many lieder by Brahms, Schumann, Schubert, Hugo Wolf and others, and songs by contemporary British composers; also the classical violin concertos and string quartets, and many violin and piano works previously little known in Australia. By this means listeners in this country were enabled to hear, at first hand, the highest artistic achievements, in both composition and performance, of the Old World, and the response has been gratifying.

Touring Artists:

Including those overseas artists already mentioned, the Commission has during the current year allotted touring engagements to over forty artists, of whom thirty-one were Australians, drawn from all States of the Commonwealth. The type of artist engaged for this purpose was widely varied, and the programmes ranged from the classical to the lightest forms of music.

Auditions:

Particulars have already been stated of the numbers of engagements given to artists, both instrumental and vocal, and ensembles. In the case of artists whose work was not previously known to the programme officers, the selections were made by means of audition tests held in the various States. An endeavour was made to engage every artist or ensemble the standard of whose work appeared to be satisfactory, subject to the limitations of programme requirements. During the year over 1,000 auditions were given to all types of musician, and, while the percentage of successful applicants was small, the tests have been the means of discovering musical talent, which in some cases shows much promise.

Permanent Employees:

The number of orchestral musicians and choristers employed on regular full-time weekly salary by the Commission, as distinct from those engaged temporarily or casually, was increased by 64 to 319 during the year. At June 30, 1937, the allocation was as follows:—

STUDIO ORCHESTRAS:			
Players: New South Wales	45		
Victoria	36		
Queensland	17		
South Australia	16		
Western Australia	17		
Tasmania	11		
		—	142
Conductors	6		
Orchestrators and arrangers	7		
		—	13
Total orchestral			155
MILITARY BAND:			
Players	30		
Conductor	1		
Total Military Band			31
DANCE BANDS:			
Sydney	16	(plus 3 vocalists)	
Melbourne	17		
Total Dance Band		—	36

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CHORUSES:			
Special Conductor	1		
Sydney	16		
Melbourne	16		
Brisbane	16		
Adelaide	16		
Hobart	16		
Perth	16		
		—	97
GRAND TOTAL			319

There were also 142 choristers in Sydney and Adelaide on part-time employment by the Commission, and 15 dance band musicians in Perth. Casual employment was also given to some 225 orchestral players in the various States for public concerts and special studio work.

The report then deals with co-operation with established bodies, orchestras, orchestral committees, choral, permanent studio orchestras, programmes, celebrity concert orchestras, first performances and conductors. Musical libraries, young people's concerts, choral music, chamber music, band music, and dance bands were also dealt with in the report.

RECORDINGS:

While it is realised that gramophone recordings must occupy an important place in the programmes, the considerable increase in the employment of "flesh and blood" artists has this year reduced further the number of recordings broadcast. Nevertheless, the building of recorded programmes of definite types, rather than of a miscellaneous character, has received special attention. These have included symphony and chamber music programmes, lieder recitals, and variety and vaudeville programmes. In many instances suitable continuity has been provided to give added interest. A series of international celebrity artists' recordings has also been given, with annotations.

Recorded Grand Opera:

A series of weekly performances of recorded Grand Opera was a new feature introduced during the closing stages of the year under review. Each State was allotted certain operas for performance on stated days and at stated times. Each opera was broadcast (from recordings) in its entirety. Interested listeners have thus had an opportunity of hearing an extensive operatic season. The selected operas covered a wide range and included many copyright works, permission to perform which was granted by the publishers concerned.

FEDERAL MUSIC DEPARTMENT.

This section has now been in operation for 12 months. It was created in June, 1936, in order to centralise the musical activities of the Commission under one department instead of leaving each State independently responsible for its own music. The ideal aimed at is the raising of the standard of performance in all things musical throughout the Commonwealth, by making available to each State the experience, and where practicable the resources, of the whole organisation. With this end in view the Federal Music Department has during the past 12 months considered the detailed requirements of the various States, with the object of equipping them fully to obtain the best possible results and of ultimately bringing all into line.

All States now have their own orchestras and choruses; the Federal Music Department has made available instruction and advice as to their programmes, and has selected and purchased music suitable to their respective requirements. Thus it is possible for each State to carry on, if necessary, an adequate programme independent of others, and to contribute to the national programmes when required. With the facilities now at the disposal of the smaller States, their contributions to the national programmes have shown a marked development during the past 12 months. Many of their items have included musical works of importance, notably choral, orchestral and chamber music compositions, and in numbers of instances they have reached a high standard of performance.

During the year the Federal Controller of Music has visited several States in order to conduct auditions, interview artists and musical bodies, and obtain a general insight into conditions in these centres.

It is anticipated that during the next twelve months all States will be visited at least once, and that those which are at present inclined to be weak will be strengthened.

PUBLIC CONCERTS:

Adhering to its policy of bringing to Australia, for the entertainment of listeners, musicians outstanding in their respective fields of art, while at the same time utilising Australian orchestras, bands, and soloists, the Commission gave during the year 193 public concerts, the receipts from which made a considerable contribution to the cost of engaging these artists.

When the year under review began, Eileen Joyce had been on tour since March 31, having given 23 public concerts. Three concerts remained for the current year to complete a most successful season for the young Australian pianist.

In presenting 193 public concerts throughout Australia during the year 1936-37, the Commission set out to:—

(a) Secure an off-set against the otherwise prohibitive expenditure on celebrity artists and orchestras for its broadcast programmes;
(b) Satisfy the widespread desire to see these artists and orchestras in performance and to hear them in the concert hall;
(c) Give Australians greater opportunities of experiencing world standards in music entertainment.

The Commission has been encouraged, by the ready public response to its concerts, to continue this policy.

PRODUCTIONS:

Encouragement of Local Playwrights:

At the end of May, 1936, the Federal Productions Department was established, and its first year's work may conveniently be reviewed as a preliminary to the report on this section of the Commission's activities.

The desire of the Department has been to encourage the supply of locally-written material for all sections of the programmes under its control, namely, plays, sketches, serials, musical comedies, revues, children's plays and similar productions. Considerable publicity was given to the fact that local authors' work would be considered, and as a consequence, over 1,400 plays, libretti, sketches and other works were read by the Department during the year.

Of these some

127 plays, sketches and serial episodes;
38 musical comedies, revues and features;
10 descriptive or historical features;
6 adaptations of novels;
7 children's serials;

188 in all,

were accepted, and most of them have already been produced.

In some cases, where the writing was not equal to the idea, the author was paid for the latter, and the play was re-written by the Commission's staff. The staff writers have also been responsible for many adaptations of stage plays, as well as a number of successful original plays and serials.

A large number of authors have been interviewed, and letters of advice written in hundreds of cases; in fact,

(Continued overleaf.)

Australian Broadcasting Commission Annual Report (continued)

everything possible has been done to help writers whose work showed promise.

The proportion of locally-written plays, musical comedies and revues had risen to over 70 per cent. of the total by January last, and is being maintained at that level, with every hope of subsequent increase. Much of the music for the musical plays has also been written by local composers.

Adaptations of stage plays have been produced as in the past, but it is hoped to confine these in future to particularly fine plays, such as classical dramas, which would not otherwise be heard in Australia.

Light Entertainment:

A light entertainment section has been added to this Department, and the supply of scripts available for this side of the work, with the necessary music, should soon be increased in both quantity and quality.

Australian writers who for some years have found little opening for work in dramatic form are welcoming the outlet provided by broadcasting. Higher fees are being paid than in the past, and these will be increased as the quality of the work submitted improves.

Serials:

Increased use has been made of the serial form of dramatic reservation. Plays which run in episodes from week to week preserve a continuity which strongly appeals to many listeners. An Australian Saga, "As Ye Sow" (Edmund Barclay), began in January, 1937, and was still running at the end of June. In it the fortunes of two fictional families are followed against an authentic background of Australian history from the arrival of the First Fleet to the present day. This has become, in many ways, the most popular production of the year.

Adaptations of the "Father Brown" stories of G. K. Chesterton have also been successfully broadcast in serial form.

Australian Drama Week:

In April last, an "Australian Drama Week" was held, during which a play on Australian life by an Australian author was produced on each of the seven successive nights. A good deal of publicity for local playwrights resulted, and the dramatic critics of many Australian papers began to pay attention to broadcast activities as well as to other branches of dramatic work. It is hoped to hold two such festivals each year.

TALKS:

General Policy:

During the year 1936-1937, the Commission's policy in regard to the broadcasting of talks developed steadily along lines previously laid down. There have been talks by single speakers, occasional discussions by two or more speakers, and speeches delivered at public functions.

The two most notable developmental tendencies were the higher proportion of controversial talks (in which two or more aspects of "live" public questions were presented by carefully selected representatives of particular bodies of opinion), and the wider use of the serial form.

Controversial Questions:

The Commission is satisfied that both these practices have increased the interest and value of the talks. There is an urgent demand for authoritative exposition of topical issues. In meeting this demand, the Commission has not endeavoured to mould public opinion, but to ensure that the speakers chosen have had valid claims to present their particular point of view and that the contestants have been as evenly matched as possible.

Serial Talks:

Experience suggests that it is fairer and more satisfactory to allow the rival arguments to be presented in separate talks, following closely upon each other, than in debate form, which appears to throw too much emphasis on purely forensic ability. Debates were broadcast occasionally, but for the most part they were friendly or humorous discussions and not sharp or serious verbal combats. It is believed that the programming of numbers of talks on the same subject in serial form has given listeners an opportunity of forming judgments on the issues at stake. This is rarely possible in the limited time allowed for a single talk or debate.

NATIONAL TALKS.

The relaying of outstanding talks to all States (under the title of "National Talks") had already been found successful and was continued. All listeners were thus given an opportunity of hearing most of the leading thinkers and speakers of the Commonwealth.

A synopsis of these talks was printed in booklets and distributed free of charge among listeners at the commencement of each quarter of the year.

The full weekly programme of national talks was, at June 30, 1937, as follows:—

Sunday	6.40 p.m. to 6.55 p.m. 8.50 p.m. to 9.10 p.m.	(As per booklet). (International Affairs).
Monday	7 p.m. to 7.20 p.m.	(As per booklet).
Tuesday	7 p.m. to 7.15 p.m.	(Subject of topical interest).
Wednesday	7 p.m. to 7.15 p.m.	(As per booklet).
Thursday	7 p.m. to 7.15 p.m.	(Distinguished visitor).
Friday	7 p.m. to 7.15 p.m.	(Book Review).

State Talks:

As before, talks covering a wide field in both subject-matter and method of approach were broadcast locally in all States.

BROADCASTS TO SCHOOLS:

General Policy:

School broadcasting already established throughout the Commonwealth, was continued, the scope of the lessons being enlarged considerably.

Lessons were designed not as direct aids to examinations, but in reasonably close relationship to the school syllabuses. The aim is to supplement, and not duplicate, the work of the teacher, by using material and methods of presentation which are unlikely to be available to him.

The number of schools regularly listening to these broadcasts increased from 1024 to 1214.

The Commission anticipates that progress will be even more rapid when a second transmitter is available in every capital city, thus leaving more programme space free, at suitable times, for school broadcasts.

Subjects:

The number of subjects dealt with has also increased and in most of them two sets of broadcasts have been given, one intended for primary schools, the other for secondary schools. Special courses were also given for advanced students.

Modern Languages:

In the modern language section, French broadcasts had been included in the Commission's programmes for a number of years. Little or no attention, however, had been paid to other languages, which most schools had also neglected.

Following the recent decision of the British Broadcasting Corporation to adopt multi-lingual broadcasting, there will no longer be any great nation which confines its programmes to the language of its own people. The rapid improvement in the efficiency of world-range short-wave receiving sets brings closer the day when every home will be equipped to receive programmes from all parts of the world. This development has stimulated a wide-spread desire for the acquisition of some knowledge of foreign languages, and broadcasting may play a useful part in meeting this need.

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The Commission has, in response to this desire, now added German and Italian to its already established courses in French.

It is believed that the newly arranged series of broadcast lessons and readings in these three languages will serve two main classes of listeners. First, the uninitiated who desire help in the earlier stages of learning a foreign language—especially a language such as German or Italian, in which little or no tuition is given in most schools.

Secondly, those who, although acquainted with a language, may be benefited by hearing it spoken with fluency, grace and authority.

The broadcast will be wide enough to embrace an audience composed of both adults and children.

It is not to be expected that anyone whose effort to learn a language is confined to listening to a broadcast for fifteen minutes weekly will secure a competent knowledge of that language. The broadcasts must be looked upon only as supplementary to a more intensive study. It would be impossible, however, for competent teachers to be made available for every school, every small corner of the Commonwealth, and every individual who might be debarred for various reasons from securing such tuition. One of the great advantages of broadcasting is that it may serve the needs of a widely scattered potential audience. The Commission's facilities for reaching homes and schools throughout the Commonwealth enable it to give such a service from a central point by means of direct broadcasts and relays to other States and outlying districts.

"National" Broadcasts to Schools:

Progress was made in another direction by the introduction of three series of "National" School broadcasts—broadcasts relayed from one centre to all or at least most of the States. These broadcasts dealt with musical appreciation, international events and tendencies, and elementary physiology and hygiene. It is hoped that in future increasing numbers of school broadcasts may be relayed throughout the Commonwealth, so that only the most expert broadcast teachers will be employed, higher fees will be paid, and more time and money spent on the preparation of the lessons. Wide variations between the syllabuses of the several States have hitherto retarded this development, while further difficulties arise as to suitable times and dates. Despite these obstacles, the three series mentioned above have proved most successful, and it is the Commission's intention to retain and extend them whenever opportunity occurs.

Booklets:

The Commission has continued to issue booklets illustrating each series of school broadcasts, and to distribute these free of charge to all school pupils who are able to listen to the relevant lectures, as well as to any other listeners on application. In some States, by way of experiment, a separate booklet was issued for each subject; in other all courses were included in one publication.

In Victoria alone 11,000 booklets relating to the "Health" broadcasts were distributed, while in New South Wales 27,000 children were supplied with the composite booklet dealing with all broadcasts to primary schools in that State.

NEWS SERVICE:

National News:

In August, 1936, the Commission appointed a Federal News Editor to control the national news service, and to secure the fullest possible advantages available to the Commission under its agreement with the Australian Newspapers' Conference. One of the first steps taken was to arrange for the early morning cable news to be relayed from Sydney to all States except Western Australia. This brought the morning service into line with the evening service, and created two national news sessions each day, with the exception of Sunday. The news is in both cases re-written from the information contained in the Australian Associated Press Cables and the British official wireless news. This enables a great many more facts to be included in a given time, while the matter is made much simpler and easier to follow, being prepared for the ear instead of for the eye. The relay of the morning and evening cable news from Sydney to other States ensures a continuity of treatment that was difficult to achieve when each State prepared its own cable news, and also enables all States to benefit by the employment of a central staff of men experienced in newspaper work.

The Timing of Sessions:

The morning and evening sessions were rearranged to meet the convenience of the greatest number of listeners.

The first session was altered to run from 6.45 to 7 a.m., and to include a "summing-up" of the latest overseas news for the information of listeners. The second session, from 8 a.m. to 8.15 a.m., has included the greater part of the British official wireless bulletin, received in Sydney about 7.30 a.m. The evening news session has extended from 7.20 p.m. to 7.35 p.m., and has included the cable news, a news commentary (relayed to all States except Western Australia), and five minutes of local news in Each State. The news commentaries were given by prominent students of overseas affairs and proved highly popular.

The A.B.C. Service:

During the year listeners were well served on a number of occasions by the Commission's own news organisation. Probably the most notable instance was during the constitutional crisis in England last year, when a special service of cables kept listeners supplied with the latest authentic information. On other occasions, too, listeners were kept promptly informed concerning important happenings by means of telegrams, cables, talks and eye-witness descriptions.

Sunday "Pointer" News:

Sunday night news services were arranged in each State during the year. In a majority of the States the members of the Australian Newspapers' Conference agreed to supply "pointer" services for broadcasting at a mutually satisfactory hour. These bulletins contain a brief outline of the most important news to be featured in the following morning's papers. In addition to these Sunday night "pointer" services, the Commission's own news staff collected details of many important happenings, and these were broadcast in the evening news session. Arrangements have also been made for the States to exchange news of major happenings on Sundays, so that listeners as a whole may know what is taking place all over Australia.

"Affairs at Home and Abroad":

"The Watchman" returned from his overseas tour in February and resumed the daily session, "At Home and Abroad." During his absence this session was conducted by "The Spectator."

ESSENTIAL SERVICES:

Summarising of Information:

Arrangements are in hand to revise the method of compiling and broadcasting what is known as "essential services"—news relating to markets, weather, etc., etc. Experience has shown that listeners prefer simple outlines of trends to a mass of statistics. When the technical arrangements are complete it is proposed to broadcast through each Regional Station only such market information as is of direct interest to the listeners served by it. In this way the whole of the rural districts will be catered for, with a minimum of repetition of unwanted matter.

(Continued overleaf.)

Australian Broadcasting Commission Annual Report (continued)

RELIGIOUS BROADCASTS:

Regular Services:

Daily devotional services and Sunday Church services have been prominent features of the Commission's programmes. Each week-day morning a brief non-denominational service has been broadcast, and on Sundays both morning and evening church services have been transmitted. "Pleasant Sunday Afternoon" services in different States, and a Melbourne "Questions and Answers" religious session, have been regular programme features. "A Sermon for those who may not Like Sermons" has been broadcast once each month. A half-hour session of sacred choral music has been regularly included in the Sunday evening programme, which always concludes with an epilogue.

The number of services broadcast on behalf of each denomination is, as nearly as possible, in proportion to the population strength of each, as set out in the latest stastics available in each State. When requested, a mixed vocal quartet is sent, at the Commission's expense, to augment the choir in the broadcast service.

CHILDREN'S SESSION:

A special half-hour daily is reserved for children, and this feature has been developed considerably. It has been found that serials, especially when dramatised, are popular, and Australian authors have been invited to contribute work for this purpose.

Entertaining instruction is given in the principles of essay writing, poetry writing, and drawing. Children are invited to submit original work, and have responded readily in some States, the standard being at times surprisingly high. Topics such as the news of the week, animals in the Zoo, and travel experiences are discussed in appropriate form and language.

DESCRIPTIVE BROADCASTS:

A wide variety of descriptive broadcasts, such as of the Coronation (by courtesy of the B.B.C.) and the landing of Miss Jean Batten at Mascot, have been presented.

Special Reporter:

This feature of the Commission's activities has been developed during the past twelve months. A notable occasion was the sending of a special reporter by aeroplane to the scene of the Rabaul Volcanic disturbance.

Fleet Manoeuvres:

There were also the usual broadcasts of Armistice Day Services, the Royal Agricultural Shows in the several States, and other annual outdoor events. Particular reference should be made to a special broadcast by short-wave transmitter from H.M.A.S. "Canberra," when an officer of the Commission gave a running commentary on the Fleet's manoeuvres and its full-calibre shoot. In this relay principal squadron leaders also contributed descriptive talks.

"Glimpses of Melbourne":

In Victoria a series of descriptive broadcasts entitled "Glimpses of Melbourne" has given listeners an insight into the everyday life of such places and organisations as the Central Fire Station, the Flinders Street Signal Box, the Forests Research Laboratory and the Government Observatory.

Stinson Air-Liner:

A Commission representative was early on the scene of the tragic crash of the Stinson air-liner in Queensland, and a descriptive broadcast of nation-wide interest included interviews with the survivors and with Bernard O'Reilly, through whose heroic efforts the missing plane was discovered.

"Behind the Scenes":

A series of descriptive broadcasts of the work and life of Australians employed in various occupations, under the title "Behind the Scenes," was given during the year.

SPORTING BROADCASTS:

The Commission once more maintained a comprehensive sporting service. Preliminary comments and actual running descriptions were broadcast in respect of nearly every important sporting event in Australia during the year under review, while results of still more events were secured by telegraph or telephone and announced as soon as they were available.

Overseas events of interest to Australia were also comprehensively covered with a minimum of delay, sometimes by the rebroadcasting of running accounts transmitted by the short-wave stations of the British Broadcasting Corporation, the National Broadcasting Company (Incorporated) of America or European organisations, and sometimes from cables despatched from the scene of the contest.

Purchase of Broadcasting Rights:

While convinced by experience that broadcasting tends to increase, rather than to decrease, attendances at the sporting fixtures which are described over the air, the Commission has on occasion paid for the right to broadcast important sporting events. In the majority of such cases it has purchased exclusive rights, but has nevertheless been faced at times with the competition of other stations which have described the same events from points beyond the area controlled by those arranging the fixture in question. Owing partly to the high standard of efficiency maintained by the Commission's describing staff and partly to the advantageous position from which their descriptions have usually been given, this competition is thought to have been serious only in cases where there has been a substantial limitation of the time or content of the descriptions permitted to the Commission. Such limitations, being included in the licence to broadcast the fixture purchased by the Commission, do not affect unauthorised describers, who have thus, for example, been free to broadcast information of special interest to those engaged in starting-price betting.

Olympic Games:

A representative of the Commission was present at the Berlin Olympiad and each night gave eye-witness commentaries upon events in which Australians were particularly interested. The commentaries were transmitted, by courtesy of the Reichs Rundfunk Gesellschaft and the organisers of the Games, from the scene of the contests.

International Tennis:

The Commission arranged an extensive cable service to give listeners frequent progress results of the matches comprising the Davis Cup Zone Final lawn tennis contest between America and Australia in 1937, and this service was supplemented by re-broadcasts of running commentaries transmitted from the Forest Hills courts by the National Broadcasting Corporation Inc. of America.

Similarly, during the Wimbledon lawn tennis championships the Commission, in addition to receiving results by cable, rebroadcast several of the British Broadcasting corporation's running descriptions.

Cricket:

The English (M.C.C.) cricket team visited Australia during the 1936-37 season and was accompanied throughout the greater part of its Australian tour by a representative of the Commission. The entire course of play in every Test match was described on a National relay, ball by ball, while substantial portions of all other first-class fixtures were also broadcast.

Australian Broadcasting Commission Annual Report (continued)

Football:

Visits from three international football teams, namely, the English Rugby League in the early part of the year under review and the English Association (amateur) and South African Rugby Union teams in 1937, provided a number of unusually interesting broadcasts. Many other notable football matches were also described in their entirety.

Racing:

Every metropolitan race meeting of note throughout the Commonwealth—including the Melbourne and Sydney Cup meetings—was described by the Commission, and many such descriptions relayed to other States. A large number of country meetings were also broadcast and results of the remainder announced to listeners as they became available.

The British Broadcasting Corporation's descriptions of well-known English meetings, such as the Derby and the Grand National Steeplechase, were re-broadcast from the Empire Station's transmissions.

WOMEN'S SESSIONS:

During the year the women's session, which is broadcast every morning in each State, underwent several changes, with a view to increasing its appeal to all classes of listeners. The principal change was the increasing of the amount of light music and reducing of the talk periods. Interspersed with the broadcasting of light recordings have been recipes, social notes, household hints and brief talks of a popular nature, as much as possible of direct interest to women.

A new and successful feature incorporated in the women's session in each State has been the reading of a weekly airmail letter written by an Australian woman from London.

Contact has been made, and maintained, with women's organisations, with a view to obtaining speakers able to make suitable contributions to the programmes.

COMMUNITY SINGING AND OLD-TIME DANCE CONCERTS:

Community singing still remains a popular feature of radio in Australia, and the Commission regularly broadcasts—in each State, except Tasmania—concerts of this description, the proceeds of which are given to charity or applied in the purchase of receiving sets for hospitals. In Sydney and Melbourne both a midday and an evening community concert are held each week; in Brisbane and Adelaide the concert is at midday, and in Perth in the evening.

Old-time dance nights continue to be popular in certain States, and are programmed once a month in Sydney and once every three weeks in Melbourne. This session is of particular benefit to the remoter country districts, where it is difficult to secure dance bands.

OVERSEAS RE-BROADCASTS:

The Commission would once again like to place on record its gratitude to the British Broadcasting Corporation for permission to relay many of the Corporation's interesting features. These rebroadcasts have included talks by world-personalities, interesting musical programmes, descriptions of famous events and ceremonies, and notable sporting commentaries.

From time to time the Commission has also rebroadcast short programmes from other short-wave stations, such as those of the National Broadcasting Company (Inc.) of America, the Reichs Rundfunk Gesellschaft (Germany) Radionations (Geneva), and Philips Radio (Holland).

The chief overseas relays of the year were, in chronological order, the Olympic Games broadcasts from Berlin; the First World Concert, given by the United States of America under the auspices of the International Broadcasting Union; the League Assembly series of talks; the programme from Klemzig, Germany, marking the centenary of Klemzig, South Australia; the Abdication speech by Earl (then Mr. Stanley) Baldwin, and the address by King Edward VIII; the Proclamation of King George VI; Princess Juliana's Wedding; Herr Hitler's speech at the opening of the Reichstag; a concert from the U.S.S.R. commemorating the death of Pushkin; the Coronation broadcasts; and Wimbledon lawn tennis.

The League Assembly series was a larger venture than anything of the kind previously undertaken by the Commission. It was made possible in the first place by the fact that the chief A.B.C. commentator on affairs, "The Watchman," had been invited to Geneva as an observer by the League Secretariat, and was thus able to act as the Commission's official representative. Through him, with the assistance of Secretariat officials and the Australian High Commissioner in London, the Right Honourable S. M. Bruce, a series of special broadcasts to Australia was arranged, including speeches by M. Blum, Mr. Malcolm Macdonald, and the Aga Khan.

SHORTWAVE PROGRAMMES:

The Commission has itself made some contribution to the shortwave entertainment of other countries. From mid-October onwards throughout the summer a special one-hour transmission of ball-to-ball cricket commentary was broadcast from the shortwave station 3LR, with an aerial directed on Western Europe, for the special benefit of Test cricket enthusiasts in England and India. This session, which developed some little following among shortwave listeners, was continued until mid-July.

Since the beginning of December, 1936, a special bi-weekly evening news session in French has been broadcast on shortwave for New Caledonia and the New Hebrides, in response to a request from French listeners made to the Commission through the Consul-General for France in Sydney. The service is necessarily limited in scope, but has been warmly welcomed by its French listeners, for whom apparently it does much to lessen the sense of isolation.

During the recent visit of the South African Rugby Union team, commentaries on the test matches which it played against Australia were broadcast on shortwave for the benefit of South Africa, with very great success.

Note:

Since the end of the period under review it has been decided to cancel the special one-hour directional transmission directed daily to shortwave listeners in England and India. This transmission, which was introduced in order to provide a special service during the Test cricket season, met with some encouraging response from shortwave listeners abroad; but, in spite of the advantage given by the directional aerial, the power of 3LR is not at present great enough to provide a really satisfactory service at that distance.

Station 3LR was originally designed to serve remote Australian listeners (i.e., people beyond the range of medium-wave stations), and the Commission proposes to use it primarily for this purpose until its effective range is substantially increased.

TECHNICAL:

During the latter part of the period under review, considerable development has taken place in improving the acoustic response of the various studios under the Commission's control, and in bringing programme-handling methods into line with modern overseas practices. With

(Continued overleaf.)

Australian Broadcasting Commission Annual Report (continued)

this in view, control booths are being provided in association with a number of studios, so that an effective joint programme-control may be obtained over the artistic and technical components of each item. By this system a producer and his technical associate sit side by side in a soundproof room which, however, has visual access to the studio, so that a close supervision may be exercised over each rehearsal and performance.

The Postmaster-General's Department has devised a new form of control console to enable the most efficient use to be made of the new system. Even, however, with these improvements, the studios available to the Commission must continue to be inadequate until new premises are built.

Postmaster-General's Department:

The Commission is once more happy to place on record its appreciation of the help and courtesy extended to it by the Postmaster-General's Department, and would like to make particular reference to the excellent technical arrangements made by the Department for the Abdication, Coronation and Olympic Games re-broadcasts, and the Test Cricket, Rabaul, and Stinson Air Liner Relays.

STUDIO ACCOMMODATION:

During the year an intensive survey was made of the existing studio facilities in all States.

With the co-operation of the Postmaster-General's Department on the technical side, steps are being taken to modernise the studios both acoustically and technically.

As the Commission's studios in all States except one are housed in rented buildings, which in no case were initially intended for broadcasting purposes, it will be realised that any success achieved by the programme staffs has been in spite of, rather than because of, studio conditions.

The Commission, therefore, has been faced with the problem of modernising its programme-handling facilities and increasing the number and types of studios available, at a cost commensurate with the temporary nature of its premises and the basic difficulty of sound-proofing and treating acoustically buildings not originally designed for such purposes.

The acoustic condition of the studios generally has not been satisfactory, and the shortage in the number of studios of all types has hampered the work of artists and programme staffs as to both rehearsals and performances.

The work now in hand is expected to effect a great improvement in methods of programme-production and to eliminate many of the difficulties with which performers and staff have been faced, ensuring at least reasonable conditions until such time as the Commission is able to provide correctly designed studios, adequate in number and suitably graduated in size and acoustical condition to permit of the satisfactory transmission of the various types of programme it is called upon to produce. Unfortunately, however, the cost of erecting the buildings necessary to house such new studios will be very high and far beyond the scope of the Building Reserve Fund at present held by the Commission. Nevertheless, plans for new premises in Sydney and Melbourne are being prepared and construction work will be commenced if and when the necessary funds can be made available.

STAFF:

With the increasing scope of the Commission's work, and in particular with increasing specialisation in various aspects of that work, there has naturally been an expanson of staff. The principal features of this expansion have been the appointment of a Federal Superintendent (next in seniority to the general manager) and the creation of a concert management department, a news department, a lighter productions department, and a school broadcasts department. In each case a Federal officer has been appointed to supervise the new department's activities. Good results are already apparent from this specialisation, and even greater improvements in the programmes may be expected when the necessary preparatory work has been completed.

The Commission would again like to place on record its appreciation of the loyal service given by its officers in both Federal and State departments in work which is constantly developing and which in its scope is truly national.

PERFORMING RIGHTS:

The acquisition of the right to perform copyright works of many types has again occupied much of the Commission's time and has required the expenditure of many thousands of pounds.

In the absence of any system of compulsory registration of copyright ownership and agency, the mere ascertaining of relevant facts prior to performance must always remain a source of embarrassment.

The negotiation of appropriate fees is also a subject of continual difficulty, especially in cases where copyright owners are joined together in a body of sufficiently representative size to make a licence to perform its jointly controlled works virtually obligatory upon any broadcasting organisation which purports to provide adequate and comprehensive programmes. Friction in regard to such matters has already induced one of the British Dominions, Canada, to legislate in regard to them, while the government of a second, viz., New Zealand, has indicated its intention of introducing a similar bill in the near future. The Commission doubts whether the problems in Australia will be satisfactorily solved without similar legislative action by the Australian Government.

In the meantime, following disputes with the Australasian Performing Rights Association concerning the proper rate of payment for a licence to perform works which that association controls, the Commission terminated as from 15th May, 1937, its agreement with the association. The association is suing the Commission for balance of fees under the old agreement as from 1st January, 1937, to 31st August, 1937. The parties have now arranged to submit their respective claims to voluntary arbitration and the hearing will come on shortly. Any determination of the arbitrator, however, will be binding upon the parties only until the end of the year 1938.

FINANCE.

Apart from the difficulty of providing for the urgent building requirements mentioned earlier in this report, the financial position of the Commission was sound at the conclusion of the fiscal year 1936-37. Assets stood at £283,865, as compared with £257,013 at 30th June, 1936, an improvement of £26,852. Against this, actual liabilities

Australian Broadcasting Commission Annual Report (continued)

(sundry creditors) amounted to only £31,702. The balance is made up of Reserve Fund £110,000, and Accumulated Fund £142,163.

The reserve fund consists of unexpended revenue which is being held in liquid form for the purpose of meeting future capital expenditure on land, buildings and equipment. It is represented by fixed deposits at the Commonwealth Bank of Australia.

The accumulated fund represents the total sum which has already been expended from revenue on capital assets, or absorbed in working capital. Of the total sum shown in this fund, freehold land and buildings account for £70,320. The balance, £71,843, is represented by office furniture, musical instruments, and equipment, together with the margin of sundry debtors over sundry creditors.

The sundry creditors total in the balance sheet includes a provision for an estimated payment to the Australasian Performing Rights Association. The actual amount of the Commission's liability will not be determined until the arbitration proceedings previously mentioned have been concluded, but for greater caution the estimate adopted has been based on the terms of the agreement previously in force, and terminated by the Commission.

Revenue from all sources increased by £87,242 to a total of £558,238. Revenue from broadcast listeners' licences increased by £67,761 to £529,135. Other gross revenue, including concert takings, interest in investments and sundries, increased by £19,481 to £29,103.

Expenditure increased by £165,411 to £544,942. This increase was nearly double the increase in revenue, and left a credit balance of only £13,296, as against the balance of £91,465 for the previous year.

This additional expenditure resulted partly from the unprecedentedly full season of concerts by world-famous celebrity artists who visited Australia under engagement to the Commission; their fees, travelling and gross concert expenses, together with gross expenses of other public concerts, increased by £60,723 over the corresponding figure for 1935-36.

Increased orchestral activities in all States accounted for a further £26,565 of the additional expenditure. Copyright and broadcasting right fees each increased by over £4,000 and rental of lines for "outside" broadcasts by over £2,000. By far the greater part of the remainder was accounted for by additional payments to Australian artists (including two dance orchestras which were employed on a full-time basis).

Comparison between the profit and loss statements of this year and previous years will be affected by the inclusion of rental of studios and salaries of programme-officers under the heading of "Artists' Fees and Programme Expenses"; "Rent of Offices" and "Staff Salaries" have been correspondingly reduced.

From the balance of £13,296 of revenue over expenditure, the sum of £10,000 was transferred to the reserve fund, raising the total of £110,000. The balance of £3,296 has been transferred to the accumulated fund, bringing it to £142,163.

It will thus be seen that by far the greater part of the Commission's increased expenditure for the year has been reflected directly in the programmes. The greatly increased number of broadcasts by celebrity artists, the higher standard of orchestral performances, and the general improvement in the quality of both material and artists used in the ordinary programmes has unquestionably enriched substantially the entertainment and service provided for listeners. Further, the encouragement given to local talent through the direct medium of increased opportunities for employment has been greater than in any previous year.

Further avenues of improvement are awaiting exploitation as revenues become available. Orchestras need to be increased in size, and their standard raised by extra rehearsals and the addition to their ranks of more efficient players in certain sections. As, too, the standard of local artists' work improves, it will be desirable to offer fees more in keeping with those paid overseas, in order that some at least may be prepared to remain in this country even when they have prospects of success abroad, and that all may be encouraged to spend more time and money in securing training and perfecting their technique.

It will, however, be impossible to set aside for this purpose the proportion of revenue which the Commission would like to devote to it until some arrangement can be made by which the quality of transmission from the studios will do justice to the quality of present programme material. This sum available for this purpose in the reserve fund, even when augmented to the fullest possible extent by the amount which the Commission can be authorised, under the Act, to borrow on debenture, viz., £50,000, will still fall far short of requirements. In default, therefore, of advances by the Treasurer, or Legislative amendment to increase the amount which may be borrowed on debenture, it will be necessary for the Commission to delay important programme developmental work in order to increase its reserve fund.

PERSONNEL OF COMMISSION:

The personnel of the Commission has remained unchanged during the year under review. The terms of office of the vice-chairman (Mr. Herbert Brookes) and the chairman (Mr. W. J. Cleary) expired on 25th May, 1937, and 2nd July, 1937 (i.e., in the latter case two days after the end of the period under review). In each case a re-appointment for a further period of one year was made.

We have the honour to be,

Sir,

Your obedient servants,

W. J. Cleary (Chairman)
H. R. Brookes (Vice-Chairman)
R. B. Orchard (Commissioner)
Elizabeth M. R. Couchman (Commissioner).
J. W. Kitto (Commissioner)

Australian Broadcasting Commission.

See next page for Balance Sheet and Profit and Loss Statement.

AUSTRALIAN BROADCASTING COMMISSION

BALANCE SHEET AS AT JUNE 30th, 1937

Previous Year £ s. d.	LIABILITIES.		1936-37 £ s. d.
18,146 5 9	Sundry Creditors		31,702 0 6
100,000 0 0	Reserve Fund		110,000 0 0
138,867 2 6	Accumulated Fund (Capital Account)	£138,867 2 6	
	Add Balance from Profit and Loss Statement	3,296 6 7	
			142,163 9 1
£257,013 8 3			£283,865 9 7

Previous Year £ s. d.	ASSETS.		1936-37 £ s. d.
53,259 16 7	Land and Buildings—Freehold	70,598 18 3	
	Less Depreciation	278 6 2	
			70,320 12 1
21,727 5 4	Office Furniture, Musical Instruments and Equipment	42,326 6 4	
2,443 3 0	Less Depreciation	18,581 2 4	
			23,745 4 0
	Stores and Stationery		3,225 6 0
	Sundry Debtors: Postmaster-General for Licence Fees	60,912 6 6	
55,557 12 3	Other	1,609 17 7	
2,303 16 10			62,522 4 1
	Payments in Advance		3,001 11 2
	Other Investments—Fixed Deposits	110,000 0 0	
100,958 9 10	Add Accrued Interest	1,154 5 0	
20,763 4 5			111,154 5 0
	Cash in Hand and at Bank		9,896 7 3
£257,013 8 3			£283,865 9 7

A. L. HOLMAN, Secretary.

W. J. CLEARY, Chairman of Commission.
Examined and found to be in accordance with the books and documents produced
1/12/37
H. C. BROWN, Auditor-General for the Commonwealth.

PROFIT AND LOSS STATEMENT FOR YEAR ENDED 30th JUNE, 1937

Previous Year £ s. d.	EXPENDITURE.		1936-37 £ s. d.
232,464 15 5	To *Artists' Fees and Programme Expenses (Payments to artists, orchestras, dance bands, military band, lecturers, announcers, accompanists, producers, salaries of programme officers and rent of studio accommodation)		395,710 12 7
44,137 10 5	Copyright Fees		48,249 6 0
9,679 13 4	Broadcasting Rights		13,790 8 4
9,962 0 2	Rental of Telephone Lines for Broadcasting and Outside Pick-up Costs		12,197 2 2
1,800 0 0	Commissioners' Fees		1,800 0 0
33,074 17 9	Staff Salaries		33,031 3 10
9,481 12 8	Rent of Offices		2,338 19 2
4,060 2 4	Publicity		4,350 7 3
5,324 12 7	Depreciation		6,052 18 4
	Other Expenses: Printing and Stationery	£6,009 11 6	
	Telephones	5,175 12 3	
	Travelling Expenses	5,138 0 5	
	Stamps and Telegrams	3,836 2 2	
	Sundry Expenses	7,261 19 6	
24,546 0 7			27,421 5 10
91,465 6 6	Balance carried down		13,296 6 7
£470,996 11 9			£558,238 10 1
40,000 0 0	To Transfer to Reserve Fund		10,000 0 0
51,465 6 6	Balance to Accumulated Fund		3,296 6 7
£91,465 6 6			£13,296 6 7

Previous Year £ s. d.	REVENUE.	1936-37 £ s. d.
461,374 18 0	By Revenue from Licence Fees	529,135 6 6
1,656 9 0	Interest on Investments	2,670 15 2
7,965 4 9	Other Revenue	26,432 8 5
£470,996 11 9		£558,238 10 1
91,465 6 6	By Balance brought down	13,296 6 7
£91,465 6 6		£13,296 6 7

*In the previous year's Statement the salaries of programme officers were included in Staff Salaries, and rent of studio accommodation was included in Rent of Offices.

Postmaster-General's Department

Twenty-Seventh Annual Report

The nett result of the working of the Postmaster-General's Department for the year after charging interest on capital was a surplus of £3,340,930.

Earnings.—The earnings of the Department for the year totalled £15,999,584, compared with £15,055,118 for the previous year, an increase of 6.27 per cent.

Working Expenses.—The working expenses of the Department, excluding interest on capital, for the year totalled £10,822,634, compared with £10,251,505 for the previous year, an increase of £571,129 or 5.57 per cent.

Interest on Capital.—The amount charged for interest on capital for the year represents 2.78 per cent. and with exchange added approximately 3.43 per cent. per annum. The amount is that allocated by the Treasury as this Department's proportion of the sum paid by the Treasury for interest on loan moneys and exchange on interest payments.

PERIOD: JUNE 1936 TO JULY 1937

The accounts of the Wireless Branch show a surplus of £87,718 as compared with a surplus of £86,184 for 1935-36.

The receipts for 1936-37 were £409,241, an increase of £65,205 or 18.95 per cent.

The expenditure, including interest charges, was £321,523, an increase of £63,671 or 24.69 per cent.

TASMANIAN CABLE.

The telephone service to Tasmania, which was opened on March 25, 1936, following the laying of a modern submarine telephone cable across Bass Strait, has proved mos tattractive and useful to residents in Tasmania and on the mainland. During the financial year 1936-37 88,036 calls were completed and the business is steadily increasing in volume. Plans are in hand to provide an additional channel between Melbourne and Hobart and also one between Melbourne and Launceston, increasing the number of telephone channels in the cable from four to six.

CARRIER TELEPHONE SYSTEMS.

Several carrier wave systems were installed during the year. There are now 85 systems in service providing 150 channels which total 41,700 miles in length. Thirty-three further systems are on order, including one for installation between Sydney and Melbourne to increase the number of channels from fifteen to eighteen, and one between Sydney and Brisbane to bring that group to ten.

OVERSEAS TELEPHONE SERVICE.

During the year the volume of business transacted over the radio telephone services terminating in Australia increased by 37 per cent. Three thousand nine hundred and eighty-one calls were connected, of which 2,258 originated in Australia.

Reductions were effected in the tariffs for calls to a number of countries and, during May, 1937, the rates for conversations between Australia and Great Britain were reduced specially in connection with the Coronation of His Majesty King George VI.

Fifty-two countries can be reached by radio telephone from Australia. In these countries approximately 34,500,000 telephones are in service, this representing 93 per cent. of the world's connections.

TOUR OF ENGLISH CRICKET TEAM.

Special arrangements were made to deal with the large volume of telegraph traffic at the various cricket grounds in connection with the English cricketers' tour of the Commonwealth during the 1936-37 season. Teleprinters were for the first time installed at Cricket Ground Telegraph Offices to provide direct communication with the Chief Telegraph Offices in other capitals and with the office of the Cable Company. A total of 1,507,232 words was dealt with at the Cricket Ground offices during the five Test matches. This represents an increase of 17 per cent. compared with the telegraph load arising out of the 1932-33 tour of English cricketers.

PEDAL WIRELESS STATIONS.

During recent years a system of licensed pedal wireless stations, under the control of the Australian Aerial Medical Services and the Australian Inland Mission, respectively, has developed in remote parts of the Commonwealth not served by the normal telegraph or telephone system. Each pedal station transacts telegraph business by wireless with a particular base station from which point the traffic is handed over to the local telegraph office for onward transmission over departmental channels or for local delivery, as the case may be. There are at present six base stations serving 100 pedal stations, but the service is rapidly extending to new localities. The system provides a valuable means of communication for outback residents, enabling them to exchange messages with other pedal stations in their locality and with any telegraph office in the Commonwealth, as well as with overseas destinations.

BROADCASTING SERVICE

NATIONAL BROADCASTING STATIONS.

The year marked an important advance in the extension of the National Broadcasting Service, as six new regional stations were opened, viz.:—

2NR (Lawrence), New South Wales.
2CR (Cumnock), New South Wales.
3WV (Dooen), Victoria.
4QN (Cliveden), Queensland.
6WA (Minding), Western Australia.
6GF (Kalgoorlie), Western Australia.

A number of other new stations are in course of construction in accordance with the plans for the development of the National Broadcasting network.

Postmaster General's Department Annual Report

COMMERCIAL BROADCASTING STATIONS.

There are now 80 Commercial Broadcasting Stations in operation, seven additional stations having commenced service during the year. Twenty-three stations are located in the capital cities and 57 in the country areas, the aerial power of the metropolitan stations varying from 100 to 1,000 watts, and the country stations from 100 to 2,000 watts. The aggregate weekly programme hours are 5,991.

USE OF TRUNK LINES FOR BROADCASTING PURPOSES.

Increasingly heavy demands were made on the long-distance telephone system by both National and Licensed Broadcasting Stations in order to provide for the relaying of programmes for simultaneous radiation. During the year, telephone channels were used for relay purposes on 6,243 occasions by the Commission and in 7,055 instances by licensed stations; altogether trunk line channels were occupied for 27,291 hours.

The Australian Broadcasting Commission utilised interstate channels on 5,351 occasions whilst the licensed stations made use of them for 1,668 relays. Of the total transmissions which occurred, 754 included broadcasting stations in six States, 1,591 extended to five States, 85 to four States, 1,296 to three States, and 2,526 to two States.

The following details, which relate to national service relays over the interstate circuits, indicate generally the types of programmes transmitted over the trunk lines for broadcasting purposes:—

Item.	Number of Relays
Race descriptions	1,242
Musical programmes	1,174
Talks and speeches	730
Stock Exchange, market and corn reports	717
News sessions	643
Cricket descriptions	380
Operas, plays, etc.	187
Overseas programmes	107
Sporting descriptions	104
Miscellaneous items	39
Concerts	28
	5,351

The record previously established for a simultaneous broadcast was broken during the year when 96 separate broadcasting stations in the Commonwealth were linked together by approximately 20,000 miles of telephone channels which had to be withdrawn temporarily from their normal functions and specially arranged by the technical staffs of the Post Office to give the high quality transmission which is essential to the effective relaying of items for broadcast purposes.

The continued demand for the use of channels suitable for programme transmissions between broadcasting stations has become a problem requiring constant and careful consideration in the design of the long-line plant of the Department. Already 7,419 miles of special high quality channels have been provided exclusively for broadcasting relay purposes and there is a growing tendency towards the continuous association of country and metropolitan licensed stations for the purpose of securing better programmes at less cost and widening the advertising field.

CORONATION CEREMONY.

The description of the Coronation celebrations was successfully received and relayed throughout the Commonwealth for rebroadcasting by National and licensed stations.

AUSTRALIAN BROADCASTING COMMISSION STUDIOS.

During the year, the Australian Broadcasting Commission commenced a programme for the installation of a number of additional studios in the capital cities. A new system of technical control, based on the latest overseas practice, was introduced by the Department in order to meet the requirements in the most effective manner. This system employs standardised units, and provides complete facilities for rehearsing, observation and testing. It enables a grade of transmission to be attained that is equal to the highest standard achieved by recent overseas installations.

During the year this new system was introduced in Perth where a new group of studios was taken over by the Australian Broadcasting Commission. The equipment for these studios was designed and manufactured wholly in Australia.

BROADCAST LISTENERS' LICENCES.

Licences authorising the reception of broadcast programmes increased during the year by 114,932 or 14 per cent., compared with 103,284 or 14 per cent. during the previous year; the total for the Commonwealth at June 30, 1937, was 940,068. This number represents 58 per cent. of the total dwellings. The greatest percentage increase was recorded in Queensland and Western Australia where the number of licences in each State increased by 22 per cent., the actual figures being 18,360 and 11,184 respectively.

The greatest density exists in South Australia (including the Northern Territory), where 99,209 homes or 69 per cent. of the total dwellings are equipped with licensed receivers.

The corresponding totals and percentages for the other States, in order of density, are—

		Per cent.
Victoria	289,198	65
New South Wales (including Federal Capital Territory)	358,976	57
Western Australia	61,265	56
Tasmania	29,830	55
Queensland	101,590	45

Of the total licences in the Commonwealth (940,068) 63 per cent. are in the metropolitan areas.

During the year, 48,622 persons availed themselves of the facility whereby provision may be made for the payment of licence-fees, by the purchase of postage stamps.

Free licences issued to blind persons during the year numbered 1,988.

UNLICENSED LISTENERS.

Prosecutions during the year, in connection with the use of unlicensed broadcast receivers, numbered 3,658; the total amount of fines and costs inflicted totalled £7,939. Up to June 30, 1937, 15,198 persons were convicted for this offence, the fines and costs aggregating £35,240. The number of investigations by Licence Inspectors during the year exceeded 151,000.

RADIO INDUCTIVE INTERFERENCE.

Details of the activities of the Department during 1936-37 in the investigation of interference with broadcast reception are given hereunder—

Cases reported during the year	9,599	Cases in which interference was eliminated as a result of departmental efforts	9,606
Cases carried over from previous year	942	Cases awaiting inspection or further attention by Department	935
	10,541		10,541

In the course of their investigations, the officers engaged on the work made 26,332 inspections.

Postmaster General's Department Annual Report

PROFICIENCY CERTIFICATES.

During the year, 840 candidates were examined for Operators' Certificates of Proficiency. The number of certificates issued during the year was—

Commercial:		
First class in Radiotelegraphy and Radiotelephony		34
Second Class in Radiotelegraphy		36
Third Class—		
Radiotelegraphy	338	
Radiotelephony	12	
Telegraphy and telephony	51	
		401
Broadcast Operator		102
Limited—Radiotelephony		5
Amateur		258
		836

Third Class Certificates and Broadcast Operators' Certificates were introduced under new Regulations gazetted on July 1, 1936, the issue of Limited Certificates being discontinued as from that date.

Examinations for Third Class and Broadcast Operators' Certificates of Proficiency were conducted, however, during the previous year, when 146 candidates qualified for Third Class Certificates and 46 qualified for the Broadcast Certificates. The issue of the certificates was held in abeyance pending the gazettal of the Regulations. This accounts for the unusually high number of certificates issued (836) compared with the number of examinations conducted (840).

OTHER SERVICES.

The total number of radio communication stations (other than broadcasting stations and experimental stations) in operation in the Commonwealth, including Papua, at June 30, 1937, was 533, compared with 421 at the end of the previous year. The comparative figures for the various classes are—

	Number at June 30, 1936	Number at June 30, 1937
Coast Stations	21	21
Ship Stations	195	212
Aircraft Stations	14	23
Land Stations	102	154
Portable Stations	29	51
Special Stations	60	72
	421	533

Stations in the Mandated Territory of New Guinea at June 30, 1937, numbered 22, including seven coast stations.

Experimental stations increased during the year from 1,523 to 1,737.

RESEARCH LABORATORIES.

The research laboratories—the establishment of which and progress from time to time have been referred to in these annual reports—have again reached the stage when more accommodation is required to cope with the work resulting from the increasing fields of activity. Certain space on the ground floor of the building at 59 Little Collins Street, Melbourne, previously leased to tenants, was resumed at the conclusion of the tenancy and is to be equipped for laboratory purposes. With the exception of two small lock-up shops, the whole of the three-storey building is now devoted to the laboratory activities, the floor space totalling 34,000 square feet. The staff now comprises 57 persons and the laboratory equipment asset value is £35,000.

In addition to specifications and reports in connection with the specific projects, there is issued from the laboratories a series of publications dealing with the regular work. They are entitled—

Laboratory Reports,

Test Reports,

Apparatus Development Reports, and

Information Bulletins.

and the total of these issued during the year was 131.

Among the functions of this organisation is that of originating, investigating or developing new forms or systems of electrical communication, the intention being that when such development has reached the point where the system is established as a regular plant activity of the Department, the work is then to be transferred to an appropriate branch or section of the Department. This was the course adopted with the original transmission planning of the main telephone trunk line system of the Commonwealth, and with the introduction of telephone repeaters and the high frequency carrier systems of telegraphy and telephony. In accordance with this procedure the technical plan and design of the National Broadcasting System was worked out and a series of engineering practices established for the design and construction of the stations, their radiators (aerials) and the technical equipment of the associated studios. During the course of the year this work had reached the stage when it could with advantage, be transferred to another section of the Chief Engineer's Branch. This has been done and a section of the laboratories staff is now able to concentrate upon other new activities. The special work in connection with the selection of sites for the National Broadcasting System will still be dealt with in the laboratories.

Among the activities with which the staff were concerned during the year under review was the application of an improved technique that had been developed from prior investigations in the location of faults which had occurred in one of the Bass Strait submarine telegraph cables. A method had been developed by which was minimised the ill effects of stray currents induced in the cables by variation in the earth's magnetic field, and the accuracy of the location tests was thereby considerably improved, and in addition there was developed and put into use the electrical cable tracer for trailing from ship to locate the precise position of the cable. Although not a new idea, this particular apparatus differs in some respects from similar equipment used in other countries. It proved of great value in cases where the cable had moved away from its charted course and avoided blind searching by means of grapnels.

A large number of cases of corrosion of underground cables has been investigated and the knowledge being gained from these is helping to discover methods of reducing the damage to this type of the Department's plant in which very large sums of money are invested. Another activity concerning basic plant materials is that of studying the fatigue of metals subject to vibration such as the copper wires on telephone poles which can vibrate severely under certain wind conditions. From this study it is hoped to devise improved methods of tying the wires to the insulators so as to reduce the number of breakages at these points.

RADIO COMMUNICATION INVESTIGATIONS.

Radio propagation at very high frequencies is assuming an increasingly important function in commercial telegraph and telephone practice and development of this kind of service is now taking place in many parts of the world. The Australian problem is being investigated here to ascertain the field of use and to determine the dependability of the service. Experiments are at present being conducted across Bass Strait from a point near Apollo Bay (Victoria) to a hill near Stanley (Tasmania).

SUMMARY OF FINANCIAL RESULTS OF WIRELESS BRANCH

For the year 1936-37, together with a comparison with "Total Commonwealth Results" for the years 1931-32 to 1935-36 inclusive.

	Earnings	Working Exes. excl. of Interest	Earnings compared with Working Expenses	Interest on Capital, incl. Exch. thereon	Result, after Providing for Working Exes. and Interest	Percentage of Working Exes. to Earnings
New South Wales	156,568	99,337	57,231 Sur.	4,632	52,599 Sur.	63.45
Victoria	129,870	79,434	50,436 ,,	3,381	47,055 ,,	61.19
Queensland	41,358	44,595	3,237 Def.	2,562	5,799 Def.	107.83
South Australia	43,756	33,087	10.669 Sur.	1,962	8,707 Sur.	75.62
Western Australia	25,242	29,023	3,781 Def.	3,200	6,981 Def.	114.98
Tasmania	12,447	18,826	6,379 Def.	1,484	7,863 Def.	151.25
Total C'wealth 1936-1937	409,241	304,302	104,939 Sur.	17,221	87,718 Sur.	74.36
Total C'wealth 1935-36	344,036	244,204	99,832 ,,	13,648	86,184 ,,	70.98
,, ,, 1934-35	371,604	193,507	178,097 ,,	15,754	162,343 ,,	52.07
,, ,, 1933-34	269,640	170,711	98,929 ,,	11,694	87,235 ,,	63.31
,, ,, 1932-33	192,480	153,199	39,281 ,,	16,485	22,796 ,,	79.59
,, ,, 1931-32	160.576	116,143	44,433 ,,	13,501	30,932 ,,	72.34

PROFIT AND LOSS ACCOUNT OF WIRELESS BRANCH

FOR YEAR ENDED JUNE 30, 1937.

Table No. 7—Appendix A.

EXPENDITURE.

	Percentages of Net Income	£	s.	d.
Upkeep and Operation of Broadcasting Stations	18.51	75,757	4	4
Upkeep and Operation of Broadcasting Studios	8.02	32,804	13	5
General Supervision and Cost of Issuing Licences	19.92	81,519	17	8
Telephone Circuits used for Broadcasting and Miscellaneous Expenditure	17.49	71,564	5	10
	63.94	261,646	1	3
Proportion of General Administration Expenses	1.42	5,826	0	0
Depreciation	7.52	30,775	9	7
Proportion of Superannuation Liability and Pensions	1.48	6,054	0	0
	74.36	304,301	10	10
Surplus, exclusive of Interest, carried down	25.64	104,939	1	9
	100.00	409,240	12	7

REVENUE.

	£	s.	d.	Percentages of Net Income	£	s.	d.
Gross Revenue	938,375	19	1				
Less—							
Payments to Australian Broadcasting Commission	529,135	6	6				
Net Revenue: Licence Fees, Fines, etc.				100.00	409,240	12	7
				100.00	409,240	12	7
Surplus, exclusive of Interest, brought down				25.64	104,939	1	9
				25.64	104,939	1	9
Interest and Exchange charges				4.21	17,221	0	0
Surplus, inclusive of Interest, transferred to General Profit and Loss Account				21.43	87,718	1	9
				25.64	104,939	1	9

DETAILED STATEMENT OF FIXED ASSETS

Description.	Value on July 1, 1936	Expenditure 1936-37	Gross Value of June 30, 1937	Dismantled Assets Depreciation written off, and Assets transferred 1936-7	Net Value on June 30, 1937
National Station Equipment	235,355	72,524	307,879	880	306,999
National Studio Equipment	52,072	17,984	70,056	659	69,397
Other Broadcasting and Wireless Assets	11,597	1,935	13,532	279	13,253
Total Wireless Plant	299,024	92,443	391,467	1,818	389,649

WIRELESS BRANCH

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

	1936-37 Surplus			1936-37 Deficit			1935-36 Surplus			1935-36 Deficit		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
New South Wales	52,598	17	5				51,697	1	9			
Victoria	47,054	13	8				39,942	7	5			
Queensland				5,799	7	6				1,740	6	2
South Australia	8,707	3	6				7,084	19	7			
Western Australia				6,980	14	4	983	10	9			
Tasmania				7,862	11	0				11,783	19	2
	108,360	14	7	20,642	12	10	99,707	19	6	13,524	5	4

Total Net Surplus, 1936-37 £87,718 1 9

Total Net Surplus, 1935-36 £86,183 14 2

COMMUNICATION SERVICES *of the* P.M.G's. DEPARTMENT

THROUGHOUT the world the Postal Service is universally regarded as a public utility which it is fitting to place under direct Government control, its activities being of vital importance to the wellbeing of the general community in both business and social relations.

Hence, when the Commonwealth of Australia was constituted by the Federation of the six States in 1900, and it became necessary to define the affairs of State which, from their National character, it would be appropriate to transfer from the jurisdiction of the States to the Federal Parliament, the Post Office was naturally included in the functions deputed to the newly-constituted governing authority.

The carrying out of the work of the Post Office in Australia at the present time necessitates the employment, either fully or for part time, of over 47,000 persons, through the medium of some 10,000 offices, the transactions at which involve annual financial turnover of approximately £168,000,000. The number of postal articles dealt with exceeds 1,000,000,000 per annum.

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 journey 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, therefore, 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 horseback, by pack-horse, and occasionally by camel. For many miles in the outlying parts road are not available, and somewhat indefinite tracks point the way.

Aviation

To no country in the world has the newest means of transportation—aviation—offered greater benefits from the commercial and social standpoints than to Australia, with its great distances and scattered settlements in isolated territories. The Post Office was quick to recognise the possibilities of this rapid means of communication, and has availed itself of every opportunity to use regular aerial services for the conveyance of mails.

The expansion of the internal air mail system is evidenced by the increase in the route distance of services operating in Australia from 5,927 miles in 1931 to 18,544 miles in 1938, and by the increase in the total distance flown in air mail operations from 1,067,000 miles in 1931, to 8,000,000 per annum at the present time.

The Australia-Singapore section of the overseas air mail service, which was duplicated in May, 1936, now provides a twice weekly frequency between Britain and the Commonwealth.

EXPANSION DURING 1937.

The year 1937 has seen a marked expansion of the telephone system, 34,388 telephones having been added as compared with 32,541 during 1936. With the gradual return to pre-depression levels the development of telephone subscribers' services has shown a consistent improvement during recent years, and the 1937 figures are the best recorded since 1927. The improvement has not been confined to the metropolitan areas, the nett increase in country services in 1937 having totalled 8,874.

At the end of December, 1937, there were 613,955 telephones in service throughout the Commonwealth, of which 241,255 were connected to exchanges situated outside the telephone networks of the State capital cities. With an average of 8.71 telephones per 100 people, Australia occupies seventh place in the list of nations showing the greatest telephone density.

Record figures were also reached during the year in regard to the business handled. Approximately 550,000,000 local calls were dealt with as against 498,000,000 in 1936, and about 39,500,000 trunk calls were completed in comparison with 36,500,000 in the preceding year. The total length of telephone wire in use is in the region of 2,700,000 miles, and there are 9,120 exchanges in operation.

The quality of the telephone service rendered is determined by its speed, accuracy and dependability, and setting out to achieve a high standard in these respects the department has spared no effort to avail itself of the most modern methods of scientific aids. Not only have the products of the research laboratories in other countries been adopted wherever they are suited to Australian conditions, but constant researches have been made locally by specially trained staffs for the purpose of remedying likely defects in the service and introducing improved practices and procedure.

Australia has not been slow to avail itself of the advantages of the automatic system, and the proportion of dial telephones throughout the Commonwealth is much higher than in many leading countries overseas. 275,000 telephones in the metropolitan areas, or 74 per cent. of the total connected in the various capital city networks, are now served by automatic exchanges, and the number is steadily increasing. Each year additional manual exchanges are converted to the automatic system, and the plans contemplate the complete conversion of the metropolitan networks within the next few years.

The benefits of the automatic system in provincial and country centres are also recognised, and, whilst the conversion of all exchanges is out of the question because of the prohibitive cost which would be en-

Communication Services of the P.M.G's. Department *(continued)*

tailed, a gratifying and steady advance has been made in installing in rural areas automatic units which have been developed specially to meet the needs of small communities. Forty-one such units are now in service, and a further forty-four are listed for installation in the near future.

The efficiency and range of the long distance system has also received close attention, with the result that to-day the system penetrates into almost every settled locality in Australia, and a subscriber in one part of the Commonwealth can make a call to any other part of the continent, including Tasmania, clearly, quickly, and at low cost. In 1926 the average time taken to connect a trunk call was 13 minutes, and practically no calls could be obtained without some delay. Now the average waiting time is little more than four minutes, and 61 per cent. of the calls can be had while the caller remains at the telephone.

With the erection of high quality channels serving important centres and the installation of repeaters at suitable points, enormous distances can now be bridged with almost the same clarity as that of a local call, as, for instance, a call between Wiluna in Western Australia and Cloncurry in Queensland, a distance of 5,500 miles, which is possibly a record in long distance landline telephony.

CARRIER WAVE.

Another scientific development which has had a pronounced effect on the trunk line service is the carrier wave apparatus. By means of this equipment several channels of communication can be secured from one pair of wires, thus obviating the very heavy expense involved in the erection of new wires. Not only does the carrier system enable substantial economies to be effected in plant costs, but it also appreciably improves the quality of the transmission. There are now 103 such systems in use in Australia, and each system on the average saves the erection of nearly 1,500 miles of wire. 70 further systems will be installed in the near future.

The 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 Townsville station in Queensland to the Wagin station in Western Australia the circuit distance is 4,500 miles, and on several occasions programmes have been simultaneously broadcast at these extreme distances with many other intermediate broadcasting stations transmitting the same programme at the same time.

During 1930 a page in telephone history was turned with the establishment of radio telephone services with Great Britain, New Zealand and Java. These services have extended rapidly and there is now a steady stream of traffic to London and to places on the Continent such as Paris and Berlin, as well as to America. It is now possible for a subscriber in Australia to telephone any one of more than 34,500,000 telephones situated in 52 countries abroad. Calls may also be made to certain Trans-Atlantic liners whilst they are at sea, including the latest leviathan, the "Queen Mary," and the "Awatea," which trades between Sydney and New Zealand.

During the eight years since the inception of the overseas services, 16,361 calls have been completed, of which 9,326 originated in Australia. Great Britain has shared in 10,915 calls, New Zealand in 3,943, the United States of America in 512, France in 176, Germany in 161 and Ireland in 87, whilst the remainder have been distributed over other countries with which communication is practicable. Altogether calls have been made to 30 different countries in addition to ships at sea. Approximately 52 per cent. of the calls have been of a business nature and 48 per cent. of a domestic or social character.

The telegraph service is conducted from 10,000 offices interconnected by 300,000 channel miles of circuit. It deals with 16 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 simultantous telephone conversation. A facsimile of a picture, photograph or any document capable of photographic reproduction may be 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.

Private wire teleprinter services are made available by the Post Office for communication between two points either in the same area or thousands of miles apart. Transmission is effected by the operation of a keyboard similar to that of a typewriter, a printed record being made simultaneously at both terminals. The apparatus may be operated by any typist of average skill. Teleprinters may also be utilised for the

(Continued at foot of Page 71.)

Use of Long Distance Telephone Service for Australian Broadcasting

THE demand for the use of telephone trunk lines for broadcasting purposes by the Australian Broadcasting Commission and by commercial broadcasting organisations continues to increase, both in volume and in complexity, due to a growing appreciation of the value of simultaneous broadcasts from groups of stations. During 1937 telephone trunk line channels were used for broadcasting purposes on 14,279 occasions, and the growth since 1932 is evidenced by the following figures:—

Year	No. of transmissions over trunk lines.
1932	2,118
1933	3,478
1934	7,679
1935	9,997
1936	12,497
1937	14,279

Of the total relays which were completed in 1937, 2,458 extended to two States, 1,332 to three States, 1,052 to four States, 1,715 to five States and 852 to six States. The remaining 6,870 relays concerned only stations in the State of origin. The total time for which channels were occupied for broadcasting purposes exceeded 27,000 hours. There seems to be no limit to the variety of programmes transmitted over trunk lines and the following is a broad analysis of the items dealt with in 1937:—

Item	No. of relays
Race descriptions	1,288
Talks and speeches	926
News sessions	624
Musical programmes	1,488
Stock exchange, market and corn reports	576
Cricket descriptions	301
Programmes from overseas stations	46
Operas, plays, musical comedies, and revues	266
Other sporting events	166
Concerts	33
Miscellaneous items	2

Another record went by the board during the year when 96 national and commercial broadcasting stations were linked together by 20,000 miles of telephone trunk lines for the purpose of broadcasting the Coronation ceremonies. The greatest number of stations participating in a simultaneous broadcast on any previous occasion was 87. The value of these chain broadcasts appears to be more clearly realised each year and they provide a means whereby descriptions of events of national importance and programmes by leading artists in various spheres are made available to the maximum audience. Naturally, they impose an added strain on the tele-communication facilities of the Postmaster-General's Department which has to take special measures to cope with this important public service, both in the matter of providing equipment and staff.

So constant is the regular demand for simultaneous broadcasts now that no less than 7,323 miles of channels are tied up permanently for broadcasting purposes. To meet other requirements in respect of relays, long distance telephone channels are diverted from their normal functions for use as programme channels, due regard being paid to the volume of telephone business waiting disposal over the route concerned. The adequate provision of additional permanent programme transmission channels and also of telephone channels which can be used for broadcasting purposes for a portion of the time is another problem which continually faces the Department in the design of the long distance communication system of the Commonwealth.

Communication Services of the P.M G's. Department (Continued from Page 70.)

transmission of telegrams between a subscriber's premises and the local telegraph office.

A telephone subscriber may telephone telegrams to a telegraph office for onward transmission, the charges being included in the telephone account. A telegram addressed to a telephone number will be telephoned to the addressee without extra charge, thus ensuring more expeditious delivery of the message.

BROADCASTING SERVICES.

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 stationed operated by private enterprise. There are eleven national stations in the capital cities and twelve in the country areas. Several additional country stations, or regional stations as they are known, are in course of construction. The network is designed to provide extensive coverage and on completion of the scheme will service effectively about 95 per cent. of the total population.

The privately-owned group consists of 92 broadcasting stations which are distributed in the more densely populated areas of the Commonwealth. Frequently, by mutual arrangements among the managements of a number of these stations, extensive simultaneous broadcasting is effected.

ESTABLISHMENT OF FEDERAL ACCREDITATION BUREAU

SET OF RULES AGREED TO BY N.C.A.A.A.

Following protracted negotiations between the Australian Federation of Broadcasting Stations and the National Council of Accedited Advertising Agents, agreement was reached in April, 1938, on a set of rules for the accreditation of advertising agencies. Thus was achieved the first concrete step in the foundations of a Federal Accreditation Bureau, which will have a stabilising influence upon the industry.

The rules of accreditation as drafted and agreed to are set out in their entirety below.

1. Definitions:—

(a) "Federation" means Australian Federation of Commercial Broadcasting Stations.

(b) "Bureau" means the Accreditation Bureau established by the Australian Federation of Commercial Broadcasting Stations.

(c) "Secretary" means the Administrative-Secretary of the Australian Federation of Commercial Broadcasting Stations.

(d) An "Agency" for the purpose of these rules is one that has received Accreditation from the Bureau.

(e) A "member" of the National Council of Accredited Advertising Agents means a member of any of the bodies affiliated with that Council.

2. For the purpose of this Accreditation full powers to issue, withhold and cancel Accreditation Certificates are vested in the Bureau.

3. Applications for accreditation must be supported by evidence that the applicant maintains a properly equipped office, has sufficient standing and ability to carry out the undertaking involved in the granting of Accreditation under these Rules, and in respect of an Agency established after January 1, 1938, is independent of any financial control by, or arrangement with, any advertiser or broadcasting station, whereby the latter obtains any interest in the commissions paid to the applicant.

4. The Bureau shall consult with the National Council of Accredited Advertising Agents upon all matters affecting the interest of their members under these Rules.

5. When a member of the Federation or an Agency which is a member of the National Council of Accredited Advertising Agents has been accused of an infringement of these Rules the matter shall be investigated by a joint committee of equal numbers drawn from the Federation and the National Council of Accredited Advertising Agents. In the event of such an investigation the parties to the dispute shall both be required to produce any order or other material document that the committee desires to sight. The Joint Committee shall report the result of its investigation to the Bureau.

6. Agencies may be accredited under one of the following headings:—

(a) For the whole of Australia;

(b) For a State only.

(Continued on opposite page.)

P.M.G's. DEPARTMENT'S RELATION WITH COMMERCIAL STATIONS

As the licensing and controlling authority the P.M.G.'s Department is closely associated with the commercial stations. Applications for new stations, alterations or replacements to existing transmitters, and all other technical features of the stations call for the approval of the Department. In the interests of listeners these matters are carefully investigated in order to permit the broadcasters to develop the commercial service as far as conditions will allow throughout the various States.

The main limiting factor is the shortage of broadcasting channels (wavelengths) which, as already mentioned, are internationally limited to a certain band. In order, however, to provide for additional stations where they are considered justified and where there is a prospect of the stations becoming a financial success for their owners, the Department has introduced a system, adopted in other countries, of sharing the channels between two or more stations. In certain areas where more powerful stations are justified on the basis of population and area to be served, clear channels are provided for those stations, while in other cases, where a comparatively local service is required, stations are allotted channels on the sharing principle.

The maintenance of the operating frequency of the stations is of great importance in the success of the commercial stations, particularly those on shared channels, and the department gratefully records the co-operation which is afforded by the station owners in arranging for the installation of reliable equipment for this purpose. In order to help the stations in this matter, checks of the operating frequency are regularly made and the Department has provided suitable equipment for its radio inspectors in the different capital cities so that the work may be more usefully carried out in the interests of the broadcasters and listeners.

In 1937 trunk line channels were made available for commercial broadcasting stations on 7,652 occasions. Of the total relays, 855 went to stations in two States, 415 to stations in three States, 181 to four States, 237 to five States, and four relays included stations in the whole six States. The total time for which telephone channels were occupied for this purpose by commercial stations amounted to approximately 9,500 hours. Whilst a fairly wide variety of programmes is transmitted, the items comprising the majority of the relays are sporting descriptions and radio plays.

Federal Accreditation Bureau - Rules

(continued)

A certificate shall be issued for accreditation, for which a charge shall be made of £1/1/- for Australia-wide accreditation and 10/6 for State accreditation.

7. Applications for accreditation shall be made individually by Agencies, whether trading as individuals, partners or incorporated Companies. Only such Agencies as are duly accredited shall be eligible to receive commission.

8. All applications for either of the above classes of accreditation shall be made to the secretary on the form prescribed for that purpose and shall contain a signed undertaking to abide by the rules of accreditation and shall be accompanied by the prescribed fee.

9. The full period of accreditation shall be 12 months, and Agencies that are accredited shall be issued with an Accreditation Certificate by the Bureau for that period.

10. No Agency shall offer to any advertiser or seek from any Stations an advantage or concession in rates, station time or other advantage not included in the Station's schedule of rates and conditions upon which Advertising Agents are authorised to quote; in the event of any Station making any special offer not provided in the schedule, it shall be competent for the Agency to place such business under the terms of such offer at full commission rates.

11. Member Stations shall pay accredited Agents commission on air time and features at the rates fixed from time to time by the Federation. Not less than two months notice shall be given to the National Council of Accredited Advertising Agents of any variation in the rate of commission. In the event of any variation of commission rates or any variation in advertising rates, such variations shall not apply to existing orders or to bona fide quotations already made by an Agency to an overseas client; this arrangement to be subject to the production of evidence satisfactory to the Station concerned.

12. Full commission allowed by the Stations shall be retained by the Agency and, subject to the provision in this clause contained, shall not be shared with or rebated to any person, firm or company directly or indirectly and shall be apart from any service fees that may be charged by the Agency. This shall not be held to prohibit any Agency sharing any part of the commission with another Agency or from paying to any bona fide employee of the Agency a share of the commission payable by Stations. Free entertainment, free advertising of any other type, free advertising material or part or whole payment of the advertiser's staff, shall be regarded as a rebate.

13. Subject to Clause 16, the Agency shall accept full responsibility for the payment of its client's accounts in respect of all orders placed by the Agency or on which commission is paid or payable.

14. Agencies agree that representatives of Stations shall be entitled to quote direct to their clients provided that, if business should ensue the Agency is notified. Commission shall be payable to the Agency if it prepare and lodge the copy.

15. Commission shall be payable only to the Agency preparing and lodging the copy and only as accounts are paid, but no commission shall be payable or deducted by the Agency unless payment for accounts duly rendered and certified are despatched by the Agency to the Station by the end of the month following date of broadcast.

16. No commission shall be payable on business taken over by an Agency during the currency of an order previously obtained direct from the clients by the Stations unless it be definitely stipulated by the client that the business is to be serviced thereafter by the Agency. Commission shall be payable on all renewals placed and accepted under the Agency's order.

17. Where a principal transfers his advertising account from one Agency to another during the currency of any order, it is expressly agreed that no responsibility shall attach to the Station for the payment of commission to the first Agency on advertising broadcasts after the date notified by the Advertiser to the Station as that upon which the second Agency shall take over the servicing of the accounts, but transfer of the account shall not be recognised if the first Agency has notified the Station that his accounts have not been paid by the Advertiser. Subject to this condition commission shall be paid only to the Agency from which service is accepted and only as accounts are paid.

18. No commission shall be payable on landlines and other out-of-pocket expenses.

19. An accredited Agency shall not sub-let Station time of its principal in any form, nor shall time be made the subject of a rebate of goods, indirectly or otherwise. Distributing Agencies or others are not permitted to advertise the goods of several manufacturing or business houses under one order without the approval of the Station.

20. The Agency shall conform strictly to the Federation's Code of Ethics and the individual Station's conditions respecting:—

(a) Programme standards.

(b) Policy.

(c) Receipt of copy.

(d) Amount of wordage.

21. The advertising Agency shall endeavour to see that all advertising submitted is clean, honest and truthful advertising, conforming as far as ascertainable to the standards of the respective Stations concerned.

22. Should an Agency retire from business, its accreditation shall forthwith lapse.

23. In the event of an Agency reconstructing its business or effecting any changes in its proprietary, the Secretary shall immediately be advised and its accreditation shall be subject to review by the Bureau in the light of the information tendered, and unless continuance be approved, shall lapse and a fresh application for accreditation shall be necessary.

24. The Bureau shall be the sole arbiter upon the interpretation of these Rules and Regulations, and any question or questions arising from or not covered by them, and its decision or decisions shall be final, but neither the Bureau nor any member thereof shall be liable to be sued by reason or in respect thereof.

25. All orders are to be subject to the conditions stipulated on the printed form of the Stations with which the order is placed. Such conditions shall operate irrespective of whether or not an order is issued on the official order form of the Agency, and such conditions shall supersede anything to the contrary which may appear on the order issued by the Agency, provided always that a waiver of any conditions on the Station's printed order form may be issued in writing by the Station accepting the order.

26. An Agent may require from any Station a declaration certifying that announcements scheduled have been duly made in terms of the order as accepted by the Station.

27. An Agency shall not undertake to represent exclusively any Station or group of Stations, but nothing in this clause shall prohibit the National Council of Accredited Advertising Agents or any group of Agencies from withholding business from any Station for infringement of the Federation Code of Ethics.

Schedule.

(See Clause 11.)

For the purpose of Clause 11 of this Accreditation is it agreed that from January 1 to December 31, 1938, member Stations shall pay to Accredited Agents commission at the rate of 12½ per cent. on air time and 7½ per cent. on features purchased from Stations by the Agency on behalf of the client.

(See foot of next page for Code of Ethics.)

Comments on Patents Granted in 1937

BY BROADCASTING BUSINESS PATENT ATTORNEY

THE number of applications for radio and television patents accepted during 1937 by the Australian Patents Office increased by nearly 50 per cent., compared to 1936. Last year 554 inventions relating to circuits, valves, cathode ray tubes, electron multipliers and cameras, navigation aiding apparatus, components and other arrangements were protected. In 1936 the total was 370.

As in previous years England, the United States, Germany, Holland and Australia were the principal contributors, the rest of the world supplying only 16. England had the largest proportional increase. As to subject matter, the miscellaneous group showed the largest gain, but, as this group contains cathode ray tubes and other apparatus not specifically mentioned as having been designed for television, but obviously intended for such use, television is really the principal contributor to the increase.

Again, the United States easily headed the list as to country of origin, its total growing to 244 from 147. England displaced Germany from second place, jumping from 79 to 137. Germany went ahead but only slightly, from 96 to 104. Holland made a gain of 11 to 34, and Australia's total grew by 4 to 19.

United States gained in radio subjects (from 69 to 102), in television (from 35 to 49) and in miscellaneous groups (from 43 to 93).

England also went ahead in all directions, from 42 to 53 in radio, 20 to 45 in television, and from 17 to 39 in miscellaneous. Germany increased her radio contributions from 18 to 26, but the inventions credited to television (56) and miscellaneous (22) were, by a coincidence, exactly the same. Holland showed more activity in radio and came slightly into the picture in television, and Australia's gain was two each in radio and miscellaneous.

In ownership the Marconi Company, as is its habit, came an easy first, gaining about 50 per cent., 128 to 184, the increase being apparently mostly confined to the miscellaneous group, but in fact fairly distributed over most classes of inventions.

Radioaktiengesellschaft D. S. Loewe again held second place, but with a decrease of five in its total. Its specialty is television receiver circuits and cathode ray tubes.

S.T.C. came from an insignificant place in the 1936 table to third place last year, appearing with large increases in all groups and in its total from 9 to 44.

Farnsworth Television was another group that made an imposing gain from 7 to 43, rising to fourth place. Television and electron multipliers and like appliances were its strong suits.

Hazeltine, which as usual relied mostly on receiver circuit arrangements, also made healthy progress, rising from 14 to 35.

Philips and Telefunken both showed a good increase from 20 and 25 respectively to 34, although they fell considerably in the list. They spread their gains evenly. The General Electric Co. (England) was the only other concern to reach double figures (30) to which it increased its previous total of 9.

The same tendency apparent last year, viz., for companies outside the old patent holding groups to come in in increasing numbers and strength, was again in evidence, and the policy of covering everything that can be covered is spreading. And so is the grip that overseas technical resources have on the patent position. In 1936 Australia produced 4.05 per cent. of the ideas that were protected. Last year Australia produced 3.42 per cent. of the ideas, 1.08 per cent. of the grand total coming from A.W.A.

Noticeable features were the increases in applications relating to beam valves, wave guide systems, automatic direction finding apparatus, electron multipliers and cameras, electron image amplifiers, new types of screens for cathode ray tubes, large screens for television and electron optical systems. The favourites of previous years were still strongly supported.

In 1936 Germany was easily first in television, having as many applications as the rest of the world combined. Last year it was still first, but not very far ahead of England and the United States. There is an all-round quickening of interest in television—many concerns which have apparently neglected this subject coming into the field in a manner which shows that when the time comes for a discussion of patent arrangements, there will be a more even distribution of interests than has so far been the case in ordinary radio.

In the current twelve months there will be, of necessity, a greater interest taken in radio patents than in the last year or two. A licence agreement will come up for renewal, and on such occasions things are always likely to happen.

FEDERATION CODE OF ETHICS

1. Recognising that the radio audience includes persons of all ages and all types of political, social and religious belief, each member Station will endeavour to prevent the broadcasting of any matter which would commonly be regarded as offensive.

2. When the facilities of a member Station are used by others than the owner, the member shall ascertain the financial responsibility and character of such client, that no dishonest, fraudulent or dangerous person, firm or corporation may gain access to the radio audience.

3. Matter which is barred from the mails as fraudulent, deceptive or obscene shall not be broadcast by a member Station.

4. Each member Station should refuse to accept any business on a cost per inquiry, contingent or percentage basis, or to accord free time for commercial use.

5. No member Station should permit the broadcasting of advertising statements or claims which he knows or believes to be false, deceptive or grossly exaggerated.

6. No member Station shall defame or disparage a competitor, directly or indirectly, by words or acts which call in question such competitor's business integrity, ability to perform contracts, credit standing or quality of service.

7. No member Station should knowingly broadcast ambiguous statements which may be misleading to the listening audience.

8. Member Stations should not broadcast anonymous advertising testimonials.

9. As far as possible, member Stations shall not allow more than 300 words of direct advertising in a 15-minute sponsored session or 450 words in a 30-minute session.

Australian Radio and Television Patents for 1937

SUMMARY—COUNTRIES OF ORIGIN.

	U.S.A.	England	Germany	Australia	Holland	Others	T'l.
Radio	102	53	26	8	15	9	213
Television	49	45	56	2	2	6	160
Miscellaneous	93	39	22	9	17	1	181
Total	244	137	104	19	34	16	554

OWNERSHIP.

Name	Radio	Television	Miscellaneous	Total
Marconi Co.	80	38	66	184
Hazeltine	25	5	5	35
S.T.C.	22	11	11	44
Telefunken Co.	18	10	6	34
Philips'	15	2	17	34
Gen. Electric Co.	8	16	6	30
Int. Gen. Electric	6	1	1	8
Farnsworth Tel.	4	19	20	43
A.W.A.	4	—	2	6
D. S. Loewe	3	45	10	58
Johnson Lab.	3	—	1	4
Philco Radio	2	2	2	6
Baird Television	1	3	1	5
Siemens & Halske	3	—	3	6
E.M.I.	3	2	1	6
Sundry Applicants	16	6	29	51
Total	213	160	181	554

RADIO CIRCUITS

Marconi Wireless Telegraph Co. Ltd.

No.	Subject and Country of Origin.
100,037	Radio alternator, U.S.A.
100,039	Thermionic amplifiers, U.S.A.
100,040	Frequency control, U.S.A.
100,041	Degenerative Plate circuit, detector, U.S.A.
100,159	Electron multiplier, U.S.A.
100,170	Navigation aiding system, England.
100,171	Feeder for receiving, England.
100,172	High frequency modulator, England.
100,350	Electron discharge oscillators, England.
100,489	Modulation, England.
100,491	Modulated carrier wave transmitters, England.
100,533	Short wave superheterodyne, U.S.A.
100,570	Valve oscillator. England.
100,598	Electron discharge device circuits. U.S.A.
100,648	Aerial systems. U.S.A.
100,650	Directional radio system. England.
100,651	Receivers of the homodyne type. England.
100,661	Modulation circuit arrangements. England.
100,718	Automatic tone control. England.
100,722	Navigation aiding systems. U.S.A.
100,737	Direction finding. England.
100,759	Single side band receivers. England.
100,881	Oscillator arrangements. England.
100,886	Band pass filters. England.
101,042	Noise reduction in receivers. U.S.A.
101,183	Frequency control. U.S.A.
101,186	Frequency control lines. U.S.A.
101,208	Radio navigation systems. England.
101,233	Distortionless volume control. U.S.A.
101,239	Filters. England.
101,272	Aerial lead-in arrangements. England.
101,273	Aerials. England.
101,310	Automatic volume control. U.S.A.
101,386	Piezo electric crystals. U.S.A.
101,387	Noise reduction. U.S.A.
101,394	Automatic frequency control. U.S.A.
101,396	Amplifiers. England.
101,444	Transmission line. U.S.A.
101,558	Antennae. U.S.A.
101,616	Selectivity systems. U.S.A.
101,638	Short wave modulating systems. U.S.A.
101,672	Modulated transmitters. England.
101,673	Piezo-electric crystal arrangements. England.
101,729	Ultra-high frequency oscillators. U.S.A.
101,827	Oscillation generators. U.S.A.
101,834	Delayed automatic volume control. U.S.A.
101,835	Electron discharge device circuit arrangements. U.S.A.
101,847	Frequency modulated carrier systems. U.S.A.
101,917	Aerial feeders. England.
101,918	Direction finding aerials. England.
101,920	Volume range expander systems. U.S.A.
101,945	Feeder systems. U.S.A.
101,966	Frequency modulated transmitters. U.S.A.
101,989	Receivers embodying means for indicating accuracy of tuning. England.
101,990	Oscillation generators. England.
101,992	Oscillation generators. England.
102,066	Amplifiers. U.S.A.
102,067	Frequency variation response networks. U.S.A.
102,090	Image suppression in superheterodyne receivers. England.
102,107	Phase modulated transmitters. U.S.A.
102,162	Phase modulated transmitters. U.S.A.
102,163	Receiver for phase modulation. U.S.A.
102,227	Valve oscillator. U.S.A.
102,229	Transmitting aerial. U.S.A.
102,263	High frequency oscillator. U.S.A.
102,264	Phase control and modulation. U.S.A.
102,337	Modulated monitoring. England.
102,339	Hum elimination. England.
102,440	Ultra high frequency transmitter. U.S.A.
102,442	Tuning control. U.S.A.
102,443	Automatic gain control. U.S.A.
102,619	Superheterodyne receiver. U.S.A.
102,672	Double resonance oscillator. U.S.A.
102,733	Modulator. U.S.A.
102,734	Frequency stabilisation. U.S.A.
102,757	Automatic volume control. England.
102,759	Delayed automatic volume control. England.
102,863	Filter. U.S.A.
102,865	Antenna. U.S.A.
102,896	Homodyne reception. England.

Hazeltine Corporation.

100,100	Amplification control. U.S.A.
100,240	Receiving system. U.S.A.
100,242	Transmission circuits. U.S.A.
100,377	Radio frequency coupling. U.S.A.
100,402	High frequency coupling. U.S.A.
100,573	Automatic volume control. U.S.A.

(Continued overleaf.)

PATENTS (Continued.)

100,608 Signal-translating system. U.S.A.
100,698 Automatic amplification control. U.S.A.
101,075 Band selector systems. U.S.A.
101,112 Multi band receivers. U.S.A.
101,122 Oscillators for superheterodyne receivers. U.S.A.
101,238 Bandpass filters. U.S.A.
101,265 Variable selective circuits. U.S.A.
101,280 Bandpass filters. U.S.A.
101,599 Automatic frequency control. Sweden.
101,640 High frequency systems. U.S.A.
101,794 Coupling systems. U.S.A.
101,956 Automatic frequency control. U.S.A.
102,005 Antenna coupling systems. U.S.A.
102,019 Antenna coupling. U.S.A.
102,020 Antenna coupling. U.S.A.
102,104 Automatic variable selectivity. U.S.A.
102,522 Push-pull amplifier. U.S.A.
102,534 Variable selectivity. U.S.A.
102,853 Coupling system. U.S.A.

Standard Telephones and Cables (Australasia) Ltd.

100,006 Image suppression. Hungary.
100,116 Transmitter modulation. England.
100,588 Controllable impedance elements. France.
100,725 Antenna systems. England.
100,726 Eliminating interference. England.
100,791 Wave filters using mechanical elements. U.S.A.
100,839 Transmission networks. U.S.A.
100,915 Amplifiers. U.S.A.
101,289 Frequency control. England.
101,363 Muting arrangements. U.S.A.
101,499 Electromechanical wave filters. U.S.A.
101,511 Filters, including piezo electric crystals. U.S.A.
101,902 Transmission of electro magnetic means over a wave guide. U.S.A.
101,907 Wave guides. U.S.A.
102,350 Dielectric wave guide system. U.S.A.
102,373 Dielectric wave guide system. U.S.A.
102,374 Terminals for dielectric wave guides. U.S.A.
102,445 Transmission gain regulation. U.S.A.
102,461 Termination for dielectric guides. U.S.A.
102,477 Multiple receiver. England.
102,478 Frequency modulation detector. U.S.A.
102,712 Radio direction finding system. France.

Telefunken Co.

100,034 Selecting signals. Germany.
100,035 Magnetron oscillator. Germany.
100,252 Aerial system. Germany.
100,253 Ultra short wave receiving system. Germany.
100,529 Direction finding radio systems. Germany.
100,822 Modulated transmitters. Germany.
100,909 Automatic gain control means. Germany.
100,986 Directional receiver. Germany.
101,052 Modulated carrier wave apparatus. Germany.
101,083 Navigation aiding systems. Germany.
101,182 Ultra short wave receiving. Germany.
101,384 Direction finding. Germany.
101,597 Aerials. Germany.
102,485 High frequency transmitters. Germany.
102,486 Short wave oscillator. Germany.
102,488 Neutralised short wave transmitter. Germany.
102,553 Thermionic amplifier. Germany.
102,554 Wave guide system. Germany.

N. V. Philips.

100,103 Automatic frequency control. Holland.
100,330 Electrode systems. Holland.
100,376 Superheterodyne receiving circuits. Holland.
100,583 Automatically controlling bandwidth. Holland.
100,778 Amplification of oscillations. Holland.
100,782 Tuning superheterodyne. Holland.
101,104 Filters with variable band width. Holland.
101,839 Facilitating receiving sets. Holland.
102,269 Facilitating tuning. Holland.
102,340 Selective detector. Holland.
102,446 Facilitating tuning. Holland.
102,682 Audio amplifier. Holland.
102,683 High frequency transformer. Holland.
102,698 Neutralised amplifier. Holland.
102,790 Reversed feed back amplifier. Holland.

The General Electric Co. Ltd.

100,749 Power supply for amplifiers. England.
100,925 Automatic variable selectivity. England.
101,264 Modulating and demodulating apparatus. England.
101,301 Automatic varying selectivity. England.
101,302 Amplifier. England.
101,594 Muting means. England.
101,728 Valve amplifiers. England.
102,702 Aerial coupling system. England.

International General Electric.

100,483 Controlling valves. U.S.A.
101,020 Transmission line termination. U.S.A.
101,761 Transmission line. U.S.A.
101,951 Automatic fidelity control. U.S.A.
101,962 Antenna systems. U.S.A.
102,016 Distance and speed measurement of moving craft. U.S.A.

Farnsworth Television Inc.

100,077 Time delay oscillator. U.S.A.
102,223 Multipactor oscillator and amplifier. U.S.A.
102,434 Oscillation generator. U.S.A.
102,452 Detector. U.S.A.

Amalgamated Wireless (A/sia) Ltd.

100,115 Radio antennae. N.S.W.
102,111 Receiver muting. N.S.W.
102,701 Regenerative radio circuit. Poland.
102,746 Beam aerial system. N.S.W.

Radio A.G. D. S. Loewe.

100,372 Eliminating receiver radiation. Germany.
101,153 Eliminating receiver radiation. Germany.
101,765 Oscillatory circuits. Germany.

Johnson Laboratories Inc.

101,370 Tuning systems for wireless. England.
101,446 Automatic volume control. U.S.A.
101,690 Coupling means for permeability tuned circuits. U.S.A.

Siemens and Halske, Aktiengesellschaft.

100,287 Variable selective receiver. Germany.
100,398 Electric signalling system. Germany.
101,152 Filters. Germany.

Electric and Musical Industries Ltd.

100,569 Amplifying electrical variations. England.
102,065 Reducing the effect of shunt capacity or reactance. England.
102,424 Suppression disturbances. England.

Associated Electric Laboratories.

101,658 Frequency reducing. U.S.A.
101,717 Frequency reducing. U.S.A.

C. Lorenz Aktiengesellschaft.

101,135 Radio beacon. Germany.
102,745 Automatic volume control. Germany.

Philco Radio Cpn.

100,013 Tone control. England.
100,745 Image frequency suppression. U.S.A.

L. H. Paddle.

100,507 Ultra short wave generator. England.
100,508 Wireless receiving systems. England.

Compagnie Generale de Telegraphie Sans Fil.

101,148 Locating objects. France.
102,779 Radio self steering arrangements. France.

Ace Amplifiers Ltd.

101,553 Signalling apparatus. N.S.W.
101,807 Automatic gain control. N.S.W.

Sundry Applicants.

No.	Subject name, and Country or origin.
100,138	Super-regenerative receiving system. Baird Television Ltd. England.
100,186	Short wave converter. E. H. Wood, New Zealand.
100,720	Blind landing systems. Societe Francaise Radio-electrique. France.
101,039	Tuning arrangements. E. G. Beard, N.S.W.
101,188	Thermionic valves. F. G. Brown and T. D. Headley, N.S.W.
102,233	Pre-tuned receivers. H. M. Beck, N.S.W.
101,812	Signal transmission.; Electrical Research Pdts., U.S.A.

Television

Radio A.G. D. S. Loewe.

No.	Subject and Country of Origin.
100,019	Synchronising method. Germany.
100,061	Regulating synchronising impulses. Germany.
100,075	Transmitting television images. Germany.
100,166	Ikonoscope television. Germany.
100,343	Mains connection apparatus for television. Germany.
100,344	Television transmitter. Germany.
100,383	Regulation of television amplifiers. Germany.
100,396	Impulse trimming of television, signals. Germany.
100,397	Modulating television transmitters. Germany.
100,440	Television receivers. Germany.
100,606	Light source for television transmitters. Germany.
100,972	Adjustment for trapezoidal distortion. Germany.
100,993	Controlling light. Germany.
101,063	Coupling transformer. Germany.
101,097	Polarisation. Germany.
101,166	Synchronising method. Germany.
101,418	High voltage transformer for television. Germany.
101,542	Light control device. Germany.
101,623	Regulation of television receivers. Germany.
101,639	Short wave television transmitter. Germany.
101,793	Multiple cathode ray tube. Germany.
101,815	Determining the passage through zero to an alternating potential. Germany.
101,833	Cathode ray television receiving apparatus. Germany.
101,885	Television transmission. Germany.
101,896	Synchronisation method. Germany.
101,934	Television receivers. Germany.
101,954	Relaxation oscillations. Germany.
102,026	Rectification of television signals.
102,028	Relaxation apparatus. Germany.
102,141	Electrical filter system. Germany.
102,176	Correction of trapezoidal distortion. Germany.
102,228	Synchronising impulses. Germany.
102,268	Television tube. Germany.
102,279	Television "tone" control. Germany.
102,334	Stabilisation of image amplifiers. Germany.
102,470	Scanning disc. Germany.
102,500	Television receiver. Germany.
102,547	Television receiver. Germany.
102,587	Synchronising generator. Germany.
102,674	Television scanning. Germany.
102,760	Television system. Germany.
102,795	Scanning disc. Germany.
102,796	Synchronisation. Germany.
102,803	Scanning means. Germany.

Marconi's Wireless Telegraph Co. Ltd.

100,017 Television scanning systems. England.
100,084 Television receiver. England.
100,085 Kerr cells. England.
100,236 Synchronising Impulse generator. U.S.A.
100,423 Kerr cells. England.
100,447 Super-regenerative receiver. England.
100,456 Electrical time circut arrangements. England.
100,459 Television systems. U.S.A.
100,488 Television and like receivers. England.
100,546 Television transmitting arrangements. England.
100,591 Oscillation generators. U.S.A.
100,760 Synchronisation television signals. England.
100,829 Television transmitting apparatus. England.
100,880 Kerr cell. England.
100,910 Television receivers. U.S.A.
101,033 Transmitting television. England.
101,069 Television apparatus. U.S.A.
101,140 Receivers tunable to television. England.
101,271 Deflecting means for cathode rays. England.
101,529 Electrical impulse generators. England.
101,557 Cathode ray tubes. U.S.A.

PATENTS (Continued.)

101,618 Regulation of synchronising impulses. U.S.A.
101,735 Oscillation generators. England.
101,773 Electro-optical electron discharge devices. U.S.A.
101,890 Protective devices for television receivers. England.
101,991 Television picture reproducing. England.
102,041 Television cathode ray tube. U.S.A.
102,484 Deflecting coils. U.S.A.
102,502 Deflecting systems. U.S.A.
102,610 Television receiving system. U.S.A.
102,611 Cathode heating. England.
102,647 Composite television pictures. U.S.A.
102,648 Automatic frequency changer England.
102,649 Frequency changer. England.
102,711 Synchronising impulses. U.S.A.
102,802 Television scanning. England.
102,864 Synchronising impulses. U.S.A.
102,897 Television reproduction. England.

Farnsworth Television Inc.

100,454 Television power supply system. U.S.A.
100,457 Scanning and synchronising system. U.S.A.
100,657 Transmission for facsimile images. U.S.A.
100,819 Charge storage dissector. U.S.A.
100,845 Producing incandescent images. U.S.A.
100,879 Telephoto system. U.S.A.
100,896 Image analysis. U.S.A.
100,905 Projecting oscillights. U.S.A.
101,005 Charge storage amplifier. U.S.A.
101,161 Charge storage tube. U.S.A.
101,410 Cathode ray amplifiers. U.S.A.
101,492 Electron image amplification. U.S.A.
101,730 Picture transmission. U.S.A.
101,747 Electron multiplication. U.S.A.
101,837 Cathode ray tube. U.S.A.
102,063 Incandescent light source. U.S.A.
102,212 Scanning current generator. U.S.A.
102,404 Dissector tube. U.S.A.
102,439 Electron multiplier. U.S.A.

The General Electric Co. Ltd.

100,093 Receiving television. England.
100,359 Transmitters. England.
100,472 Time base circuits. England.
100,574 Cathode ray tubes for television. England.

(Continued overleaf)

PATENTS (Continued.)

100,826 Receiving apparatus for television. England.
100,949 Mounting television sets. England.
101,587 Time bases. England.
102,052 Valves with indirectly heated cathodes. England.
102,073 Rectifying circuits. England.
102,359 Keystone corrections. England.
102,394 Television transmitter. England.
102,815 Viewing television pictures. England.
102,597 Automatic signal control. England.
102,621 Sync pulse separation. England.
102,622 Generating synchronising signals. England.
102,644 Television receiver. England.

Standard Telephones and Cables (Aust.) Pty. Ltd.

101,537 Oscillation generating. France.
101,581 Electro optical systems. U.S.A.
101,582 Electro optical systems. France.
101,746 Scanning devices. Japan.
101,753 Signal transmission systems. France.
102,430 Electro optical system. N.S.W.
102,459 Image production. U.S.A.
102,572 Scanning disc. Japan.
102,573 Scanning system. Japan.
102,713 Electro optical system. U.S.A.
102,871 Scanning by mirror helix. U.S.A.

Telefunken Co.

100,528 Television transmitting installations. Germany.
100,942 Cathode ray tubes. Germany.
101,037 Cathode ray tube apparatus. Germany.
101,068 Synchronising systems. Germany.
101,838 Scanning. Germany.
101,385 Cathode ray tube apparatus. Germany.
101,383 Cathode ray transmitter tube. Germany.
101,873 Television transmitting apparatus. Germany.
102,353 Television receiver. Germany.
102,650 Saw tooth oscillator. Germany.

Hazeltine Cpn.

100,133 Scanning current generators. U.S.A.
101,012 Cathode ray tubes. U.S.A.
102,523 Scanning voltage generator. U.S.A.
102,561 Saw tooth voltage generator. U.S.A.
102,657 Periodic voltage generator. U.S.A.

N. V. Philips Gloeilampenfabrieken

100,276 Generating a saw tooth voltage. Holland.
100,827 Saw tooth wave generator. Holland.

Electrical Research Products.

101,538 Electro optical systems. U.S.A.
101,563 Electro optical systems. U.S.A.
101,620 Electro optical systems. U.S.A.

Baird Television.

100,614 Scanning oscillators for television. England.
100,913 Scanning oscillators. England.
101,199 Deflecting means for cathode ray tubes. England.

Electric and Musical Industries Inc.

100,742 Television. England.
100,808 Transmission signals having a direct current component. England.

Philco Radio Television Cpn.

100,637 Composite signal device. U.S.A.
100,707 Scanning circuit. U.S.A.

Sundry Applicants.

No.	Subject, Name and Country origin.
101,300	Oscillograph sweep circuits. International General Elec. U.S.A.
101,543	Intensification of an optical image. Allgemeine Elektricitats Gesellschaft. Germany.
102,086	Television cameras and projectors. P. Clague and M. E. Clague, N.S.W.
102,883	Picture reproduction. Photo Electrograph Ltd. England.

Miscellaneous

Marconi's Wireless Telegraph Co. Ltd.

No.	Subject and Country of Origin.
100,036	Scanning a tubular mesh electrode. U.S.A.
100,038	Television transmitting tube. U.S.A.
100,073	Power supply. U.S.A.
100,150	Screen structures for cathode ray tubes. U.S.A.
100,313	Insulators for very high frequencies. England.
100,337	Electron multiplying devices. U.S.A.
100,338	Electron discharge devices. U.S.A.
100,448	Electron beam valve. England.
100,490	Piezo-electric crystals. England.
100,592	Lead-in bushing. U.S.A.
100,593	Valve base. U.S.A.
100,594	Electrode mount. U.S.A.
100,649	Metal rectifier. U.S.A.
100,660	Electron gun. England.
100,721	Thermionic valve. U.S.A.
100,723	Tuning indicator. U.S.A.
100,928	Electron discharge device. U.S.A.
100,935	Tuning control. U.S.A.
101,034	Inductance. England.
101,035	Microphone arrangement. England.
101,099	Electron gun structure. England.
101,143	Electron multiplier. England.
101,184	Visual indicator. U.S.A.
101,187	Mounting piezo-electric crystals. U.S.A.
101,234	Visual indicator tube. U.S.A.
101,337	Artificial line. England.
101,397	Electron discharge device. England.
101,534	Label for valve. England.
101,614	Telegraph apparatus. U.S.A.
101,615	Diaphragm. U.S.A.
101,617	Electron multiplier. U.S.A.
101,675	Tuning dial. U.S.A.
101,732	Electron beam valve. U.S.A.
101,774	Frequency control. England.
101,806	Electron multiplier. U.S.A.
101,867	Electron beam valve. England.
101,877	Sound reproducing apparatus. U.S.A.
101,915	Cathode ray tube. England.
101,916	Beam valve. England.
101,935	Mounting for tuning condensers. U.S.A.
102,068	"Getter." U.S.A.
102,069	Electron lens system for electron multipliers. U.S.A.
102,114	Piezo-electric crystal. U.S.A.
102,225	Electron multiplier. U.S.A.
102,226	Condenser for line frequency control. U.S.A.
102,265	Valves. U.S.A.
102,266	Electron optical system. U.S.A.
102,338	Flexible aerial mounting. England.
102,441	Electron emitting electrodes. U.S.A.
102,444	Thermostatic control apparatus. U.S.A.
102,458	Gun structures for "beam" valves. England.
102,552	Piezo-electric crystal mounting. U.S.A.
102,556	Variable condenser. England.
102,620	Electro-optical electron discharge device. U.S.A.
102,687	Electro-optical electron discharge device. U.S.A.
102,709	Telephone. England.
102,710	Electron beam valve. England.
102,736	Electron beam tube. U.S.A.
102,737	Electron multiplier, arrangements. U.S.A.
102,744	Electron multiplier. U.S.A.
102,751	Piezo-electric element. U.S.A.
102,758	Beam valve. England.

102,801 Light valve. England.
102,862 Luminescent material. U.S.A.
102,890 Cathode ray tube. England.
102,895 Magnetic cores. U.S.A.

N. V. Philips Gloeilampenfabrieken

100,058 Valve. Holland.
100,248 Electrode system. Holland.
100,279 Electrode system. Holland.
100,623 Resistance. Holland.
100,790 Mercury vapour rectifying tubes. Holland.
101,103 High frequency valve connection. Holland.
101,231 Electrode system. Holland.
101,347 Rectifier. Holland.
101,585 Converter apparatus. Holland.
101,586 Electrolytic condenser. Holland.
101,706 Rectifier valve. Holland.
102,015 Electric resistance. Holland.
102,147 Valve. Holland.
102,383 High secondary emission electrodes Holland.
102,749 Gas filled relay tube rectifier system. Holland.
102,828 Multi-grid valve. Holland.
102,838 Beam valve. Holland.

Farnsworth Television.

100,010 Grids for thermionic tubes. U.S.A.
100,274 Image projector. U.S.A.
100,519 Multipactor phase control. U.S.A.
100,694 Image dissector. U.S.A.
100,695 Photoelectric surfaces. U.S.A.
100,696 Water cooled tube. U.S.A.
100,965 Incandescent screen. U.S.A.
101,495 Grid for thermionic tube. U.S.A.
101,496 Mosaic screen. U.S.A.
102,175 Amplifying tube. U.S.A.
102,330 Cathode ray amplifier tube. U.S.A.
102,406 Dissector tube. U.S.A.
102,450 Electron multiplier. U.S.A.
102,451 Electron multiplier. U.S.A.
102,453 Television multiplier. U.S.A.
102,454 Electron multiplier. U.S.A.
102,481 Cathode ray projector arrangement. U.S.A.
102,559 Electron multiplier oscillator. U.S.A.
102,726 Fine beam electron gun. U.S.A.
102,850 Multi stage multipactor. U.S.A.

Standard Telephones and Cables (Australasia) Ltd.

100,003 Electro-magnetic wave amplifying discs. U.S.A.
100,255 Thermionic vacuum tubes. England.
101,237 Concentric cable. England.
101,285 Termination for concentric cables. England.
101,813 Valve. U.S.A.
101,970 Beam valve. U.S.A.
102,047 Electrical condenser. England.
102,177 Electro mechanical impedance. U.S.A.
102,186 Water cooled valve. France.
102,284 Cathode ray tube. England.
102,651 Loud speaker. U.S.A.

Radio A.G. D. S. Loewe.

100,318 Producing finely divided metallic layers. Germany.
100,954 Cathode ray tube. Germany.
101,371 Valve construction. Germany.
101,579 Electron multiplier. Germany.
101,748 Television tube. Germany.
101,749 Electron-optical arrangement. Germany.
102,010 Television transmission tube. Germany.
102,126 Braun tube. Germany.
102,405 Cathode ray tube. Germany.
102,754 Cathode ray tube. Germany.

Telefunken Co.

100,460 Electron image tubes. Germany.
100,825 Electrical lens. Germany.
101,185 Envelope for valves. Germany.
102,579 Negative resistance device. Germany.
102,645 Magnetron. Germany.
102,765 Coupled coils. Germany.

The General Electric Co.

100,091 Cathode ray tube mask. England.
100,095 Adjustable inductances. England.
100,335 Storage photo-electric devices. England.
100,429 Cathode ray tube. England.
101,027 Cathode ray tube. England.
102,764 Cathode ray tube. England.

Hazeltine Cpn.

100,124 Reproducing sound. U.S.A.
100,258 Inductance units. U.S.A.
100,305 Sound recording apparatus. U.S.A.
100,316 High fidelity reproduction. U.S.A.
100,578 Sound reproducing apparatus. U.S.A.

Aerovox Cpn.

101,257 Condensers. U.S.A.
101,304 Impregnating insulating material. U.S.A.
101,449 Electrolytic condenser. U.S.A.
101,450 Electrolytic condenser. U.S.A.
102,151 Electrolytic condenser. U.S.A.

Siemens and Halske.

101,750 Variable inductance. Germany.
101,876 Valve gettering. Germany.
102,555 Magnetron valve. Germany.

Allgemeine Elektricitats Gesellschaft.

100,600 Cathode ray tube. Germany.
102,525 Electron multiplier. Germany.

PATENTS (Continued.)

Utah Radio Products Co.

101,526 Converter apparatus. U.S.A.
102,675 Vibratory type rectifier. U.S.A.

Amalgamated Wireless (Aust.) Ltd.

102,888 Sound reproducing apparatus. N.S.W.
102,889 Sound record. N.S.W.

Philco Radio Television Cpn.

100,641 Tuning indicator. U.S.A.
101,792 Acoustic damping. U.S.A.

Sundry Applicants.

100,083 Resistors. R. C. K. Young. N.S.W.
100,302 Photographic developers. Baird Television. England.
100,317 Resistor construction. International Resistance Co. U.S.A.
100,469 Tuning mechanism. R. J. Leishman. U.S.A.

Sundry Applicants (Cont.)

101,079 Cathode ray tube. Electric Musical Inds. England.
101,178 Loud speaker. D. T. Hinchen. N.S.W.
101,200 Cathode ray tube. C. H. F. Muller. Germany.
101,330 Valve. Metropolitan Vickers Electrical Co. England.
101,342 Acoustic labyrinth. Stromberg-Carlson. U.S.A.
101,476 Valve with tensioned cathode. The M-O Valve Co. England.
101,564 Resistance. International Resistance. U.S.A.
101,482 Variable inductance. Johnson Laboratories. U.S.A.
101,697 Reproduction of sound. O. K. Molb. England.
101,709 Magnetic core. Associated Electric Laboratories. U.S.A.
101,770 Microphone. Shaftesbury Microphones. England.
101,958 Vacuum tube. J. H. O. Harris. England.
100,051 Radio cabinet. N. J. Pritchard and N. S. Gilmour. N.S.W.
102,352 Gettering. International General Electric. U.S.A.
102,393 Bias Supply. Radio Cpn. Pty. Ltd. Victoria.
102,635 Producing electrical conditions in the ionosphere. V. A. Bailey. N.S.W.
102,684 Sound reflector. W. Reed-Lethbridge. N.S.W.
102,716 Radio tuning dial. R. R. Chilton. N.S.W.
102,729 Tuning indicator. Ferranti Ltd. England.
102,845 Public address system. Guided Radio Cpn. U.S.A.

RADIO APPARATUS IMPORTATIONS INTO AUSTRALIA DURING 1937

New South Wales.

	Battery Eliminators £	Parts N.E.I. £	Radio Sets £	Total £
January	7	3,572	291	3,870
February	20	4,335	1,417	5,772
March	1	3,078	370	3,449
April	2	4,238	897	5,137
May	—	4,794	1,387	6,204
June	167	3,977	1,567	5,751
July	8	8,924	1,210	10,142
August	7	7,725	1,069	8,826
September	159	4,837	924	5,920
October	352	3,015	1,784	5,173
November	1	4,493	1,144	5,638
December	5	4,151	1,236	5,393
	729	57,139	13,296	71,274

Battery Chargers value: 23 were imported into N.S.W. in May, 1937, 40 in June, 1937, 25 in August, 1937, and 22 in October, 1937.

Victoria.

	Battery Eliminators £	Parts N.E.I. £	Radio Sets £	Total £
January	4	594	90	1,048
February	1	636	133	770
March	3	1,723	34	1,760
April	32	2,549	29	2,901
May	5	890	127	1,022
June	—	292	—	292
July	5	4,050	116	4,171
August	808	6,162	18	6,988
September	—	1,848	—	1,848
October	2	1,228	9	1,239
November	2	404	12	418
December	4	963	13	980
	1,157	21,339	581	23,437

Queensland.

	Battery Eliminators £	Parts N.E.I. £	Radio Sets £	Total £
January	—	—	62	62
February	—	15	35	50
March	—	—	77	77
April	—	—	11	11
May	—	—	44	44
June	—	6	40	46
July	—	69	20	89
August	—	—	28	28
September	—	1	11	12
October	—	—	66	66
November	—	1	19	20
December	—	9	17	26
	—	101	430	531

Battery Chargers value: 12 were imported into Queensland in June, 1937.

South Australia.

	Battery Eliminators £	Parts N.E.I. £	Radio Sets £	Total £
January	—	8	8	16
February	—	29	—	29
March	—	1	182	183
April	4	99	13	116
May	—	111	5	116
June	—	55	—	55
July	—	60	2	62
August	—	56	—	56
September	—	—	3,574	3,574
October	5	52	189	246
November	—	101	24	125
December	—	66	—	66
	9	638	3,997	4,644

Western Australia.

	Battery Eliminators £	Parts N.E.I. £	Radio Sets £	Total £
January	—	26	—	26
February	—	19	—	19
March	—	5	—	5
April	—	2	—	2
May	—	—	—	—
June	—	71	—	71
July	—	8	—	8
August	—	6	—	6
September	—	—	—	—
October	—	147	6	153
November	—	45	4	49
December	—	32	9	41
	—	361	19	380

Tasmania.

	Battery Eliminators £	Parts N.E.I. £	Radio Sets £	Total £
January	—	29	—	29
February	—	—	1	1
March	—	—	—	—
April	—	—	—	—
May	—	—	—	—
June	—	—	—	—
July	—	—	—	—
August	—	—	—	—
September	—	—	—	—
October	—	—	—	—
November	—	2	9	11
December	—	—	—	—
	—	31	10	41

Commonwealth.

	Battery Eliminators £	Parts N.E.I. £	Radio Sets £	Total £
January	11	4,589	451	5,051
February	21	5,034	1,586	6,641
March	4	4,807	663	5,474
April	329	6,888	950	8,167
May	5	5,795	1,563	7,363
June	167	4,401	1,607	6,175
July	13	13,111	1,348	14,472
August	815	13,949	1,115	15,879
September	159	6,686	4,509	11,354
October	359	4,442	2,054	6,855
November	3	5,046	1,212	6,261
December	9	5,221	1,275	6,505
	1,895	79,969	18,333	100,197

Radio Valve Importations Into Australia

January to December, 1937

New South Wales.

Quantity—	U.K.	Holland	U.S.A.	Total
January	28,363	57,271	19,073	104,719
February	15,924	29,401	25,502	70,828
March	32,488	45,577	59,486	137,661
April	68,631	29,574	80,595	190,857
May	56,472	7,643	25,551	95,495
June	26,062	5,504	92,490	124,504
July	24,023	12,082	26,958	63,102
August	3,684	17,404	20,256	44,383
September	7,679	19,499	13,424	40,655
October	8,244	8,445	29,569	46,429
November	3,480	4,766	39,449	47,710
December	7,779	4,971	42,794	55,548
	282,829	242,137	475,147	1,021,891
Value—	£	£	£	£
January	7,109	16,079	1,907	25,100
February	2,404	7,366	2,388	12,161
March	8,404	11,355	5,639	25,411
April	18,613	7,873	8,657	36,831
May	14,374	2,080	2,742	19,969
June	5,511	1,533	9,037	16,206
July	7,910	2,705	3,348	13,963
August	1,507	4,307	2,142	8,810
September	1,873	5,454	2,300	9,811
October	3,361	1,939	3,184	8,616
November	2,744	1,890	4,650	9,287
December	3,784	1,703	5,801	11,292
	77,594	64,284	51,795	197,457

Totals in column 4 include the following N.S.W. importations:—

	No.	Value £
Germany, January	8	3
Germany, February	1	3
Hungary, March	110	13
Canada, April	12,050	1,686
Canada, May	5,800	765
Germany, May	29	8
Germany, June	485	105
Austria, August	3,000	835
Germany, August	24	6
Germany September	53	184
Germany, October	171	132
Germany, November	15	3

Victoria.

Quantity—	U.K.	Holland	U.S.A.	Total
January	560	2,000	6,845	9,426
February	2,073	—	6,755	9,478
March	2,028	4	19,340	27,230
April	46	4	12,403	16,453
May	641	3	14,526	15,170
June	1,045	144	9,277	11,436
July	291	6	17,517	18,814
August	128	—	11	139
September	27	—	1,000	9,027
October	16	—	2,028	2,047
November	97	67	8,321	10,485
December	322	25	4,860	7,210
	7,274	2,253	102,833	136,915
Value—	£	£	£	£
January	616	587	711	1,943
February	296	—	765	1,116
March	246	2	2,007	3,249
April	22	73	1,231	2,179
May	1,319	81	1,424	2,824
June	574	322	1,043	2,043
July	968	15	1,692	2,804
August	626	—	4	630
September	15	—	89	1,693
October	334	—	269	611
November	864	701	1,090	3,047
December	1,972	558	690	3,626
	7,851	2,339	11,015	25,765

Totals in column 4 include the following Victorian importations:—

	No.	Value £
Germany, January	21	29
Canada, February	650	56
Canada, March	5,854	991
Germany, March	4	3
Canada, April	4,000	853
Canada, June	1,000	104
Canada, July	1,000	129
Canada, September	8,000	1,588
Canada, November	2,000	392
Canada, December	2,000	404
Austria, December	3	2

Queensland.

Quantity—	U.K.	Holland	U.S.A.	Total
January	—	2	—	2
February	—	—	—	—
March	1	3	5	9
April	—	—	—	—
May	299	—	—	299
June	121	120	—	241
July	352	—	—	352
August	30	—	—	30
September	87	—	2	89
October	19	—	84	103
November	18	9	4	31
December	31	9	—	40
	958	143	95	1,196
Value—	£	£	£	£
January	—	2	—	2
February	—	—	—	—
March	5	2	1	8
April	—	—	—	—
May	463	—	—	463
June	150	103	—	253
July	522	—	—	522
August	64	—	—	64
September	56	—	1	57
October	942	—	15	957
November	333	138	2	473
December	246	138	—	384
	2,781	383	19	3,183

South Australia.

Quantity—	U.K.	Holland	U.S.A.	Total
January	—	6	—	6
February	3	—	—	3
March	150	—	—	150
April	8	2	7	17
May	210	13	9	232
June	50	79	—	129
July	144	—	—	144
August	—	—	—	—
September	154	—	—	154
October	46	527	24	597
November	35	—	6	41
December	25	200	—	225
	825	827	46	1,698

RADIO VALVE IMPORTATIONS INTO AUSTRALIA (Continued from Page 81.)

Value—	U.K. £	Holland £	U.S.A. £	Total £
January	—	184	—	184
February	2	—	—	2
March	21	—	—	21
April	3	62	1	66
May	341	165	11	517
June	74	171	—	245
July	237	—	—	237
August	—	—	—	—
September	54	—	—	54
October	292	681	19	992
November	14	—	3	17
December	970	59	—	1,029
	2,008	1,322	34	3,364

Western Australia.

Quantity—	U.K.	Holland	U.S.A.	Total
January	10	—	—	10
February	—	—	—	—
March	—	—	—	—
April	54	—	—	54
May	—	—	29	29
June	81	—	26	107
July	260	—	—	260
August	260	—	—	260
September	—	—	12	12
October	7	—	28	35
November	24	—	29	53
December	86	18	—	104
	782	18	124	924

Value—	£	£	£	£
January	21	—	—	21
February	—	—	—	—
March	—	—	—	—
April	10	1	—	11
May	—	—	72	72
June	170	—	24	194
July	477	—	—	477
August	477	—	—	477
September	—	—	11	11
October	111	—	17	128
November	1,097	171	—	1,268
December	171	350	—	521
	2,534	522	124	3,180

Tasmania.

Quantity—	U.K.	Holland	U.S.A.	Total
January	10	—	—	10
February	—	—	—	—
March	—	—	—	—
April	1	—	—	1
May	20	—	—	20
June	60	—	—	60
July	44	32	—	76
August	15	—	—	15
September	—	—	—	—
October	—	—	22	22
November	37	18	—	55
December	30	—	—	30
	217	50	22	289

Value—	£	£	£	£
January	21	—	—	21
February	—	—	—	—
March	—	—	—	—
April	1	—	—	1
May	25	—	—	25
June	74	—	—	74
July	41	45	—	86
August	25	—	—	25
September	—	—	—	—
October	—	—	2	2
November	1,055	123	—	1,178
December	28	—	—	28
	1,270	168	2	1,440

Commonwealth.

Quantity—	U.K.	Holland	U.S.A.	Total
January	28,951	59,279	25,918	114,181
February	18,000	29,401	32,257	80,309
March	34,667	45,584	78,831	165,050
April	68,740	29,580	93,005	207,388
May	57,642	7,659	40,115	111,245
June	27,380	5,817	101,793	136,477
July	25,153	12,120	44,475	82,748
August	4,117	17,404	20,267	44,827
September	7,947	19,499	14,438	49,937
October	8,332	8,972	31,755	49,233
November	3,691	4,889	47,780	58,375
December	8,273	5,223	47,654	63,157
	292,893	245,427	578,288	1,162,927

Value—	£	£	£	£
January	8,329	16,852	2,618	27,833
February	2,701	7,366	3,153	13,279
March	8,676	11,359	7,647	28,689
April	18,649	8,008	9,889	39,088
May	16,522	2,326	4,249	23,870
June	6,553	2,129	10,104	19,015
July	10,155	2,765	5,040	18,089
August	2,699	4,307	2,146	10,006
September	1,999	5,454	2,401	11,626
October	5,040	2,620	3,506	11,306
November	6,107	3,023	5,745	15,270
December	7,171	2,808	6,491	16,880
	94,601	69,017	62,989	234,951

Miscellaneous Importations.

	No.	Value £
Germany, January	29	32
Canada, April	16,050	2,539
Canada, February	650	56
Germany, February	1	3
Canada, March	5,854	991
Germany, March	4	3
Hungary, March	110	13
Canada, April	16,050	2,539
Norway, April	6	1
Canada, May	5,800	765
Germany, May	29	8
Canada, June	1,000	104
Germany, June	485	105
Canada, July	1,000	129
Austria, August	3,000	835
Germany, August	24	6
Canada, September	8,000	1,588
Germany, September	53	184
Germany, October	174	140
Canada, November	2,000	392
Germany, November	15	3
Canada, December	2,000	404
Austria, December	3	2

INSTITUTION OF RADIO ENGINEERS (AUSTRALIA)

Patron:
His Excellency the Governor-General.
The Right Hon. Lord Gowrie, V.C., K.C.M.G., C.B., D.S.O.

Head Office:
30 CARRINGTON STREET, SYDNEY.

THE objects for which the Institution is founded are subject to Section 53 of the N.S.W. Companies Act, 1899, and are as follow: 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.

The following conditions govern applications for admission to the Institution:—

Full Members—Shall be persons of not less than 25 years of age and who, over a period of not less than five years, have acquired experience by invention or practice in radio arts or radio literature and thereby merit, in the opinion of the Council, appointment as Full Members and/or who have passed such examination or complied with such conditions as are prescribed by Council. (Application fee £1/1/-, annual subscription from date of election £3/3/-).

Associate Members—Shall be persons not less than 21 years of age, who, in the opinion of Council, have been engaged in radio or associated industry for a period of 3 years, and who possess such technical knowledge and/or passed such examination as is acceptable to Council. (Application fee £1/1/-, annual subscription from date of election £2/2/-).

Associates—Shall be not less than 21 years of age and shall be acceptable persons who, in the opinion of Council, are connected with the application of radio science or the radio arts. (Application fee £1/1/-, annual subscription from date of election, £1/11/6).

Juniors—Shall be persons (16-20 years of age) registered as students in a university, technical school or place of recognised standing, who are pursuing a regular course of study in the science of radio, and/or are engaged in technical application of radio. (Annual subscription £1/1/-, no entrance fee.)

The actual grade to which candidate is allotted is determined by Council.

Government of the Institution.

The Institution is governed by a Council with headquarters in Sydney, but this Council is elected by a vote of all members all over Australia every year. This postal vote is conducted when there are more nominations than positions to be filled.

During 1937 the activities of the Institution were further enlarged by the formation of Divisions in Brisbane and Perth.

Membership of the Institution is not confined to any particular division, but is of the Institution as a whole, whilst each member is allocated to the division nearest his place of residence. All monies are payable to the head office of the Institution, whilst the divisional branches are responsible for the holding of meetings and functions in their respective territories.

There are now five divisions in Australia, with a further division to be formed in Hobart, Tasmania. It is hoped that this Hobart division will be in operation about April or May of this year.

Membership.

Membership of the Institution at the end of February, 1938, numbered 391, consisting of: Fellow, 1; Hon. Life Member 1; Full Members 138; Associate Members 175; Associates, 47; Juniors, 29.

The membership in each State is as follows: Sydney, 205; Melbourne, 85; Brisbane, 36; Adelaide, 29; Perth, 17; Hobart, 8; Overseas, 11.

The growth of membership during the calendar year 1937 amounted to 52.

I.R.E. Council, 1938-39.

President: Mr. N. S. Gilmour.
Vice-Presidents: Messrs. L. P. R. Bean, D. G. Wyles.
Hon. Treasurer: Mr. C. H. Norville.
Hon. General Secretary: Mr. O. F. Mingay.
Councillors: Messrs. R. Allsop, J. N. Briton, F. G. Canning, T. P. Court, W. T. S. Crawford, Sir Ernest Fisk, Messrs. L. A. Hooke, F. Langford Smith, A. S. McDonald, P. S. Parker, H. C. Trenam, C. W. Tyrrell.
Qualifications Board: Messrs. A. S. McDonald (chairman), D. G. Wyles, W. T. S. Crawford, F. W. P. Thom.
Examination Board: Messrs. J. N. Briton (chairman), Murray Stevenson, R. R. Chilton, E. G. Bailey, F. Langford Smith.
Editorial Board: Messrs. C. W. Tyrrell (chairman), P. S. Parker, R. Allsop, S. Colville, F. G. Canning, R. J. W. Kennell, T. P. Court.
Library Board: Messrs. T. P. Court, L. N. Schultz.
Constitution Committee: Messrs. L. P. R. Bean, D. G. Wyles, O. F. Mingay.
Annual Awards Committee: Professor Kerr Grant, Messrs. S. H. Witt, N. M. Goddard, R. Allsop, N. S. Gilmour.
Radio Interference Committee: Messrs. T. P. Court (chairman), E. A. Burbury.
Editor of Proceedings: Mr. J. R. Edwards.

(Continued at foot of opposite page.)

Institution of Radio Engineers (Australia)

List of Members as at May 1st, 1938

Fellow Member:

Fisk, Sir Ernest, A.W.A., Cnr. York and Erskine Streets, Sydney, N.S.W.

Hon. Life Member:

Renshaw, W. P., C/o Box 1857K, G.P.O., Sydney, N.S.W.

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Ackland, S. F., 7 Beatty Street, Linden Park, Adelaide, S.A.
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Apperley, G., C/o A.W.A., Queen Street, Melbourne, Vic.
Armstrong, T., Senior Radio Inspector, G.P.O., Brisbane, Queensland.
Austin, S. C., O.I.C. Wireless Branch, Central Police Station, Perth, W.A.

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Barnes, H. J., officer in charge, Nauru Radio Administration, Nauru, Central Pacific.
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Cruickshank, N. W., C/- Grand Hotel, Wooroolin, Qld.

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Dobbyn, J. Mc., Radio Inspector, Treasury Gardens, Melbourne, Vic.
Draffin, J. C., C/o A.W.A., Sydney, N.S.W.
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(Continued on next page.)

Institution of Radio Engineers (Australia)

Sydney Division Officials.

Past Chairman: D. G. Wyles.
Chairman: T. P. Court.
Vice-Chairman: L. N. Schultz.
Secretary: S. J. Rubenstein.
Treasurer: G. G. Hall.
Social Secretary: S. V. Colville.

Adelaide Division Officials.

Chairman: Professor Kerr Grant.
Vice-Chairmen: H. W. Harrington, D. M. Gooding.
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Auditor: E. J. Risely.
Publicity Officer: H. B. Wilson.
Committeeman: E. R. Lindberg.

Brisbane Division Officials.

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Vice-Chairman and Acting Hon. Secretary: A. L. Dixon.
Hon. Treasurer: E. C. Littler.
Hon. Secretary (on extended leave): F. Hoe, Junr.
Committeemen: P. Andrews, P. Grant, F. Elliott, A. G. Brayne, D. A. Laws.
Lectures and Papers Committee: P. Andrews, P. Grant, E. C. Littler.

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Vice-Chairmen: F. J. Henderson, Major R. Kendall (on extended leave).
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Barkley, D. A., 1 Constitution Road, Dulwich Hill, N.S.W.
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(Continued on next page.)

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Musician's Union of Australia

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OFFICE BEARERS, 1938.

President, Frank Kitson; Vice-presidents, W. Robb (Vic.), A. R. Bushell (Adelaide), F. Pforr (Queensland); Treasurer, W. Harrison (Vic.).

Trustees: Messrs. Rawlin, Robb and Caddy; Auditors, W. N. Robertson.

The organisation functions throughout the whole of the Commonwealth and is a union of employees registered as such in the Arbitration Court.

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Newcastle: 99 Cleary Street, Hamilton. 'Phone Hamilton 656. (S. Alder, secretary).

Broken Hill: 510 Argent Street, Broken Hill. (S. Brookes, secretary).

Brisbane: Albert House, Albert Square. 'Phone B 9685. (F. Pforr, secretary).

South Australia: 10 Pirie Street, Adelaide. 'Phone Central 3700. (A. Bushell, secretary).

Kalgoorlie: 89 Dugand Street, Kalgoorlie. 'Phone Kal. 316. (G. Falan, secretary).

Tasmanian District: 180 Elizabeth Street, Hobart. Hob. 4183. (B. McCann, secretary).

The Musicians' Union of Australia has played an important part in the industrial side of broadcasting. Provision has been made in the general award secured by the musicians for rates of pay and working conditions for union members employed in broadcasting and the original award has been varied from time to time.

Of considerable importance was a variation of the Award in relation to orchestral musicians employed by the A.B.C. secured on and made operative as from December 5, 1937. This variation provided for a 21-hours' working week, rates of pay, conditions of employment, etc. The variation also provided that orchestras in all parts of the Commonwealth will be kept at existing strength during the currency of the variation, which was to be for a period of 12 months and thereafter until terminated by three months' written notice from either side.

Radio Industry Functions' Clubs

In order to take care of the various social functions conducted by the radio industry and to organise such functions as the Annual Radio Industry Ball, golf outings and regular luncheons, the R.I.F. Club of Sydney was formed in 1937. The word R.I.F. is the abbreviation of Radio Industry Functions. So successful was this movement in Sydney that a similar club has been formed in Melbourne, and other clubs are projected in the other capital cities. Each club is self governing.

R.I.F. CLUB OF SYDNEY

Formed February, 1937. Hon. secretary's office, 30 Carrington Street, Sydney; 'phone B 7188.

The original officers for 1937-38 were as follow: Chairman, Mr. J. L. Mulholland; Deputy Chairman, A. L. Freedman; Treasurer, G. Davidson; Hon. Secretary, O. F. Mingay. Committee: A. R. Allen, G. Anderson, E. Dare, C. Gittoes, W. Godley, A. P. Hosking, R. Jennings, C. F. Marden.

Officers for 1938-39 were not decided at time of this report being compiled.

POLICY AND OBJECTS.

The Club is composed of members engaged in radio and broadcasting in all its phases and is formed for the purpose of carrying out social functions in the radio field, in so doing any residue of funds to be used for such charitable and other purposes as the Board of Management at its discretion deems advisable. The Club is non profit making and entirely honorary.

Membership is open to all persons of good standing directly engaged in radio and broadcasting. Subscription is 5/- per annum and the financial year commences March 1 of each year.

List of Members as at May 1, 1938

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Gendle, J. H., Featuradio Sound Productions, 296 Pitt St., Sydney.
Gilmour, N. S., Lekmek Radio Labs., Box 2971 NN., G.P.O., Sydney.
Gittoes, C. S., Ducon Condenser Pty. Ltd., 73 Bourke St., Waterloo.
Godley, W., Airzone (1931) Ltd., 16 Australia St., Camperdown.
Graham, L. B., Australian Radio College Ltd., Cnr. Broadway and City Rd., Sydney.
Green, Dr. A. L., Amalgamated Wireless Valve Works, Parramatta Rd., Ashfield.
Griffin, T. N., Mullard Radio Co. (Aust.) Ltd., 26 Clarence St., Sydney.
Hall, P. R., H. Rowe and Co. Pty. Ltd., 136 Elizabeth St., Sydney.
Hawkes, G. D., Thom and Smith Pty. Ltd., Box 2596 EE, G.P.O., Sydney.
Haworth, S. R. E., A.W. Valve Co. Ltd., Cnr. York and Erskine Sts., Sydney.

(Continued on next page.)

SYDNEY R.I.F. MEMBERS (*Continued*)

Hawton, H., Brolite Pty. Ltd., 298 Pyrmont Bridge Rd., Glebe.
Hankin, H. H. J., Simplex Radio, 716 Parramatta Rd., Petersham.
Herring, G. K., Ever Ready Co. (Aust.) Ltd., Box 37, P.O., Mascot.
Higginbotham, E., Station 2TM, Peel St., Tamworth.
Hinchen, D. T., Magnavox (Aust.) Ltd., 61 Dowling St., East Sydney.
Hobden, H. I., E.T.C. Industries Ltd., 460 Elizabeth St., Sydney.
Hooke, L. A., Amalgamated Wireless A/sia Ltd., Cnr. York and Erskine Sts., Sydney.
Horner, E. A., A.W.A., Cnr. York and Erskine Sts., Sydney.
Hosking, A. P., A.W. Valve Co. Ltd., Cnr. York and Erskine Sts., Sydney.
Hunt, G., Briton Elec. and Radio Pty. Ltd., 152 Parramatta Rd., Petersham.
Ives, J. C., Australian General Electric Ltd., 93 Clarence St., Sydney.
Jeacocke, N. R., "Wireless Weekly," 60 Elizabeth St., Sydney.
Jennings, R., Thom and Smith Ltd., Box 2596 EE, G.P.O., Sydney.
Jesson, R. A., Station 2GB, 29 Bligh St., Sydney.
Jones, F. P., Crown Radio Mfg. Co. Pty. Ltd., 51 Murray St., Pyrmont.
Jones, W. J., Warburton Franki Ltd., 307 Kent St., Sydney.
Joyce, J., Featuradio Sound Productions Ltd., 296 Pitt St., Sydney.
Knock, D. B., "The Bulletin," 252 George St., Sydney.
Kraegen, F. F., ARMPAL, Assembly Hall, York and Margaret Sts., Sydney.
Lackey, R., Ausn. Radio College Ltd., Cnr. Broadway and City Rd., Sydney.
Lamb, R. G., Box 2323, G.P.O., Sydney.
Larkins, F. W., Amalgamated Wireless A/sia Ltd., Cnr. York and Erskine Sts., Sydney.
Levy, F. E., Station 2UW, Market St., Sydney.
Lyons, N., Station 2UW, Market St., Sydney.
Magill, J. E., Associated Radio Finance Pty. Ltd., 58 Margaret St., Sydney.
Marden, C. F., Station 2UW, Market St., Sydney.
Martin, J., John Martin Ltd., 116 Clarence St., Sydney.
McDonald, A. S., Amalgamated Wireless A/sia Ltd., York and Erskine Sts., Sydney.
McGregor Crowe, T. J., Mullard Radio Co. (Aust.) Ltd., 26 Clarence St., Sydney.
McIntosh, C. S., Gordon and Gotch, Barrack St., Sydney.
McLellan, W. J., 55 York St., Sydney.
McNeill, T. A. E., Station 2UW, Market St., Sydney.
Meyer, H., C/- Philips' Valves, 100 Mallett St., Camperdown.
Miles, D. J., W. G. Watson & Co., Clarence St., Sydney.
Millingen, A. C., E.T.C. Industries Ltd., 460 Elizabeth St., Sydney.
Mills, W. J., 187 Catherine St., Leichhardt.
Mingay, O. F., Ausn. Radio Publications Pty. Ltd., 30 Carrington St., Sydney.
Monks, C. A., Shell House, Carrington Street, Sydney.
Moore, E. J. T., 14 O'Connell St., Sydney.
Moyle, J., Wireless Newspapers Ltd., 60 Elizabeth St., Sydney.
Mulholland, J. L., Amalgamated Wireless A/sia Ltd., York and Erskine Sts., Sydney.
Norville, C. H., 345A Penshurst St., Chatswood.
O'Brien, W. J., Breville Radio Ltd., 67 Missenden Rd., Camperdown.
Ogilvy, C., Denison Estates Pty. Ltd., Culwulla Chambers, 701 Castlereagh St., Sydney.
Overdiep, J. A., Philips' Lamps A/sia Ltd., 69 Clarence St., Sydney.
Pearce, H. F., Standard Telephones and Cables A/sia Ltd., 258 Botany Rd., Alexandria.
Persson, A. R., Ducon Condenser Pty. Ltd., 73 Bourke St., Waterloo.
Phillips, J. B., Crown Radio Mfg. Co. Pty. Ltd., 51 Murray St., Pyrmont.
Plowman, C., Airzone (1931) Ltd., 16 Australia St., Camperdown.
Purcell, L. M., Eclipse Radio Pty. Ltd., 137 Clarence St., Sydney.
Purnell, G. E., Rola Co. (Aust.) Pty. Ltd., 267 Clarence St., Sydney.
Read, A. Earl, Aust. Trade Publications Pty., Ltd., 214 George St., Sydney.
Rich, G., Simplex Radio, 716 Parramatta Rd., Petersham.
Ridley, J. E., Station 2GZ, Hosking Place, Sydney.
Robinson, W. H. R., Station 2UE, 29 Bligh St., Sydney.
Rose, Reg., 58 Margaret St., Sydney.
Rubenstein, S. J., Philips' Lamps A/sia Pty. Ltd., 69 Clarence St., Sydney.
Rubie, J. Q., Mullard Radio Co. (Aust.) Ltd., 26 Clarence St., Sydney.
Salmon, C. G., International Radio Co. Ltd., 254 Castlereagh St., Sydney.
Scarr, L. A., Philips' Radio Works Ltd., 10 Dowling St., East Sydney.
Seatree, N. J., Breville Radio, 67 Missenden Rd., Camperdown.
Sharpe, H. R., A. W. Valve Co. Ltd., Cnr. York and Erskine Sts., Sydney.
Sheppard, A. W., Professional Radio Employees' Institute, 70 King St., Sydney.
Short, V. L., Warburton Franki Ltd., 307 Kent St., Sydney.
Simpson, G., S.T.C., Botany Rd., Alexandria.
Simpson, W. G., The Gramophone Co. Ltd., 2 Parramatta Rd., Homebush.
Smith, F. Langford, A.W. Valve Co. Ltd., Cnr. York and Erskine Sts., Sydney.
Solomons, L. M., Radio Corporation Pty. Ltd., 160 Goulburn St., Sydney.
Stevenson, M. H., Station 2UE, 29 Bligh St., Sydney.
Stevenson, C. V., Station 2UE, 29 Bligh St., Sydney.
Stokes, R. K., Radiokes Ltd., Cnr. George and Cleveland Sts., Redfern.
Sullivan, W. D., Elvy & Co., George St., Sydney.
Tatham, S. E., Sound Recording Studios, 160 Castlereagh St., Sydney.
Thom, F. W. P., Thom and Smith Ltd., Box 2596 EE, G.P.O., Sydney.
Thompson, G. L., Geo. L. Thompson Ltd., 15 Dixon St., Sydney.
Townsend-Smith, R. V., Eclipse Radio Pty. Ltd., 137 Clarence St., Sydney.
Trethewey, W. H., Magnavox (Aust.) Ltd., 61 Dowling St., East Sydney.
Truebridge, A. E., Vesta Battery Co. (Aust.) Ltd., 2-14 George St., Leichhardt.
Tyrrell, C. W., C/- Philips' Lamps A/sia Ltd., 10 Dowling St., East Sydney.
Van Gessel, K. M., Philips' Valve Works, 100 Mallett St., Camperdown.
Vaughan, C. W., E.T.C. Industries Ltd., 460 Elizabeth St., Sydney.
Walker, M., W. J. McLellan and Co., 55 York St., Sydney.
Warby, F. M., D.W. Radio Co., 210 Willoughby Rd., Crow's Nest.
Warby, H. A., D.W. Radio Co., 210 Willoughby Rd., Crow's Nest.
Wedgner, N. T., E. F. Wilks and Co. Ltd., 124 Castlereagh St., Sydney.
Weingott, R., Kriesler (A/sia) Ltd., Pine and Myrtle Sts., Chippendale.
Wilkinson, B., A.W.A., Cnr. York and Erskine Sts., Sydney.
Wilson, J. F., Amalgamated Wireless A/sia Ltd., Cnr. York and Erskine Sts., Sydney.
Wodell, F. E., R.C.S. Radio, 21 Ivy St., Darlington.
Woollett, N., Philips' Lamp A/sia Ltd., 69 Clarence St., Sydney.
Wyles, D. G., Philips' Lamps A/sia Ltd., 69 Clarence St., Sydney.
Young, F. C., Clyde Engineering Co. Ltd., 61 Wentworth Ave., Sydney.

MEMBERSHIP APPLICATION.

RIF. CLUB OF SYDNEY

Any person engaged in Radio is invited to send their name, and the name of their firm, together with 5/- subscription fee in application for membership of the R.I.F. Club, Sydney, to Secretary's Office, 30 Carrington Street, Sydney. Box 3765, G.P.O., Sydney.

. . . R.I.F. CLUB OF MELBOURNE . . .

At an inaugural luncheon in December, 1937, held at Buckley and Nunn's, a representative gathering of members of the radio manufacturing, broadcasting and associate industries met with the object of forming a social club on similar lines to the R.I.F. Club of Sydney.

Officers elected for 1938 were:—

Chairman, Mr. C. Tilley (Broadcasting Station 3AK); **Vice-chairmen,** Messrs. S. Aarons (Eclipse Radio) and C. T. Sproule (A.W.A.). **Committee members,** Messrs. J. Cooper (A. G. Healing Ltd.), W. Anderson (O. H. O'Brien's), K. L. Corr (Legionnaire), J. Phillips (Howard Radio), H. Lemon (A.W.A.), A. S. Duke, L. Pogonowski (B.G.E.), Homberg (Veall's), R. Thomas (Healing's), H. Smith (Airzone), and the hon. secretary, R. W. Pfeil (Mingay Publishing Co.), hon. treasurer, V. Byrne ("Listener In").

The club is composed of members engaged in radio and broadcasting in all its phases, and is formed for the purpose of carrying out social functions in the entire radio field, in so doing, any residue of funds to be used for such charitable and other purposes as the board, at its discretion, deems advisable.

Luncheons are held fortnightly at the "Commodore" Cafe, Capital House, Swanston Street, or entrance from Howie Court.

Membership is open to all persons of good standing directly engaged in radio and broadcasting. The hon. secretary's address is 5th Floor, 239 Collins Street, Melbourne; 'phone Central 442.

The R.I.F. Club will arrange four golf matches among members during 1938, the first of which will take place in March.

Subscription is 5/- p.a., and the financial year commences January 1 of each year.

List of Members as at May 1, 1938

Aarons, A. E., Eclipse Radio Pty. Ltd., 212 City Road, South Melbourne.
Aarons, S. C., Eclipse Radio Pty. Ltd., 212 City Road, South Melbourne.
Anderson, W., O. H. O'Brien, 664 Bourke Street, Melbourne.
Atkinson, G. T., A. G. Healing Ltd., 167 Franklin Street, Melbourne.
Balmer, N., Station 3KZ, 64 Elizabeth St., Melbourne.
Boord, A., Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne.
Byrne, V. G., "Listener In," Herald Bldgs., Flinders Street, Melbourne.
Campbell, K. M., Station 3XY, 163 Spring Street, Melbourne.
Capewell, C. G., O. H. O'Brien, 664 Bourke Street, Melbourne.
Carew, J. I., B.R. (Radio) Ltd., 59 Elizabeth Street, Melbourne.
Clift, F., Widdis Diamond Dry Cells Pty., Ltd., Parks and Wells Sts., South Melbourne.
Cooper, J. H., A. G. Healing Ltd., 167 Franklin Street, Melbourne.
Corr, K. L., Legionnaire Sound Productions Pty. Ltd., 68 King Street, Melbourne.
Crome, A., Australian General Electric Ltd., 108 Queen Street, Melbourne.
Dahlberg, L. E., "Radio Times," 501 Bourke St., Melbourne.
Dawson, A. B., A. G. Healing Ltd., 167 Franklin Street, Melbourne.
Duke, A. L., Alan Duke Pty. Ltd., 486 Bourke Street, Melbourne.
Egan, H. M., Widdis Diamond Dry Cells Pty., Ltd., Parks and Wells Sts., South Melbourne.
Entwhistle, J., Healing's Pty., Ltd., 261 Swanston St., Melbourne.
Forrest, F. G., Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne.
Hargreaves, D. N., Brooks Robinson Pty. Ltd., 59 Elizabeth Street, Melbourne.
Hodgins, J. P., "Radio Times," 590 Bourke St., Melbourne.
Homberg, S. G., A. J. Veall Pty. Ltd., 247 Swanston Street, Melbourne.
Lamb, H. M., Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne.
Leeman, J., The Ever Ready Co. (Aust.), Ltd., 360 Collins St., Melbourne.
Lemon, H. D., Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne.
Little, R., National Radio Corp. Pty. Ltd., 240 Elizabeth Street, Melbourne.
Marks, M., Marco's Radio Pty. Ltd., 232 Swanston Street, Melbourne.
McCubbin, H. M., Howard Radio Pty. Ltd., Vere Street, Richmond.
McDougall, R. K., A. J. Veall Pty. Ltd., 247 Swanston Street, Melbourne.
Montgomery,. B. Warburton Franki (Melb.), Ltd., 380 Bourke St., Melbourne.
Morgan, A. S., Stan-Mor Dry Cell Co., 212 Bay Street, Brighton.
Nellis, T. W., Allied Bruce Small Ltd., Clarendon St., South Melbourne.
Nicholls, K. T., Philips Lamps (A/sia) Pty., Ltd., 590 Bourke St., Melbourne.
Parcell, A., A. J. Veall Pty., Ltd., 490 Elizabeth St., Melbourne.
Pfeil, R. W., Mingay Publishing Co., 239 Collins Street, Melbourne.
Phillips, J. H., Howard Radio Pty. Ltd., Vere Street, Richmond.
Pogonowski, L. A., British General Electric Co. Pty. Ltd., 388 Bourke Street, Melbourne.
Prior, H. V., A. J. Veall Pty. Ltd., 247 Swanston Street, Melbourne.
Proctor, A. M., Station 2GZ, 2KO, 118 Queen Street, Melbourne.
Roberts, J., Clyde Engineering Co. Ltd., 566 Elizabeth Street, Melbourne.
Rowe, H. E., Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne.
Russenberg, H. H. W. Warburton Franki (Melb.), Ltd., 380 Bourke St., Melbourne.
Smith, H. Airzone (1931) Ltd., 416 Bourke St., Melbourne.
Sproule, C. T., Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne.
Starr, L. J., A. G. Healing Ltd., 167 Franklin Street, Melbourne.

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Professional Radio Employees' Institute of Australia

By A. W. SHEPPARD, General Secretary P.R.E.I.

Formerly the Institute was called the Radio Telegraphists' (Marine) Institute and was formed by wireless operators in the Mercantile Marine in 1916. It improved greatly the conditions of the operators and established definitely their status as responsible officers.

In 1920 coastal radio telegraphists and mechanics were enrolled and the word "Marine" was dropped out of the name. When A.W.A. took over the coastal radio service in its entirety, under agreement with the Commonwealth Government, it took over most of the staff, and they were enrolled into the Institute.

Later still when the Beam started, the Institute expanded and took in telegraphists and others in that service. In 1935 the name and constitution was altered and it became the Professional Radio Employees' Institute, an industry organisation rather than a craft organisation. Since that time technicians and studio staff on broadcasting stations have been enrolled and the Institute has been divided into autonomous sections under a governing council.

The Institute secured in March, 1937, in the Federal Arbitration Court before Judge Drake-Brockman, an Award for technicians, of which a precis follows.

The Award covers only stations contained in the schedule and the stations are graded according to the staff employed, viz.:

Grade "A" means a station employing a technical staff of eight or more other than juveniles.

Grade "B" means a station employing a technical staff of under eight but over four other than juveniles.

Grade "C" means a station employing a technical staff of three or four other than juveniles.

Grade "D" means a station employing a technical staff of one or two other than juveniles.

WAGES.

As well as the current Basic Wage for the State, plus the constant "loading" of 6/- per week for New South Wales, Victoria and Queensland, and 4/- per week for South Australia, Western Australia and Tasmania, technicians and control operators must be paid the following additional or marginal rates:

GRADE "A" STATIONS.

	£	s.	d.
Technician in charge	3	15	0
Technician	2	15	0
Control room operator	1	10	0

GRADE "B" STATIONS.

Technician in charge	3	5	0
Technician	2	10	0
Control room operator	1	10	0

GRADE "C" STATIONS.

Technician in charge	2	15	0
Technician	2	5	0
Control room operator	1	10	0

GRADE "D" STATIONS.

Technician	2	5	0
Control room operator	1	10	0

Other provisions of the Award are overtime at the rate of time and a quarter for all time up to four hours and time and a half thereafter for all time worked in excess of 44 hours per week; 88 per fortnight, or 132 per three weeks, according to the agreed roster.

Every employee must receive one day off in every seven. For work done on Sundays and holidays payment is to be at the rate of time and a quarter, and each employee is entitled to three weeks' leave per annum.

It is also provided that employees with two years' service or more shall receive a month's notice of dismissal; those with one to two years a fortnight, and under one year one week.

Provision is made for Boards of Reference in each State, and one has been set up already in Victoria.

DEFINITIONS.

(a) "Technician" includes a person who in the course of his duties attends the transmitting plant and performs all duties incidental to the running of the plant.

(b) "Technician in charge" means an employee who has the supervision of two or more technicians and is responsible for the carrying out by such technicians of their work and performs similar duties.

(c) "Control operator" includes an employee who in the ordinary course of duties operates the control amplifier and sets up connections for studio and outside pick-ups.

(d) "Broadcasting station" shall include transmitter control rooms and technical equipment used in conjunction therewith operating under the one call sign and the one licence, whether on the same or different premises.

SCHEDULE.

Advertiser Newspapers Limited.
Advertiser Broadcasting Service.
Airsales Broadcasting Company.
Brisbane Broadcasting Pty. Ltd.
Broadcasters (Aust.) Pty. Ltd.
J. B. Chandler and Co.
Catholic Broadcasting Co.
Commonwealth Broadcasting Corporation Ltd.
Commercial Broadcasters Pty. Ltd.
Efftee Broadcasters Pty. Ltd.
Finlay and Wills Broadcasters Pty. Ltd.
Hume Broadcasters Pty. Ltd.
Melbourne Broadcasters Pty. Ltd.
Mobile Broadcasting Service.
Newcastle Broadcasting Co. Ltd.
Nicholson's Ltd.
Nilsen's Broadcasting Service Pty. Ltd.
Radio 2UE Sydney. Ltd.
Sport Radio Broadcasting Co. Pty. Ltd.
Theosophical Broadcasting Station Ltd.
3AW Broadcasting Co. Pty. Ltd.
3DB Broadcasting Co. Pty. Ltd.
3KZ Broadcasting Co. Pty. Ltd.
W.A. Broadcasters Ltd.

Although the Award nominally expires in March, 1938, nevertheless under the Commonwealth Conciliation and Arbitration Act, it continues in force until the Court makes a new Award to supersede it.

MELBOURNE R.I.F. CLUB MEMBERS (Cont.)

Stevenson, K., E.T.C. Industries Ltd., 486 Bourke Street, Melbourne.
Steward, A., Hartley's Ltd., 270 Flinders Street, Melbourne.
Stroud, S. P., Ohmegga Resistors (Aust.) Pty. Ltd., 21 Station Street, Carlton.
Sullivan, P. G., Station 2UW, 18 Queen Street, Melbourne.
Taylor, W. S., Vesta Battery Co. (Aust.) Ltd., 11 Stanley Street, Melbourne.
Thomas, R. W., Healing's Pty. Ltd., 261 Swanston Street, Melbourne.
Tilley, C., Station 3AK, 480 Bourke Street, Melbourne.
Tracy, F., Columbia Graphophone (Aust.) Ltd., 347 Flinders Lane, Melbourne.
Tutt, A., A. G. Healing Ltd., 167 Franklin Street. Melbourne.
Walker, R. M., Allied Bruce Small Ltd., Clarendon St., Sth. Melbourne
Walsh, P. H., Australian General Electric Ltd., 108 Queen Street, Melbourne.
Webb, A. L. C., Rola Co. (Aust.) Pty. Ltd., The Boulevard, Richmond.
Welsh, C. O., Eclipse Radio Pty. Ltd., 212 City Road, South Melbourne.
Wright, L. J., L. J. Wright and Co., 490 Bourke Street, Melbourne.
Wynne, W. W., Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne.
Yeend, R. H., Rola Co. (Aust.) Pty. Ltd., The Boulevard, Richmond.

AUSTRALIAN LISTENERS' LICENCE FIGURES

Listeners' Licences In Australia, 1934-5-6-7

At end of	N.S.W. Licenses in force.	N.S.W. Ratio to 100 of Population.	VIC. Licenses in force.	VIC. Ratio to 100 of Population.	Q'LD. Licenses in force.	Q'LD. Ratio to 100 of Population.	S.A. Licenses in force.	S.A. Ratio to 100 of Population.	W.A. Licenses in force.	W.A. Ratio to 100 of Population.	TAS. Licenses in force.	TAS. Ratio to 100 of Population.	C'WEALTH Licenses in force.	C'WEALTH Ratio to 100 of Population.
1934														
Jan.	201,654	7.71	186,717	10.25	42,021	4.43	56,539	9.64	25,985	5.91	14,087	6.19	527,003	7.93
Feb.	204,618	7.82	187,918	10.31	44,280	4.66	57,322	9.77	26,457	6.01	14,292	6.28	534,887	8.05
Mar.	218,770	8.34	199,660	10.94	49,258	5.19	61,252	9.91	27,202	6.18	14,554	6.27	543,715	8.17
April	212,903	8.12	194,746	10.67	47,076	4.96	59,548	10.15	28,136	6.39	15,014	6.47	557,423	8.37
May	218,770	8.34	199,660	10.94	49,258	5.19	61,229	10.42	29,540	6.71	15,658	6.75	574,115	8.62
June	227,289	8.66	207,324	11.36	52,185	5.50	64,303	10.94	31,476	7.15	16,582	7.14	599,159	9.00
July	238,625	9.07	211,442	11.57	54,906	5.80	66,933	11.38	33,293	7.55	17,470	7.60	622,674	9.34
Aug.	247,757	9.42	218,442	11.94	57,414	5.99	69,141	11.75	34,639	7.83	18,238	8.00	645,631	9.67
Sept.	251,967	9.57	220,290	12.04	59,074	6.16	69,838	11.87	35,279	7.98	18,400	8.07	654,848	9.81
Oct.	256,117	9.73	223,999	12.24	60,719	6.34	70,863	12.05	36,238	8.20	18,627	8.17	666,563	9.98
Nov.	259,645	9.87	225,670	12.33	61,847	6.45	71,587	12.17	36,899	8.34	18,777	8.23	674,425	10.10
Dec.	262,988	9.97	227,135	12.33	62,721	6.54	72,476	12.31	37,417	8.46	18,897	8.29	681,634	10.19
1935														
Jan.	265,887	10.08	227,760	12.41	63,857	6.65	73,171	12.43	38,004	8.59	19,086	8.38	687,765	10.28
Feb.	269,394	10.22	229,756	12.52	63,703	6.64	73,756	12.53	38,550	8.71	19,320	8.48	694,479	10.38
Mar.	272,342	10.29	232,116	12.63	64,605	6.74	74,408	12.62	39,249	8.87	19,486	8.42	702,206	10.47
April	274,364	10.37	233,913	12.73	65,589	6.83	75,294	12.77	39,968	9.03	19,653	8.53	708,781	10.57
May	277,921	10.50	236,853	12.89	66,931	6.97	76,286	12.94	40,650	9.18	19,957	8.62	718,598	10.71
June	279,166	10.53	237,247	12.90	67,546	7.02	76,515	12.97	41,257	9.29	20,121	8.76	721,852	10.74
July	280,731	10.59	239,694	13.03	69,034	7.17	77,756	13.18	42,249	9.51	20,495	8.92	729,959	10.87
Aug.	282,147	10.64	242,036	13.16	70,002	7.27	78,346	12.28	43,221	9.73	20,848	9.07	736,690	10.97
Sept.	285,641	10.76	244,716	13.31	71,387	7.37	79,142	13.41	44,057	9.88	21,282	9.30	746,225	11.09
Oct.	288,402	10.87	246,587	13.36	72,786	7.52	80,088	13.85	46,219	10.34	22,244	9.73	770,152	11.43
Nov.	291,924	10.99	249,351	13.56	73,785	7.62	81,024	13.56	44,836	10.06	21,615	9.45	754,250	11.22
Dec.	294,232	11.06	250,758	13.63	74,911	7.72	81,788	13.85	45,580	10.22	21,951	9.59	763,598	11.35
1936														
Jan.	297,033	11.17	254,198	13.81	75,712	7.80	82,626	13.99	46,636	10.44	22,446	9.82	778,651	11.56
Feb.	300,282	11.29	255,898	13.91	76,938	7.93	83,598	14.16	47,234	10.57	22,542	9.86	786,492	11.67
Mar.	305,545	11.47	256,493	13.92	78,043	8.03	84,483	14.29	47,653	10.63	22,898	9.95	795,115	11.78
April	308,406	11.58	258,980	14.05	79,849	8.13	85,289	14.42	48,293	10.78	23,204	10.09	803,215	11.90
May	312,137	11.72	259,473	14.07	81,075	8.34	85,873	14.52	48,986	10.93	23,456	10.19	811,000	12.02
June	316,340	11.87	263,817	14.31	83,230	8.56	87,500	14.80	50,081	11.18	24,168	10.50	825,136	12.22
July	323,246	12.09	269,529	14.59	85,402	8.77	88,953	15.02	51,160	11.39	24,648	10.66	842,938	12.45
Aug.	327,848	12.26	270,867	14.66	86,916	8.92	89,651	15.13	52,193	11.62	24,924	10.78	852,399	12.59
Sept.	331,542	12.39	271,388	14.69	88,461	9.02	90,597	15.28	53,344	11.84	25,497	11.10	860,829	12.70
Oct.	336,733	12.58	274,168	14.84	89,686	9.14	91,784	15.48	54,051	12.00	25,860	11.26	872,282	12.87
Nov.	338,762	12.66	275,186	14.90	90,712	9.25	92,526	15.61	54,448	12.09	26,213	11.41	877,847	12.96
Dec.	341,493	12.76	277,344	15.02	92,208	9.40	93,881	15.84	55,246	12.27	26,843	11.69	887,015	13.09
1937.														
Jan.	342,824	12.78	279,243	15.10	93,235	9.48	94,804	15.98	56,226	12.46	27,072	11.79	893,404	13.16
Feb.	344,072	12.83	279,988	15.14	94,497	9.61	95,675	16.12	56,678	12.56	27,616	12.03	898,526	13.23
Mar.	345,714	12.84	282,159	15.24	95,469	9.72	96,442	16.22	57,414	12.71	27,970	11.9	905,168	13.3
Apr.	349,054	12.97	284,543	15.36	97,283	9.90	97,345	16.37	58,503	12.95	28,615	12.17	915,343	13.44
May	353,590	13.14	287,174	15.51	99,499	10.13	98,539	16.57	59,465	13.16	29,214	12.43	927,481	13.63
June	358,976	13.30	289,198	15.58	101,590	10.31	99,209	16.71	61,265	13.23	29,830	12.78	940,068	13.78
July	365,380	13.53	290,414	15.65	103,291	10.49	99,715	16.80	62,397	13.78	30,388	13.03	951,585	13.95
Aug.	370,972	13.74	295,777	15.93	104,820	10.64	101,656	17.12	63,464	14.02	31,165	13.36	967,854	14.19
Sept.	377,481	13.99	302,604	16.30	106,971	10.78	102,886	17.31	64,413	14.18	31,628	13.61	985,983	14.43
Oct.	379,432	14.04	303,101	16.33	107,984	10.88	103,393	17.40	64,958	14.30	32,129	13.83	990,997	14.51
Nov.	384,649	14.23	304,384	16.43	109,232	11.01	104,317	17.55	65,766	14.47	32,512	13.99	1,000,860	14.65
Dec.	387,762	14.32	306,620	16.52	110,111	11.10	105,045	17.68	66,269	14.59	32,788	14.12	1,008,595	14.76

GROWTH OF LISTENERS' LICENCES IN COMMONWEALTH SINCE 1924

The total number of licenses in operation during the various months since 1924 are given hereunder, together with the ratio to 100 population.

	Licenses.	Ratio.
	1924.	
July	1,206	.02
August	8,688	.1
September	16,859	.3
October	22,087	.4
November	31,529	.54
December	38,336	.66
	1925.	
January	44,274	.76
February	50,223	.85
March	54,853	.93
April	58,133	.99
May	61,231	1.04
June	63,874	1.08
July	66,605	1.1
August	72,483	1.24
September	77,485	1.31
October	79,271	1.34
November	80,853	1.37
December	85,130	1.44
	1926.	
January	90,640	1.5
February	97,219	1.6
March	103,145	1.7
April	109,500	1.8
May	116,491	1.9
June	128,060	2.14
July	141,392	2.3
August	154,736	2.5
September	165,436	2.7
October	175,298	2.9
November	183,020	3.02
December	187,228	3.09
	1927.	
January	193,542	3.2
February	197,872	3.2
March	201,288	3.3
April	206,515	3.4
May	215,801	3.5
June	225,249	3.68
July	233,286	3.82
August	241,338	3.93
September	249,375	4.06
October	254,738	4.15
November	257,010	4.17
December	258,179	4.19
	1928.	
January	260,304	4.22
February	262,363	4.23
March	263,340	4.22
April	265,067	4.25
May	267,178	4.28
June	270,507	4.33
July	275,441	4.42
August	280,688	4.50
September	284,690	4.54
October	285,550	4.56
November	288,457	4.59
December	288,784	4.59
	1929.	
January	289,164	4.60
February	291,289	4.61

	Licenses.	Ratio.
	1929 (Continued).	
March	293,120	4.64
April	296,317	4.69
May	298,551	4.73
June	301,199	4.75
July	303,192	4.78
August	303,562	4.79
September	304,156	4.78
October	309,820	4.86
November	310,313	4.87
December	309,981	4.86
	1930.	
January	311,074	4.86
February	309,001	4.83
March	309,572	4.84
April	308,711	4.81
May	311,322	4.87
June	312,192	4.88
July	323,004	5.03
August	335,037	5.21
September	330,169	5.13
October	329,627	5.12
November	328,307	5.10
December	329,465	5.12
	1931.	
January	326,993	5.08
February	326,270	5.06
March	327,413	5.07
April	329,134	5.08
May	328,815	5.09
June	331,128	5.12
July	330,918	5.10
August	326,620	5.03
September	326,599	5.02
October	330,179	5.08
November	333,714	5.13
December	337,654	5.19
	1932.	
January	341,394	5.25
February	347,555	5.33
March	350,661	5.38
April	357,433	5.48
May	363,772	5.56
June	369,936	5.67
July	376,759	5.77
August	384,787	5.88
September	390,552	5.97
October	397,490	6.08
November	409,264	6.25
December	419,180	6.40
	1933.	
January	427,821	6.53
February	434,632	6.62
March	444,379	6.77
April	448,788	6.83
May	459,007	7.00
June	469,477	7.14
July	481,374	7.32
August	491,233	7.41
September	500,341	7.55
October	508,534	7.67

	Licenses.	Ratio.
	1933 (Continued).	
November	514,287	7.76
December	518,628	7.81
	1934.	
January	527,003	7.93
February	534,887	8.05
March	543,715	8.17
April	557,423	8.37
May	574,115	8.62
June	599,159	9.00
July	622,674	9.34
August	645,631	9.67
September	654,848	9.81
October	666,563	9.98
November	674,425	10.10
December	681,634	10.19
	1935.	
January	687,765	10.28
February	694,479	10.38
March	702,206	10.47
April	708,781	10.57
May	718,598	10.71
June	721,852	10.74
July	729,959	10.87
August	736,600	10.97
September	746,225	11.09
October	770,152	11.43
November	754,250	11.22
December	763,598	11.35
	1936.	
January	778,651	11.56
February	786,492	11.67
March	795,115	11.78
April	803,215	11.90
May	811,000	12.01
June	825,136	12.22
July	842,938	12.45
August	852,399	12.59
September	860,829	12.70
October	872,282	12.87
November	877,847	12.96
December	887,015	13.09
	1937.	
January	893,404	13.16
February	898,526	13.23
March	905,168	13.3
April	915,343	13.44
May	927,481	13.63
June	940,068	13.78
July	951,585	13.95
August	967,854	14.19
September	985,983	14.43
October	990,997	14.51
November	1,000,860	14.65
December	1,008,595	14.76

Details in respect to the number of licences in each particular State for the periods abovementioned will be found in previous copies of this Broadcasting Business Year Book.

Growth by States and Summary of Listeners' Licences

In force at 31st December each year from 1924 to 1937

Commonwealth Totals.

31st December Year ended	Number in force	Ratio to 100 of Population	During the year increase Actual	%
1924	38,336	.66	—	—
1925	85,130	1.44	46,794	122
1926	187,228	3.09	102,098	120
1927	258,179	4.19	70,951	38
1928	288,874	4.59	30,695	12
1929	309,981	4.86	21,107	7
1930	329,465	5.12	19,484	6
1931	337,658	5.19	8,193	2
1932	419,180	6.40	81,522	24
1933	518,628	7.81	99,448	24
1934	681,634	10.19	163,006	31
1935	770,152	11.43	88,518	13
1936	887,015	13.09	116,863	15
1937	1,008,595	14.76	121,580	14

New South Wales.

1924	26,071	1.1	—	—
1925	34,911	1.5	8,840	34
1926	48,858	2.1	13,947	40
1927	72,854	3.05	23,996	49
1928	91,709	3.78	18,855	26
1929	107,503	4.37	15,794	17
1930	119,131	4.79	11,628	11
1931	125,409	5.00	6,278	5
1932	159,972	6.33	34,563	28
1933	197,869	7.56	37,897	24
1934	262,988	9.97	65,119	33
1935	294,232	11.06	31,244	12
1936	341,493	12.76	47,261	16
1937	387,762	14.32	46,269	14

Victoria.

1924	8,327	.5	—	—
1925	33,988	2.0	25,661	308
1926	97,744	5.8	63,756	188
1927	134,825	7.80	37,081	38
1928	141,890	8.11	7,065	5
1929	144,141	8.16	2,251	2
1930	141,687	7.95	– 2,454	– 2
1931	134,173	7.46	– 7,514	– 5
1932	156,307	8.66	22,134	16
1933	184,861	10.14	28,554	18
1934	227,135	12.33	42,274	23
1935	250,758	13.63	23,623	10
1936	277,344	15.02	26,586	11
1937	306,620	16.52	29,276	11

Queensland.

1924	633	.07	—	—
1925	4,141	.49	3,508	554
1926	19,414	2.2	15,273	369
1927	24,433	2.73	5,019	26
1928	25,224	2.77	791	3
1929	22,449	2.42	– 2,775	– 11
1930	24,418	2.59	1,969	9

Queensland.

31st December Year ended	Number in force	Ratio to 100 of Population	During the year increase Actual	%
1931	26,449	2.76	2,031	8
1932	32,183	3.31	5,734	22
1933	40,918	4.31	8,735	27
1934	62,721	6.54	21,803	53
1935	74,911	7.72	12,190	19
1936	92,208	9.40	17,297	23
1937	110,111	11.01	17,903	19

South Australia.

1924	1,345	.25	—	—
1925	6,985	1.29	5,640	419
1926	15,165	2.7	8,180	117
1927	18,792	3.29	3,627	24
1928	22,120	3.81	3,328	18
1929	25,481	4.38	3,361	15
1930	28,447	4.90	2,966	12
1931	32,160	5.51	3,713	13
1932	43,362	7.40	11,202	35
1933	55,762	9.51	12,400	29
1934	72,476	12.31	16,714	30
1935	81,788	13.85	9,312	13
1936	93,881	15.84	12,093	15
1937	105,045	17.68	11,164	12

Western Australia.

1924	1,716	.4	—	—
1925	4,192	1.15	2,476	144
1926	4,114	1.09	– 78	– 2
1927	3,872	1.00	– 242	– 6
1928	3,814	.95	– 58	– 1
1929	4,727	1.15	913	24
1930	8,030	1.92	3,303	70
1931	10,800	2.57	2,770	35
1932	16,127	3.79	5,327	49
1933	25,325	5.76	9,198	57
1934	37,417	8.46	12,092	48
1935	46,219	10.34	8,802	24
1936	55,246	12.27	9,027	19
1937	66,269	14.59	11,023	20

Tasmania.

1924	244	.1	—	—
1925	913	.41	669	274
1926	1,933	.92	1,020	112
1927	3,403	1.63	1,470	76
1928	4,117	1.95	714	21
1929	5,680	2.67	1,563	34
1930	7,752	3.59	2,072	36
1931	8,667	3.96	915	12
1932	11,229	5.08	2,562	30
1933	13,893	6.11	2,664	24
1934	18,897	8.29	5,004	36
1935	22,244	9.73	3,347	18
1936	26,843	11.69	4,599	20
1937	32,788	14.12	5,945	22

Monthly Totals by States

Broadcast Listeners' Licence Figures for Year 1937

FIGURES in brackets alongside New Issues, Renewals, and Cancellations, indicate the free licences included in the totals of those respective columns.

To obtain the paid licences, deduct those figures in brackets from the figure on the left. The totals of free licences in the last column on the right should be deducted from the monthly total column to obtain the nett paid licences in force. Experimental licences are paid and are included in all totals.

JANUARY.

	New Issues	Renewals	Total Issues	Cancellations	Monthly Total	Net Increase	Popln. Ratio	Total Includes Experimental	Total Includes Free Blind
N.S.W.	4,674(10)	19,347(97)	24,021	3,343(7)	342,824	1,331	12.78	669	597
Victoria	3,496(7)	16,354(84)	19,850	1,597(9)	279,243	1,899	15.10	460	590
Queensland	1,433(2)	5,200(16)	6,633	406(2)	93,235	1,027	9.48	229	226
S. Australia	1,618(1)	5,006(21)	6,624	695(—)	94,804	923	15.98	170	241
W. Australia	1,092(5)	2,851(17)	3,943	112(11)	56,226	980	12.46	101	171
Tasmania	715(—)	1,266(12)	1,981	486(—)	27,072	229	11.79	47	93
C'wealth	13,028(25)	50,024(247)	63,052	6,639(29)	893,404	6,389	13.16	1,676	1,918

FEBRUARY.

N.S.W.	4,739(4)	18,640(55)	23,379	3,491(6)	344,072	1,248	12.83	665	595
Victoria	3,525(7)	14,376(37)	17,901	2,780(6)	279,988	745	15.14	457	591
Queensland	1,842(2)	5,243(15)	7,085	580(2)	94,497	1,262	9.61	224	226
S. Australia	1,563(3)	4,785(21)	6,348	692(2)	95,675	871	16.12	173	242
W. Australia	1,022(4)	2,288(19)	3,310	570(5)	56,678	452	12.56	102	170
Tasmania	851(6)	959(11)	1,810	307(—)	27,616	544	12.03	52	99
C'wealth	13,542(26)	46,291(158)	59,833	8,420(21)	898,526	5,122	13.23	1,673	1,923

MARCH.

N.S.W.	4,888(3)	21,609(54)	26,497	3,246(—)	345,714	1,642	12.84	658	598
Victoria	3,549(16)	16,038(65)	19,587	1,378(11)	282,159	2,171	15.24	461	596
Queensland	1,513(9)	5,545(16)	7,058	541(—)	95,469	972	9.72	229	235
S. Australia	1,393(2)	5,420(20)	6,813	626(4)	96,442	767	16.22	171	240
W. Australia	1,166(10)	2,772(12)	3,938	430(—)	57,414	736	12.71	106	180
Tasmania	830(—)	1,195(12)	2,025	480(3)	27,970	354	11.9	50	96
C'wealth	13,339(40)	52,579(179)	65,918	6,697(18)	905,168	6,642	13.3	1,675	1,945

APRIL.

N.S.W.	5,225(3)	20,253(38)	25,478	1,885(—)	349,054	3,340	12.97	670	601
Victoria	4,577(16)	18,360(41)	22,937	2,193(—)	284,543	2,384	15.36	465	612
Queensland	1,814(6)	5,891(20)	7,705	(—)	97,283	1,814	9.90	233	241
S. Australia	1,485(3)	6,090(25)	7,575	582(4)	97,345	903	16.37	174	239
W. Australia	1,284(6)	3,630(11)	4,914	195(—)	58,503	1,089	12.95	108	186
Tasmania	979(—)	1,325(3)	2,304	334(—)	28,615	645	12.17	49	96
C'wealth	15,364(34)	55,549(138)	70,913	5,189(4)	915,343	10,175	13.44	1,699	1,975

MAY.

N.S.W.	6,307(2)	27,899(36)	34,206	1,771(2)	353,590	4,536	13.14	683	601
Victoria	4,725(12)	22,167(62)	26,892	2,094(4)	287,174	2,631	15.51	467	620
Queensland	2,982(4)	8,068(15)	11,050	766(7)	99,499	2,216	10.13	226	238
S. Australia	1,854(3)	7,787(28)	9,641	660(3)	98,539	1,194	16.57	181	239
W. Australia	1,517(1)	4,676(22)	6,193	555(2)	59,465	962	13.16	111	185
Tasmania	975(1)	1,845(3)	2,820	376(1)	29,214	599	12.43	49	96
C'wealth	18,360(23)	72,442(166)	90,802	6,222(19)	927,481	12,138	13.63	1,717	1,979

JUNE.

N.S.W.	7,193(10)	30,941(54)	38,134	1,807(3)	358,976	5,386	13.30	684	608
Victoria	5,485(7)	26,082(25)	31,567	3,461(17)	289,198	2,024	15.58	481	610
Queensland	2,744(6)	9,154(28)	11,898	653(—)	101,590	2,091	10.31	232	244
S. Australia	1,897(3)	9,484(20)	11,381	1,227(4)	99,209	670	16.71	176	238
W. Australia	2,196(4)	5,795(12)	7,991	396(1)	61,265	1,800	13.53	114	188
Tasmania	1,247(4)	2,507(10)	3,754	631(—)	29,830	616	12.78	50	100
C'wealth	20,762(34)	83,963(149)	104,725	8,175(25)	940,068	12,587	13.78	1,737	1,988

Monthly Totals of Licences by States for 1937 (continued)

JULY.

	New Issues	Renewals	Total Issues	Cancellations	Monthly Total	Net Increase	Popln. Ratio	Total Includes Experimental	Total Includes Free Blind
N.S.W.	10,285(13)	37,353(37)	47,638	3,881(11)	365,380	6,404	13.53	684	610
Victoria	7,400(12)	27,221(53)	34,621	6,184(2)	290,414	1,216	15.65	490	620
Queensland	2,710(9)	9,777(13)	12,487	1,009(3)	103,291	1,701	10.49	232	250
S. Australia	1,886(7)	10,289(21)	12,175	1,380(—)	99,715	506	16.80	178	245
W. Australia	1,680(7)	6,100(12)	7,780	548(—)	62,397	1,132	13.78	115	195
Tasmania	1,226(5)	2,596(7)	3,822	668(—)	30,388	558	13.03	53	105
C'wealth	25,187(53)	93,336(143)	118,523	13,670(16)	951,585	11,517	13.95	1,752	2,025

AUGUST.

N.S.W.	9,428(8)	33,003(44)	42,431	3,836(4)	370,972	5,592	13.74	683	614
Victoria	7,720(12)	28,327(47)	36,047	2,357(6)	295,777	5,363	15.93	495	626
Queensland	2,137(2)	8,671(15)	10,808	608(6)	104,820	1,529	10.64	236	246
S. Australia	2,269(7)	10,814(24)	13,083	328(—)	101,656	1,941	17.12	180	252
W. Australia	1,667(3)	5,617(6)	7,284	600(3)	63,464	1,067	14.02	118	195
Tasmania	1,338(4)	2,633(3)	3,971	561(1)	31,165	777	13.36	59	108
C'wealth	24,559(36)	89,065(139)	113,624	8,290(20)	967,854	16,269	14.19	1,771	2,041

SEPTEMBER.

N.S.W.	8,214(11)	28,186(24)	36,400	1,705(5)	377,481	6,509	13.99	698	620
Victoria	7,340(11)	21,276(28)	28,616	513(7)	302,604	6,827	16.30	492	630
Queensland	2,502(8)	7,987(19)	10,489	351(—)	106,971	2,151	10.78	242	254
S. Australia	1,820(4)	6,628(8)	8,448	590(3)	102,886	1,230	17.31	180	253
W. Australia	1,469(14)	4,561(7)	6,030	520(—)	64,413	949	14.18	119	209
Tasmania	1,125(2)	1,803(5)	2,928	662(1)	31,628	463	13.61	59	109
C'wealth	22,470(50)	70,441(91)	92,911	4,341(16)	985,983	18,129	14.43	1,790	2,075

OCTOBER.

N.S.W.	6,022(9)	25,426(32)	31,448	4,071(4)	379,432	1,951	14.04	704	625
Victoria	3,779(14)	21,109(34)	24,888	3,282(2)	303,101	497	16.33	496	642
Queensland	1,948(1)	7,018(15)	8,966	935(6)	107,984	1,013	10.88	248	249
S. Australia	1,556(1)	6,192(7)	7,748	1,049(2)	103,393	507	17.40	184	252
W. Australia	1,231(3)	4,024(11)	5,255	686(3)	64,958	545	14.30	121	209
Tasmania	1,047(3)	1,533(5)	2,580	546(—)	32,129	501	13.83	58	112
C'wealth	15,583(31)	65,302(104)	80,885	10,569(17)	990,997	5,014	14.51	1,811	2,089

NOVEMBER.

N.S.W.	6,193(6)	25,124(47)	31,317	976(—)	384,649	5,217	14.23	705	631
Victoria	3,546(7)	18,306(36)	21,852	2,263(—)	304,384	1,283	16.43	491	649
Queensland	1,681(5)	6,796(13)	8,477	433(—)	109,232	1,248	11.01	248	254
S. Australia	1,412(5)	5,962(14)	7,374	488(—)	104,317	924	17.55	185	257
W. Australia	1,097(3)	3,994(7)	5,091	289(3)	65,766	808	14.47	115	209
Tasmania	872(2)	1,504(8)	2,376	489(1)	32,512	383	13.99	57	113
C'wealth	14,801(28)	61,686(125)	76,487	4,938(4)	1,000,860	9,863	14.65	1,801	2,113

DECEMBER.

N.S.W.	5,147(9)	21,666(21)	26,813	2,034(3)	387,762	3,113	14.32	719	637
Victoria	3,376(12)	18,486(14)	21,862	1,140(2)	306,620	2,236	16.52	505	659
Queensland	1,368(1)	6,087(12)	7,455	489(3)	110,111	879	11.10	258	252
S. Australia	1,553(3)	6,282(9)	7,835	825(—)	105,045	728	17.68	191	260
W. Australia	961(1)	3,579(13)	4,540	458(—)	66,269	503	14.59	118	210
Tasmania	814(3)	1,603(6)	2,417	538(1)	32,788	276	14.12	59	115
C'wealth	13,219(29)	57,703(85)	70,922	5,484(9)	1,008,595	7,735	14.76	1,850	2,133

COMMONWEALTH MONTHLY TOTALS OF BROADCAST LISTENERS' LICENCE FIGURES FOR 1937.

	New Issues.	Renewals.	Total. Issues.	Cancellations.	Monthly Total	Net Increase.	Popln. Ratio.	Total includes Experimental.	Total includes Free Blind.
January	13,028(25)	50,024(247)	63,052	6,639(29)	893,404	6,389	13.16	1,676	1,918
February	13,542(26)	46,291(158)	59,833	8,420(21)	898,526	5,122	13.23	1,673	1,923
March	13,339(40)	52,579(179)	65,918	6,697(18)	905,168	6,642	13.3	1,675	1,945
April	15,364(34)	55,549(138)	70,913	5,189(4)	915,343	10,175	13.44	1,699	1,975
May	18,360(23)	72,442(166)	90,802	6,222(19)	927,481	12,138	13.63	1,717	1,979
June	20,762(34)	83,963(149)	104,725	8,175(25)	940,068	12,587	13.78	1,737	1,988
July	25,187(53)	93,336(143)	118,523	13,670(16)	951,585	11,517	13.95	1,752	2,025
August	24,559(36)	89,065(139)	113,624	8,290(20)	967,854	16,269	14.19	1,771	2,041
September	22,470(50)	70,441(91)	92,911	4,341(16)	985,983	18,129	14.43	1,790	2,075
October	15,583(31)	65,302(104)	80,885	10,569(17)	990,997	5,014	14.51	1,811	2,089
November	14,801(28)	61,686(125)	76,487	4,938(4)	1,000,860	9,863	14.65	1,801	2,113
December	13,219(29)	57,703(85)	70,922	5,484(9)	1,008,595	7,735	14.76	1,850	2,133
Total	220,214(419)			86,634(198)		121,580		20,952	24,204

Country—Metropolitan Licence Distribution

In Various States and the Commonwealth During 1937

THE following figures show the quarterly licence figures in the various metropolitan and country areas for each State for 1937.

It must be specially noted that the generally accepted boundaries for the metropolitan areas are not exactly in accordance with that as defined by the Commonwealth Statistician, and to assist the radio industry throughout Australia in a proper determination of the various figures, it will be noted that the names of the various municipalities are given hereunder in each State:—

New South Wales.

	31/3/'37	30/6/'37	30/9/'37	31/12/'37
Metropolitan—				
Licences	214,649	220,846	228,451	232,648
Population	1,266,212	1,270,922	1,272,795	1,272,795
Ratio : Licences to 100 Popn.	16.95	17.37	17.95	18.27
Dwellings	72	73	76	78
% of State	62	62	61	60

Metropolitan area of Sydney includes: Alexandria, Annandale, Ashfield, Auburn, Balmain, Bankstown, Bexley, Botany, Burwood, Canterbury, Concord, Darlington, Drummoyne, Dundas, Eastwood, Enfield, Ermington and Rydalmere, Erskineville, Glebe, Granville, Holroyd (part), Homebush, Hunter's Hill, Hurstville, Kogarah, Kuringai, Lane Cove, Leichhardt, Lidcombe, Manly, Marrickville, Mascot, Mosman, Newtown, Paddington, Parramatta, Petersham. Randwick, Redfern, Rockdale, Ryde, St. Peters, Strathfield, Sydney, Sydney North, Vaucluse, Waterloo, Waverley, Willoughby, Woollahra.

Country—				
Licences	131,065	138,130	149,030	155,114
Population	1,425,311	1,428,445	1,430,140	1,430,140
Ratio: Licences to 100 Popn.	9.19	9.67	10.42	10.84
Dwellings	40	42	45	47
% of State	38	38	39	40
State—				
Licences	345,714	358,976	377,481	387,762
Population	2,691,523	2,699,367	2,702,935	2,702,935
Ratio: Licences to 100 Popn.	12.84	13.30	13.96	14.32
Dwellings	55	57	60	62
% of State	—	—	—	—

Victoria.

	31/3/'37	30/6/'37	30/9/'37	31/12/'37
Metropolitan—				
Licences	191,703	196,817	201,325	201,767
Population	1,013,075	1,020,460	1,020,242	1,020,242
Ratio: Licences to 100 Popn.	18.92	19.28	19.73	19.77
Dwellings	79	81	82	82
% of State	68	68	67	66

Metropolitan area of Melbourne includes: Box Hill, Brighton, Brunswick, Camberwell, Caulfield, Chelsea, Coburg, Collingwood, Essendon, Fitzroy, Footscray, Hawthorn, Kew, Malvern, Melbourne, Melbourne South, Mordialloc, Northcote, Oakleigh, Port Melbourne, Prahran, Preston, Richmond, Sandringham, St. Kilda, Williamstown, and Shires of Braybrook (part), Heidelberg (part), Moorabbin.

Country—				
Licences	90,456	92,381	101,279	104,853
Population	838,787	835,636	835,446	835,446
Ratio: Licences to 100 Popn.	10.79	11.05	12.12	12.55
Dwellings	44	45	50	51
% of State	32	32	33	34
State—				
Licences	282,159	289,198	302,604	306,620
Population	1,851,862	1,856,096	1,855,688	1,855,688
Ratio: Licences to 100 Popn.	15.24	15.58	16.30	16.52
Dwellings	63	65	68	68
% of State	—	—	—	—

Queensland.

	31/3/'37	30/6/'37	30/9/'37	31/12/'37
Metropolitan—				
Licences	52,224	55,224	57,493	58,742
Population	309,584	314,284	316,591	316,591
Ratio: Licences to 100 Popn.	16.86	17.57	18.15	18.55
Dwellings	72	76	78	79
% of State	55	54	54	53

Metropolitan area of Brisbane includes: State Electoral Districts, Bremer (part), Brisbane, Brisbane South, Bulimba, Buranda, Enoggera (part), Fortitude Valley, Hamilton, Ithaca, Kelvin Grove, Kurilpa, Logan (part), Maree, Merthyr, Nundah, Oxley (part), Sandgate (part), Toowong, Windsor, Wynnum (part).

Country—				
Licences	43,245	46,366	49,478	51,369
Population	672,550	670,540	675,500	675,500
Ratio: Licences to 100 Popn.	6.43	6.91	7.32	7.60
Dwellings	28	30	32	33
% of State	45	46	46	47
State—				
Licences	95,469	101,590	106,971	110,111
Population	982,134	984,824	992,091	992,091
Ratio: Licences to 100 Popn.	9.72	10.31	10.78	11.10
Dwellings	42	45	47	48
% of State	—	—	—	—

South Australia.

	31/3/'37	30/6/'37	30/9/'37	31/12/'37
Metropolitan—				
Licences	65,351	66,294	68,038	69,296
Population	316,645	316,352	316,594	316,594
Ratio: Licences to 100 Popn.	20.63	20.95	21.49	21.88
Dwellings	83	85	87	88
% of State	68	67	66	66

Metropolitan area of Adelaide includes: Corporations Adelaide, Brighton, Colonel Light Gardens, Glenelg, Henley and Grange, Hindmarsh, Kensington and Norwood, Port Adelaide, St. Peters, Thebarton, Unley, and the following District Councils: Burnside, Campbelltown, Marion, Mitcham, Payneham, Prospect, Torrens West, Walkerville.

Country—				
Licences	31,091	32,915	34,848	35,749
Population	277,972	277,301	277,538	277,538
Ratio: Licences to 100 Popn.	11.18	11.87	12.56	12.88
Dwellings	48	51	53	55
% of State	32	33	34	34

(Overleaf)

Country—Metropolitan Licence Distribution *(continued)*

South Australia (Continued.)

State—				
Licences	96,442	99,209	102,886	105,045
Population	594,617	593,653	594,132	594,132
Ratio: Licences to 100 Popn.	16.22	16.71	17.31	17.68
Dwellings	67	69	72	73
% of State	—	—	—	—

Western Australia.

	31/3/'37	30/6/'37	30/9/'37	31/12/'37
Metropolitan—				
Licences	38,415	40,174	41,354	42,210
Population	212,174	212,614	213,363	213,363
Ratio: Licences to 100 Popn.	18.11	18.89	19.37	19.77
Dwellings	78	81	83	85
% of State	66	65	64	64

Metropolitan area of Perth includes: Municipalities: Claremont, Cottesloe, Fremantle, Fremantle East, Fremantle North, Guildford, Midland Junction, Perth, Subiaco, and the following Road Board districts: Bassendean, Bayswater, Belmont Park, Buckland Hill, Canning, Melville, Nedland, Peppermint Grove, Perth, Perth South, Swan (part).

Country—				
Licences	18,999	21,091	23,059	24,059
Population	239,383	239,966	240,868	240,868
Ratio: Licences to 100 Popn.	7.94	8.79	9.57	9.98
Dwellings	32	36	39	40
% of State	34	35	36	36
State—				
Licences	57,414	61,265	64,413	66,269
Population	451,557	452,580	454,231	454,231
Ratio: Licences to 100 Popn.	12.71	13.53	14.18	14.59
Dwellings	52	56	59	61
% of State	—	—	—	—

Tasmania.

	31/3/'37	30/6/'37	30/9/'37	31/12/'37
Metropolitan—				
Licences	10,267	10,770	11,185	11,362
Population	62,385	61,179	60,764	60,764
Ratio: Licences to 100 Popn.	16.46	17.60	18.40	18.70
Dwellings	70	75	78	80
% of State	37	36	35	35

Metropolitan area of Hobart includes: Glenoreby, Hobart, Kingborough (part), Clarence (part).

Country—				
Licences	17,703	19,060	20,443	21,426
Population	172,674	172,012	171,522	171,522
Ratio: Licences to 100 Popn.	10.25	11.08	11.91	12.50
Dwellings	44	48	52	54
% of State	63	64	65	65
State—				
Licences	27,970	29,830	31,628	32,788
Population	235,059	233,191	232,286	232,286
Ratio: Licences to 100 Popn.	11.90	12.78	13.61	14.12
Dwellings	51	55	59	61
% of State	—	—	—	—

Commonwealth.

	31/3/'37	30/6/'37	30/9/'37	31/12/'37
Metropolitan—				
Licences	572,609	590,125	697,846	616,025
Population	3,180,075	3,195,811	3,200,349	3,200,349
Ratio: Licences to 100 Popn.	18.00	18.46	18.99	19.24
Dwellings	76	78	80	81
% of State	63	63	62	61
Country—				
Licences	332,559	349,943	378,137	392,570
Population	3,626,677	3,623,900	3,631,014	3,631,014
Ratio: Licences to 100 Popn.	9.17	9.65	10.41	10.81
Dwellings	39	41	44	46
% of State	37	37	38	39
Commonwealth—				
Licences	905,168	940,068	985,983	1,008,595
Population	6,806,752	6,819,711	6,831,363	6,831,363
Ratio: Licences to 100 Popn.	13.30	13.78	14.43	14.76
Dwellings	56	58	61	62
% of Commonwealth	—	—	—	—

N.Z. Radio Licences in Force at Dec. 31, 1937

CLASS OF LICENCE	DISTRICTS. Auckland	C'terbury	Otago	Wellington	Total
Receivers	88,821	51,221	37,737	99,464	277,243
Dealers	466	234	177	456	1,333
Experimental (Amateur)	260	191	128	431	1,010
Experimental (Research)	—	—	—	1	1
Multiple	2	4	—	3	9
Special	5	—	—	2	7
Free	269	138	122	255	784
Totals	89,823	51,788	38,164	100,612	280,387

Extracts from N.Z. Radio Regulations.

Radio receiving licences cost £1/5/- per annum.

Temporary licences can be obtained for 10/- per week of 7 days or fraction thereof.

All licences expire on March 31 of each year. Licences obtained within three months of March 31 have to pay the additional 12 months' licence at 2/1 per calendar month.

Free licences are issued to blind persons, to institutions, homes, and asylums for blind persons, and to schools, hospitals, and charitable institutions.

It is an offence against the Regulations for any receiving set to be in an oscillating condition, to the detriment of reception by other licensees.

The N.Z. Radio Regulations cover over 65 pages of printed matter.

The radio dealers' licences are divided into five classes, Class 1, 2, 3, and 5 are issued to persons to respect of a fixed place of business. Persons wishing to carry on business in more than one fixed place, shall obtain additional licence. Licences of Class 4 are for issue to individual dealers not having a fixed place of business.

Class 5 licence may be issued to a person engaged in the repair and servicing of radio apparatus, and will entitle him to sell or offer for sale apparatus to be used in the repair and servicing of radio sets, such repairs and servicing to be carried out by the licence holder. Every radio licensed dealer shall exhibit for external observation a sign bearing the words, "Licensed Radio Dealer."

Radio dealers' licence for Class 1 costs £15 per annum, Class 2 £7/10/- p.a., Class 3 £2 p.a., Class 4 £15 p.a., Class 5 £5/5/- p.a.

Official Listeners' Licence Figures

WITHIN 50 MILES OF PRINCIPAL CITIES and TOWNS

Quarter ending—
MARCH 31, 1937

50-mile Locality	Licences	Popn.	Ratio of Licences to 100 of Popn.	Homes
N.S.W. AND F.C.T.				
Sydney	238,859	1,460,054	16.36	69
Balance of State	106,855	1,231,469	8.68	38
State (inc. F.C.T.)	345,714	2,691,523	12.84	55
Albury—N.S.W. Sec.	3,428	30,792	11.13	50
Vic. „	3,513	38,016	9.24	38
Armidale	1,904	31,562	6.03	27
Bathurst	8,248	93,390	8.83	37
Broken H. (ex. S.A.)	3,675	28,257	13.01	52
Canberra— (inc. N.S.W.)	3,245	33,586	9.66	42
Corowa—N.S.W. Sec.	3,801	32,168	11.81	53
Vic. „	4,475	48,963	9.13	38
Cumnock	6,450	71,758	8.99	40
Deniliquin— N.S.W. Sec.	1,495	15,954	9.37	41
Vic. „	2,073	22,271	9.30	40
Dubbo	3,107	31,277	9.93	44
Goulburn	5,244	61,541	8.52	37
Grafton	3,115	42,314	7.36	32
Griffith	2,706	34,831	7.77	36
Gunnedah	3,230	47,214	6.84	31
Inverell	2,570	38,502	6.67	30
Katoomba— (inc. metro.)	126,772	801,793	15.81	67
(exc. metro.)	19,448	168,687	11.53	48
Lismore—N.S.W. Sec.	6,253	90,680	6.89	32
Qld. „	305	5,812	5.24	21
Moss Vale	12,716	114,179	11.14	48
Newcastle	33,130	242,606	13.66	59
Orange	5,551	79,855	6.95	30
Tamworth	3,712	50,312	7.38	33
Wagga	6,407	73,086	8.76	40
Wollongong— (inc. Metro.)	235,003	1,413,285	16.34	69
(exc. Metro.)	20,354	147,073	13.84	58
VICTORIA.				
Melbourne	216,798	1,216,061	17.82	74
Balance of State	64,304	635,801	10.11	42
State	282,159	1,851,862	15.24	63
Ballarat	22,879	161,826	14.13	56
Bendigo	12,377	126,454	9.70	38
Birchip	4,107	44,214	9.28	42
Geelong (exc. Melb.)	26,661	156,164	17.07	70
(inc. Melb.)	217,307	1,165,505	18.64	77
Hamilton	5,398	55,555	9.71	42
VICTORIA (Continued.)				
Horsham	4,972	44,380	11.20	47
Lubeck	5,668	55,451	10.22	45
Mildura—Vic. Sec.	2,650	23,976	11.05	47
N.S.W. „	348	3,584	9.74	38
Sale	5,852	49,869	11.73	47
Shepparton— Vic. Sec.	7,717	81,247	9.49	40
N.S.W. „	390	4,319	9.03	40
Swan Hill—Vic. Sec.	2,639	29,583	8.92	38
N.S.W. „	366	5,490	6.67	29
Warrnambool	5,924	50,119	11.81	52
Warragul (exc. Met.)	16,950	152,760	11.09	44
(inc. Metro.)	29,342	218,953	13.40	53
QUEENSLAND.				
Brisbane	60,414	409,121	14.76	63
Remainder of State	35,055	573,013	6.11	26
State	95,469	982,134	9.72	42
Ayr	3,379	41,529	8.13	36
Bundaberg	3,561	46,421	7.67	31
Cairns	2,203	48,850	4.50	19
Charleville	354	5,067	6.98	32
Gympie	5,205	68,492	7.59	32
Ipswich— (exc. Brisbane)	10,662	129,964	8.20	36
(inc. Brisbane)	62,657	439,142	14.25	61
Longreach	401	5,062	7.92	38
Mackay	1,891	29,065	6.50	28
Maryborough	4,531	53,527	8.46	34
Oakey	6,926	83,064	8.33	39
Rockhampton	4,853	47,944	10.12	44
Toowoomba	11,783	123,059	9.57	43
Townsville	3,421	40,055	8.54	38
Warwick—Qld. Sec.	7,460	84,287	8.85	40
N.S.W. Sec.	189	4,052	4.66	16
SOUTH AUSTRALIA.				
Adelaide	74,392	396,700	18.75	75
Balance of State	22,050	197,917	11.14	50
State (inc. N.T.)	96,442	594,617	16.22	67
Crystal Brook	7,391	50,128	14.74	63
Port Lincoln	1,112	7,196	15.45	66
Port Pirie	5,773	43,330	13.32	59
Mt. Gambier— S.A. Sec.	1,407	17,181	8.77	37
Vic. Sec.	1,500	7,922	18.92	79
Murray Bridge (exc. Metro.)	8,086	72,910	11.09	45
(inc. Metro.)	73,437	389,555	18.85	77
Renmark	2,616	21,501	12.16	50
WESTERN AUSTRALIA.				
Perth	40,689	242,097	16.81	71
Balance of State	16,725	209,460	7.98	32
State	57,414	451,557	12.71	52
Albany	1,105	9,416	11.73	43
Bunbury	3,269	33,848	9.68	33
Collie	3,252	35,470	9.17	35

Licences—within 50 miles of Cities and Towns (continued)

MARCH 31, 1937, WESTERN AUSTRALIA (Continued.)

50-mile locality	Licences	Population	Ratio of Licences to 100 Popu-lation	Dwell-ings
Fremantle				
(exc. Metro.)	1,379	28,000	4.90	20
(inc. Metro.)	39,790	235,440	16.90	73
Geraldton	742	9,984	7.43	34
Kalgoorlie	2,077	23,257	8.90	34
Katanning	2,555	14,537	17.57	73
Merredin	1,539	15,031	10.23	43
Narrogin	1,529	15,847	9.64	41
Northam	2,559	37,782	6.77	28
Wagin	1,986	17,767	11.17	47
TASMANIA.				
Hobart	15,044	102,963	14.61	62
Balance of State	12,926	132,096	9.78	42
State	27,970	235,059	11.90	51
Burnie	5,534	48,377	11.44	50
Devonport	10,585	86,597	12.22	53
Kelso	10,758	90,769	11.85	52
Launceston	9,741	82,196	11.85	51
Queenstown	1,274	9,719	13.11	52
Ulverstone	5,235	47,864	10.93	48

Quarter ending—
JUNE 30, 1937

NEW SOUTH WALES and F.C.T.

50-mile locality	Licences	Population	Ratio of Licences to 100 Popu-lation	Dwell-ings
Sydney	245,963	1,465,190	16.79	71
Balance of State	113,013	1,234,177	9.16	40
State (inc. F.C.T.)	358,976	2,699,367	13.30	57
Albury—				
(N.S.W. Sec.)	3,526	30,792	11.45	52
(Vic. Sec.)	3,659	38,016	9.62	40
Armidale	2,018	31,562	6.39	27
Bathurst	8,753	93,390	9.37	39
Broken Hill—				
(exc. S.A.)	3,883	28,257	13.74	55
Canberra—				
(inc. N.S.W.)	3,451	33,586	10.28	44
Corowa—				
(N.S.W. sec.)	3,915	32,168	12.17	55
(Vic. Sec.)	4,629	48,963	9.45	40
Cumnock	7,001	71,758	9.75	43
Deniliquin—				
(N.S.W. Sec.)	1,535	15,954	9.62	42
(Vic. Sec.)	2,150	22,271	9.65	42
Dubbo	3,342	31,277	10.68	47
Goulburn	5,595	61,541	9.09	40
Grafton	3,314	42,314	7.83	34
Griffith	3,168	34,831	9.09	42
Gunnedah	3,386	47,214	7.17	33
Inverell	2,852	38,502	7.41	33

JUNE 30, 1937, N.S.W. and F.C.T. (Continued.)

Katoomba—				
(inc. Met.)	130,716	804,148	16.25	68
(exc. Met.)	20,293	168,687	12.03	50
Lismore—				
(N.S.W. Sec.)	6,825	90,680	7.53	35
(Q'ld. Sec.)	319	5,812	5.48	22
Moss Vale	13,274	114,179	11.62	50
Newcastle	33,859	242,606	13.95	60
Orange	6,011	79,855	7.53	32
Tamworth	3,918	50,312	7.79	35
Wagga	6,959	73,086	9.52	44
Wollongong—				
(inc. Met.)	241,896	1,417,995	17.06	72
(ex. Met.)	21,050	147,073	14.31	60
VICTORIA.				
Melbourne	223,643	1,222,683	18.20	75
Balance of State	65,555	633,413	10.34	43
State	289,198	1,856,096	15.58	65
Ballarat	23,405	161,826	14.46	58
Bendigo	12,683	126,454	10.02	39
Birchip	4,297	44,214	9.71	44
Geelong—				
(exc. Melb.)	27,402	156,164	17.54	73
(inc. Melb.)	224,219	1,165,505	19.23	80
Hamilton	5,734	55,555	10.32	44
Horsham	5,309	44,380	11.96	50
Lubeck	6,000	55,451	10.82	48
Mildura—				
(Vic. sec.)	2,796	23,976	11.24	48
(N.S.W. sec)	361	3,584	10.07	39
Sale	5,899	49,869	11.82	48
Shepparton—				
(Vic. sec.)	8,003	81,247	9.85	42
(N.S.W. sec.)	402	4,319	9.31	41
Swan Hill—				
(Vic. sec.)	2,784	29,583	9.41	41
(N.S.W. sec.)	372	5,490	6.77	30
Warragul—				
(exc. Met.)	17,021	152,760	11.14	44
(inc. Met.)	29,814	218,953	13.62	54
QUEENSLAND.				
Brisbane	64,052	413,523	15.49	67
Balance of State	37,538	571,301	6.57	29
State	101,590	984,824	10.31	45
Ayr	4,049	41,529	9.74	43
Bundaberg	3,750	46,421	8.07	33
Cairns	3,059	48,850	6.26	26
Charleville	379	5,067	7.47	35
Gympie	5,496	68,492	8.02	34
Ipswich—				
(exc. Brisbane)	11,103	129,964	8.54	38
(inc. Brisbane)	66,095	444,048	14.86	64
Longreach	432	5,062	8.53	41
Mackay	2,236	29,065	7.69	33
Maryborough	4,791	53,527	8.95	36
Oakey	7,176	83,064	8.63	40
Rockhampton	5,072	47,944	10.57	46
Roma	668	8,492	7.86	33
Toowoomba	12,308	123,059	10.00	45
Townsville	4,102	40,055	10.24	45
Warwick—				
(Qld. sec.)	7,760	84,287	9.20	42
(N.S.W. sec.)	195	4,052	4.81	17

Licences—within 50 miles of Cities and Towns (continued)

SOUTH AUSTRALIA.

50-mile locality	Licences	Population	Ratio of Licences to 100 Popu-lation	Dwell-ings
Adelaide	75,686	369,214	19.10	76
Balance of State	23,523	197,439	11.91	53
State (inc. N.T.)	99,209	593,653	16.71	69
Crystal Brook	7,688	50,128	15.33	66
Port Lincoln	1,195	7,196	16.60	66
Port Pirie	6,030	43,330	13.91	61
Mt. Gambier—				
(S.A. sec.)	1,514	17,181	8.81	37
(Vic. sec.)	1,579	7,922	19.92	83
Murray Bridge—				
(exc. Met.)	8,506	72,910	11.66	48
(inc. Met.)	74,800	389,262	19.22	78
Renmark	2,691	21,501	12.51	51
WESTERN AUSTRALIA.				
Perth	42,592	242,609	17.55	75
Balance of State	18,673	209,971	8.89	38
State	61,265	452,580	13.53	56
Albany	1,201	9,416	12.77	48
Bunbury	3,582	33,848	10.58	41
Collie	3,518	35,470	9.91	38
Fremantle—				
(exc. Met.)	1,480	28,000	5.28	21
(inc. Met.)	41,654	235,440	17.69	76
Geraldton	696	9,984	6.97	32
Kalgoorlie	2,485	23,257	10.68	41
Katanning	2,656	14,537	18.27	77
Merredin	1,623	15,031	10.79	45
Narrogin	1,809	15,847	11.41	49
Northam	2,925	37,782	7.74	32
Wagin	2,161	17,767	12.16	51
TASMANIA.				
Hobart	15,746	101,601	15.50	67
Balance of State	14,084	131,590	10.70	46
State	29,830	233,191	12.78	55
Burnie	5,933	48,377	12.26	54
Devonport	11,307	86,597	13.06	56
Kelso	11,499	90,769	12.67	56
Launceston	10,358	82,196	12.60	54
Queenstown	1,412	9,719	14.53	58
Ulverstone	5,639	47,864	11.78	52

Quarter ending—
SEPTEMBER 30, 1937

NEW SOUTH WALES and F.C.T.

50-mile locality	Licences	Population	Ratio of Licences to 100 Popu-lation	Dwell-ings
Sydney	254,553	1,467,294	17.35	73
Balance of State	122,928	1,235,641	9.95	42
State (inc. F.C.T.)	377,481	2,702,935	13.96	60
Albury—				
(N.S.W. Sec.)	3,636	30,792	11.81	53
(Vic. Sec.)	4,076	38,016	10.72	45

SEPTEMBER 30, 1937, N.S.W. and F.C.T. (Continued.)

Armidale	2,412	31,562	7.64	33
Bathurst	9,390	93,390	10.05	42
Bega	1,695	20,321	8.34	36
Broken Hill—				
Canberra—				
(exc. S.A.)	3,907	28,257	13.83	55
inc. N.S.W.)	3,671	33,586	10.93	47
Cooma	1,515	15,828	9.57	44
Corowa—				
(N.S.W. Sec.)	4,054	32,168	12.61	57
(Vic. Sec.)	5,139	48,963	10.49	44
Cumnock	7,484	71,758	10.43	46
Deniliquin—				
(N.S.W. Sec.)	1,630	15,954	10.22	45
(Vic. Sec.)	2,382	22,271	10.69	46
Dubbo	3,622	31,277	11.58	51
Goulburn	5,858	61,541	9.52	42
Grafton	3,813	42,314	9.01	40
Griffith	3,401	34,831	9.76	45
Gunnedah	4,074	47,214	8.63	40
Inverell	3,387	38,502	8.80	39
Katoomba—				
(inc. Metrop.)	135,697	805,084	16.85	71
(exc. Metrop.)	21,472	168,687	12.73	53
Kempsey	2,543	40,180	6.33	29
Lismore—				
(N.S.W. Sec.)	8,367	90,680	9.21	42
(Qld. Sec.)	382	5,812	5.64	23
Moss Vale	13,812	114,179	12.10	52
Murwillumbah—				
(N.S.W. Sec.)	7,824	79,358	9.86	45
(Q'ld. Sec.)	2,146	26,892	7.98	33
Newcastle	35,734	242,606	14.73	53
Orange	6,402	79,855	8.02	34
Parkes	3,846	43,808	8.78	40
Singleton	34,610	242,662	14.26	62
Tamworth	4,687	50,312	9.32	42
Wagga	7,273	73,086	9.95	46
Wollongong—				
(inc. Metrop.)	250,488	1,419,868	17.61	74
(exc. Metrop.)	22,037	147,073	14.99	63
Young	5,666	56,728	9.99	45
VICTORIA.				
Melbourne	229,641	1,222,419	18.79	77
Balance of State	72,963	633,269	11.52	46
State	302,604	1,855,688	16.30	67
Ballarat	24,960	161,826	15.42	61
Bendigo	14,201	126,454	11.23	43
Birchip	4,728	44,214	10.69	48
Geelong—				
(exc. Melb.)	29,162	156,164	18.67	77
(inc. Melb.)	230,487	1,176,406	19.59	81
Hamilton	5,983	55,555	10.76	46
Horsham	5,926	44,380	13.35	56
Lubeck	6,662	55,451	12.01	53
Mildura—				
(Vic. Sec.)	3,132	23,976	13.06	55
(N.S.W. Sec.)	408	3,584	11.38	44
Sale	6,102	49,869	12.23	49
Shepparton—				
(Vic. Sec.)	8,948	81,247	11.01	47
(N.S.W. Sec.)	420	4,319	9.72	43
Swan Hill—				
(Vic. Sec.)	3,003	29,583	10.15	43
(N.S.W. Sec.)	4,410	5,490	7.47	33

(Overleaf.)

Licences—within 50 miles of Cities and Towns (continued)

SEPTEMBER 30, 1937, VICTORIA—(Continued).

50-mile Locality	Licences	Population	Ratio of Licences to 100 of Population	Ratio of Licences to 100 of Dwellings
Warragul—				
(exc. Metrop.)	18,110	152,760	11.85	47
(inc. Metrop.)	33,157	218,953	15.14	60
Warrnambool ..	6,688	50,119	13.34	58
QUEENSLAND.				
Brisbane	66,531	416,565	15.97	69
Balance of State	40,440	575,526	7.03	31
State	106,971	992,091	10.78	47
Ayr	4,238	41,529	10.20	45
Bundaberg	3,975	46,421	8.56	35
Cairns	3,244	48,850	6.64	26
Charleville	418	5,067	8.24	38
Gympie	5,905	68,492	8.62	37
Ipswich—				
(exc. Brisbane)	11,616	129,964	8.93	40
(inc. Brisbane)	68,867	446,555	15.42	67
Kingaroy	2,383	35,789	6.65	31
Longreach	455	5,062	8.97	43
Mackay	2,444	29,065	8.40	36
Maryborough ..	5,098	53,527	9.52	39
Oakey	7,567	83,064	9.10	42
Rockhampton ..	5,432	47,944	11.32	49
Roma	748	8,492	8.80	37
Toowoomba	12,875	123,059	10.46	47
Townsville	4,292	40,055	10.71	47
Warwick—				
(Q'ld. Sec.) ..	8,223	84,287	9.75	44
(N.S.W. Sec.) ..	199	4,052	4.91	17
SOUTH AUSTRALIA.				
Adelaide	77,911	396,524	19.65	79
Balance of State	24,975	197,608	12.64	56
State (inc. N.T.)	102,886	594,132	17.31	72
Crystal Brook ..	8,101	50,128	16.16	69
Port Lincoln	1,310	7,196	18.20	79
Port Pirie	6,367	43,330	14.69	65
Mt. Gambier—				
(S.A. Sec.) ..	1,673	17,181	9.73	41
(Vic. Sec.) ..	1,598	7,922	20.17	83
Murray Bridge—				
(exc. Metrop.)	9,009	72,910	12.35	51
(inc. Metrop.)	77,047	389,504	19.77	80
Renmark	2,727	21,501	12.69	52
WESTERN AUSTRALIA.				
Perth	43,961	243,471	18.05	77
Balance of State	20,452	210,760	9.70	39
State	64,413	454,231	14.18	59
Albany	1,283	9,416	13.63	51
Bunbury	3,920	33,848	11.58	45
Collie	3,920	35,470	11.04	42
Fremantle—				
(exc. Metrop.)	1,567	28,000	5.59	23
(inc. Metrop.)	42,921	241,363	17.78	76
Geraldton	729	9,984	7.29	34
Kalgoorlie	2,650	23,257	11.37	44
Katanning	2,911	14,537	20.08	84
Merredin	1,741	15,031	11.60	49
Narrogin	1,989	15,847	12.55	54
Northam—				
(exc. Metrop.)	3,133	37,782	8.29	35
(inc. Metrop.)	13,471	90,935	14.81	62
Wagin	2,395	17,767	13.48	56
TASMANIA.				
Hobart	16,469	101,071	16.29	70
Balance of State	15,159	131,215	11.55	50
State	31,628	232,286	13.61	59
Burnie	6,340	48,377	13.10	58
Devonport	11,965	86,597	13.82	59
Kelso	12,249	90,769	13.49	59
Launceston	10,983	82,196	13.36	57
Queenstown	1,551	9,719	15.96	64
Ulverstone	6,039	47,864	12.62	56

Quarter Ending—

DECEMBER 31, 1937

NEW SOUTH WALES and F.C.T.

50-mile Locality	Licences	Population	Ratio of Licences to 100 of Population	Ratio of Licences to 100 of Dwellings
Sydney	259,726	1,467,294	17.70	75
Balance of State .	128,036	1,235,641	10.36	46
State (inc. F.C.T.)	387,762	2,702,935	14.32	62
Albury—				
N.S.W. Section ..	3,700	30,792	12.01	54
Vic. Section	4,212	38,016	11.07	46
Armidale	2,557	31,562	8.10	35
Bathurst	9,764	93,390	10.45	44
Bega	1,824	20,321	8.97	37
Broken Hill—				
(exc. S.A.)	4,041	28,257	14.15	57
Canberra—				
(inc. N.S.W.) ..	3,872	33,586	11.53	50
Cooma	1,614	15,828	10.19	47
Corowa—				
N.S.W. Section ..	4,112	32,168	12.78	58
Vic. Section ..	5,321	48,963	10.86	46
Cumnock	7,764	71,758	10.81	48
Deniliquin—				
N.S.W. Section ..	1,649	15,954	10.33	46
Vic. Section ..	2,418	22,271	10.85	47
Dubbo	3,822	31,277	12.21	54
Goulburn	6,079	61,541	9.87	43
Grafton	4,085	42,314	9.67	43
Griffith	3,387	34,831	9.72	45
Gunnedah	4,190	47,214	8.87	42
Inverell	3,516	38,502	9.13	41
Katoomba—				
(inc. Metro. area)	138,655	805,084	17.22	73
(exc. Metro. area)	22,329	168,687	13.23	56
Kempsey	3,070	40,180	7.64	35
Lismore—				
N.S.W. Section ..	9,041	90,680	9.97	46
Qld. Section ..	352	5,812	6.05	25
Moss Vale	14,262	114,179	12.49	54
Murwillumbah—				
N.S.W. Section ..	8,483	79,358	10.68	49
Qld. Section ..	2,251	26,892	8.37	35
Newcastle	36,392	242,606	14.99	64

Licences—within 50 miles of Cities and Towns (Continued)

NEW SOUTH WALES and F.C.T. (Continued.)

50-mile Locality	Licences	Population	Ratio of Licences to 100 of Population	Ratio of Licences to 100 of Dwellings
Orange	6,603	79,855	8.39	36
Parkes	3,972	43,808	9.06	42
Singleton	35,251	242,662	14.52	64
Tamworth	4,834	50,312	9.60	43
Wagga	7,647	73,086	10.46	48
Wollongong—				
(inc. Metro. area)	255,523	1,419,868	17.99	76
(exc. Metro. area)	22,875	147,073	15.55	65
Young	5,922	56,728	10.43	47
VICTORIA.				
Melbourne	230,784	1,222,419	18.87	78
Balance of State ..	75,836	633,269	11.97	49
State	306,620	1,855,688	16.52	68
Ballarat	25,798	161,826	15.94	63
Bendigo	14,730	126,454	11.64	45
Birchip	5,046	44,214	11.41	52
Geelong—				
(exc. Melbourne)	29,799	156,164	19.08	79
(inc. Melbourne)	231,566	1,176,406	19.68	82
Hamilton	6,388	55,555	11.31	48
Horsham	5,797	44,380	13.47	57
Lubeck	6,734	55,451	12.14	54
Mildura—				
Vic. Section	3,098	23,976	12.92	55
N.S.W. Section ..	413	3,584	11.52	45
Sale	6,696	49,869	13.42	54
Shepparton—				
Vic. Section ..	9,143	81,247	11.25	48
N.S.W. Section ..	426	4,319	9.86	43
Swan Hill—				
Vic. Section ..	3,076	29,583	10.39	45
N.S.W. Section ..	411	5,490	7.48	33
Warragul—				
(exc. Metro. area)	18,900	152,760	12.37	49
(inc. portion of Metro. area) ..	33,628	218,953	15.36	61
Warrnambool	7,008	50,119	13.98	62
QUEENSLAND.				
Brisbane	68,192	416,565	16.36	70
Balance of State ..	41,919	575,526	7.28	32
State	110,111	992,091	11.10	48
Ayr	4,393	41,529	10.57	47
Bundaberg	4,117	46,421	8.86	36
Cairns	3,597	48,850	7.36	31
Charleville	409	5,067	8.07	37
Gympie	6,057	68,492	8.84	37
Ipswich—				
(exc. Brisbane) .	11,993	129,964	9.22	41
(inc. Brisbane) ..	70,730	446,555	15.84	69
Kingaroy	2,458	35,789	6.86	32
Longreach	482	5,062	9.52	46
Mackay	2,519	29,065	8.66	38
Maryborough	5,270	53,527	9.84	40
Oakey	7,692	83,064	9.26	43
Rockhampton	5,563	47,944	11.60	51
Roma	791	8,492	9.31	40
Toowoomba	13,131	123,059	10.67	48
Townsville	4,446	40,055	11.09	49
Warwick—				
Qld. Section	8,329	84,287	9.88	45
N.S.W. Section ..	240	4,052	5.92	21
SOUTH AUSTRALIA.				
Adelaide	79,455	396,524	20.04	80
Balance of State (inc. Nth. Ter.) .	25,590	197,608	13.96	62
State (inc. N.T.) ..	105,045	594,132	17.68	73
Crystal Brook	8,240	50,128	16.44	71
Port Lincoln	1,317	7,196	18.30	79
Port Pirie	6,472	43,330	14.93	66
Mt. Gambier—				
S.A. Section ..	1,760	17,181	10.24	43
Vic. Section	1,833	7,922	23.13	96
Murray Bridge—				
(exc. Metro. area)	9,332	72,910	12.80	52
(inc. Metro. area)	78,728	389,504	20.21	83
Renmark	2,802	21,501	13.03	53
WESTERN AUSTRALIA.				
Perth	44,882	243,471	18.43	79
Balance of State ..	21,387	210,760	10.14	41
State	66,269	454,231	14.59	61

WESTERN AUSTRALIA (Continued.)

Albany	1,352	9,416	14.38	54
Bunbury	4,153	33,848	12.28	48
Collie	4,155	35,470	11.71	44
Fremantle—				
(exc. Metro. area)	1,598	28,000	5.71	23
(inc. Metro. area)	43,807	241,363	18.15	78
Geraldton	801	9,984	8.01	37
Kalgoorlie	2,770	23,257	11.88	46
Katanning	3,065	14,537	21.13	89
Merredin	1,805	15,031	12.03	51
Narrogin	2,399	15,847	13.28	57
Northam—				
(exc. Metro. area)	3,451	37,782	9.12	38
(inc. Metro. area)	14,003	91,123	15.37	66
Wagin	2,519	17,767	14.23	60
TASMANIA.				
Hobart	16,730	101,071	16.55	71
Balance of State ..	16,058	131,215	12.23	53
State	32,788	232,286	14.12	61
Burnie	6,537	48,377	13.51	59
Derby	7,761	55,828	13.90	59
Devonport	12,274	86,597	14.17	61
Kelso	12,598	90,769	13.88	60
Launceston	11,378	82,196	13.84	59
Queenstown	1,561	9,719	16.06	65
Ulverstone	6,224	47,864	13.00	58

OFFICIAL LISTENERS' LICENCE FIGURES

Within 25 Miles of Principal Cities and Towns

The P.M.G.'s Department has released the quarterly licence figures for the period ending March 31, 1938, and for the first time the licences within 25 miles of a town or broadcasting centre are available. Hitherto these figures have only covered the 50 mile radius. BROADCASTING BUSINESS made representations last year to the P.M.G.'s Department for a 25 mile figure, and although the work involved is greater, the Director-General (Sir Harry Brown), appreciating the value of these figures to the radio trade has approved of their release.

(NOTE: IN EACH CASE THE 25 MILES FIGURE APPEARS ABOVE THE 50 MILES FIGURE).

Quarter Ending March 31st, 1938

N.S.W. and Federal Capital Territory.

Locality (1)	Licences (2)	Population (3)	Ratio of Licences to 100 of Population (4)	Ratio of Licences to 100 of Dwellings. (5)
Sydney (25 mile) ..	251,827	1,359,624	18.52	78
(50 mile) ..	264,763	1,471,494	17.99	76
Albury	3,665	30,588	11.98	52
	8,020	68,808	11.65	51
Armidale	1,868	16,138	11.57	51
	2,623	31,562	8.31	36
Bathurst	2,860	27,114	10.54	44
	10,023	93,390	10.73	45
Bega	885	10,323	8.57	38
	1,906	20,321	9.37	40
Broken Hill	4,072	27,532	14.78	62
	4,077	28,257	14.42	58
Canberra	2,459	15,738	15.62	68
	4,043	33,586	12.03	52
Cooma	542	5,290	10.24	44
	1,685	15,828	10.64	49
Corowa	1,964	23,646	8.31	36
	9,571	81,131	11.80	51
Cumnock	1,455	10,280	14.15	61
	8,075	71,758	11.25	50
Deniliquin	705	6,550	10.76	47
	4,160	38,225	10.88	47
Dubbo	1,819	16,559	10.98	49
	3,944	31,277	12.60	55
Goulburn	2,698	23,573	11.44	53
	6,210	61,541	10.08	44
Grafton	2,633	20,335	12.94	57
	4,221	42,314	9.97	44
Griffith	1,257	13,364	9.47	42
	3,424	34,831	9.83	45
Gunnedah	892	10,190	8.75	41
	4,321	47,214	9.15	42
Inverell	1,316	13,383	9.83	45
	3,640	38,502	9.45	42
Katoomba (25) ..	5,522	38,761	14.24	57
(50) Inc. Met. area	140,355	806,907	17.39	73
† Ex. Met. area	20,862	168,687	12.36	52
† Decrease compared with previous quarter due to extension of metropolitan boundaries.				
Kempsey	1,825	18,827	9.69	44
	3,258	40,180	8.11	37
Lismore	6,858	59,611	11.50	54
	9,759	96,492	10.11	46
Moss Vale	2,589	22,917	11.29	47
	14,644	114,179	12.82	55
Murwillumbah	4,018	38,615	10.41	46
	11,109	106,250	10.46	47
Newcastle	32,605	198,069	16.46	70
	37,527	242,606	15.46	66
Orange	3,215	30,058	10.69	48
	6,866	79,855	8.59	37
Parkes	2,191	17,577	12.45	57
	4,145	43,808	9.46	43
Singleton	5,109	52,955	9.64	42
	36,269	242,662	14.94	65
Tamworth	2,726	21,613	12.61	58
	4,992	50,312	9.92	45
Wagga	3,436	27,672	12.41	57
	7,670	73,086	10.49	48
Wollongong (25) ..	9,536	57,415	16.60	69
(50) Inc. Met. area	260,457	1,423,513	18.29	77
† Ex. Met. area	21,471	147,073	14.59	61
† Decrease compared with previous quarter due to extension of metropolitan boundaries.				
Young	2,660	17,039	15.61	72
	6,085	56,728	10.72	48

Victoria.

Melbourne—				
(25 mile)	212,575	1,102,052	19.28	80
(50 mile)	231,979	1,223,269	18.96	78
Ballarat	8,724	66,845	13.05	51
	26,252	161,826	16.21	64
Bendigo	7,174	53,605	13.38	52
	15,136	126,454	11.96	46
Charlton	1,563	15,567	10.04	44
	5,273	45,168	11.45	49
Geelong (25)	10,095	63,596	16.10	67
(50) Inc. Met. area	233,387	1,165,505	20.02	82
Ex. Met. area	30,947	156,164	19.81	82
Hamilton	2,620	16,464	13.05	56
	6,576	55,555	11.83	50
Horsham	2,620	16,047	16.32	69
	6,216	44,380	13.40	56
Lubeck	3,090	20,857	14.86	65
	6,989	55,451	12.60	56

Licences—Within 25 Miles of Principal Cities and Towns *(continued)*

Locality (1)	Licences (2)	Population (3)	Ratio of Licences to 100 of Population (4)	Ratio of Licences to 100 of Dwellings. (5)
Mildura	3,330	22,962	14.50	60
	3,581	27,560	13.00	55
Sale	2,213	16,563	13.35	57
	6,868	49,869	13.77	55
Shepparton	3,841	33,435	14.01	60
	9,767	85,566	11.41	49
Swan Hill	1,295	13,425	9.64	43
	3,524	35,073	10.04	43
Warragul (25) ..	5,635	41,645	11.10	43
(50) Inc. portion Metro. area	33,138	218,953	15.13	60
Ex. Met. area	19,373	152,760	12.67	50
Warrnambool	3,158	27,505	11.48	51
	7,175	50,119	14.31	63

Queensland.

Brisbane (25 mile)	66,112	366,010	18.06	77
(50 mile)	70,275	417,459	16.83	72
Ayr	1,107	12,375	8.94	40
	4,577	41,529	11.02	49
Bundaberg	2,116	22,518	9.39	39
	4,264	46,421	9.18	37
Cairns	2,017	23,745	8.49	37
	3,685	48,850	7.54	32
Charleville	326	3,742	8.71	40
	376	5,067	7.42	34
Gympie	1,414	24,390	5.79	25
	5,438	68,492	7.93	34
Ipswich (25) Inc. Metro. area	66,186	366,047	18.08	78
Ex. Metro. area	5,549	48,778	11.37	50
(50) Inc. Met. area	73,317	447,233	16.39	71
Ex. Met. area	12,690	129,964	9.76	43
Kingaroy	1,506	16,092	9.35	45
	2,617	35,789	7.31	34
Longreach	493	4,041	12.19	59
	496	5,062	9.79	47
Mackay	2,314	22,860	10.12	46
	2,565	29,065	8.82	38
Maryborough	2,155	20,190	10.67	42
	5,237	53,527	9.78	40
Oakey	5,014	47,928	10.46	48
	7,851	83,064	9.45	44
Rockhampton ..	5,258	41,908	12.54	56
	5,610	47,944	11.70	51
Roma	480	5,045	9.51	40
	816	8,492	9.60	41
Toowoomba	5,565	53,241	10.45	48
	13,547	123,059	11.00	50
Townsville	3,456	28,533	12.11	54
	4,588	40,055	11.45	51
Warwick	1,812	21,209	8.54	38
	8,814	88,339	9.98	45

South Australia.

Adelaide (25 mile)	75,551	355,276	21.26	85
(50 mile)	81,215	397,211	20.45	82
Crystal Brook ..	4,364	25,349	17.21	75
	8,469	50,128	16.90	73
Mt. Gambier	1,343	13,147	10.21	44
	3,208	25,103	12.77	53
Murray Bridge (25)	3,375	18,696	18.05	75
(50) Inc. Met. area	80,290	390,056	20.58	83
Ex. Met. area	9,591	72,910	13.15	54
Port Augusta ..	998	6,012	16.60	73
	1,982	13,778	14.38	63
Port Lincoln ..	791	4,362	18.13	75
	1,372	7,196	19.07	82
Renmark	2,274	11,159	20.37	85
	2,811	21,501	13.07	54

Western Australia.

Perth (25 mile) ..	44,363	232,392	19.08	81
(50 mile) ..	46,020	244,480	18.82	81
Albany	815	5,539	14.71	59
	1,410	9,416	14.97	57
Bunbury	1,721	15,086	11.40	45
	4,283	33,848	12.65	49
Collie	1,779	11,430	15.56	59
	4,310	35,470	12.15	47
Fremantle (25) Inc. Metro. area	44,288	231,710	19.11	82
Ex. Metro. area	1,050	17,450	6.02	25
(50) Inc. Met. area	44,892	242,260	18.53	80
Ex. Met. area	1,654	28,000	5.91	24
Geraldton	819	7,270	11.27	52
	853	9,984	8.54	39
Kalgoorlie	2,927	21,390	13.68	57
	2,927	23,257	12.58	49
Katanning	1,115	6,010	18.55	81
	3,176	14,537	21.85	92
Merredin	636	5,170	12.30	52
	1,880	15,031	12.51	53
Narrogin	933	6,016	15.51	66
	2,221	15,847	14.02	60
Northam (25)	1,411	12,782	11.04	50
(50) Inc. portion Metro. area	14,401	91,347	15.76	68
Ex. Metro. area	3,592	37,782	9.51	40
Wagin	573	4,387	13.06	56
	2,629	17,767	14.80	62

Tasmania.

Hobart (25 mile) .	14,975	74,666	20.15	86
(50 mile) .	17,034	101,555	16.77	72
Burnie	3,236	27,236	11.88	53
	6,645	48,377	13.73	60
Derby	901	9,009	10.00	42
	8,050	55,828	14.42	61
Devonport	6,178	31,603	13.22	58
	12,516	86,597	14.45	63
Kelso	2,278	18,804	12.11	52
	12,634	90,769	13.92	60
Launceston	8,075	51,497	15.68	67
	11,642	82,196	14.16	61
Queenstown	1,393	6,660	20.91	89
	1,635	9,719	16.82	68
Ulverstone	4,190	32,794	12.78	56
	6,362	47,864	13.29	59

Complete List of New Zealand Broadcasting Stations

2YA **The National Broadcasting Service, Featherston Street, Wellington, C.1.** 60 KW., 570 KC., 526 m. Transmission hours: Monday to Saturday, 7—9 a.m., 10 a.m.—11 p.m.; Sunday, 9 a.m.—noon, 1—4.30 p.m., 6—10 p.m.

1YA **The National Broadcasting Service, Shortland Street, Auckland, C.1.** 10 KW. 650 KC. 461.3 m. Transmission hours: Monday to Saturday, 7—9 a.m., 10 a.m.—11 p.m.; Sunday, 9 a.m.—noon, 1—4.30 p.m., 6—10 p.m.

4YZ **The National Broadcasting Service, Invercargill.** 100 watts, 680 KC., 441.2 m. Transmission hours: Monday to Saturday, noon—2 p.m. 7—10 p.m., Sunday 11 a.m.—1 p.m., 6.30—10 p.m.

3YA **The National Broadcasting Service, Gloucester Street, Christchurch, C.1.** 10 KW., 720 KC., 416.4 m. Monday to Saturday, 7—9 a.m., 10 a.m. —11 p.m.; Sunday, 9 a.m.—noon, 1—4.30 p.m., 5.30—10 p.m.

2YB **The North Taranaki Radio Society, King Street, New Plymouth.** 100 watts, 760 KC., 394.5 m. Transmission hours: Monday, 7—10 p.m.; Wednesday, 6.30—10 p.m.; Friday, 8—10 p.m.; Saturday, 6.30—10 p.m.; Sunday, 6—10 p.m.

4YA—The National Broadcasting Service, Stuart Street, Dunedin, C.1. 10 KW. 790 KC. 379.5 m. Transmission hours: Monday to Saturday, 7—9 a.m., 10 a.m.—11 p.m.; Sunday, 9 a.m.—noon, 1—4.30 p.m., 5.30—10 p.m.

2ZH **C. B. Hansen, Dalton Street, Napier.** 65 watts, 820 KC, 365.6 m. Transmission hours: Monday, Tuesday, Friday, noon—2 p.m., 7—10.30 p.m.; Wednesday, noon—2 p.m., 6.30—10.30 p.m.; Thursday, noon—2 p.m., Saturday 10 a.m.—5 p.m., 7—11 p.m.; Sunday, noon—3 p.m., 6.30—10 p.m.

2YC **The National Broadcasting Service, Featherston Street, Wellington, C.1.** 5 KW., 840 KC., 356.9 m. Transmission hours: Week-days, 5—6 p.m., 7—10.30 p.m.; Sundays, 6—10 p.m.

1YX **The National Broadcasting Service, Shortland Street, Auckland, C.1.** 150 watts, 880 KC., 340.7 m. Transmission hours: Week-days, 5—6 p.m., 7—10.30 p.m.; Sundays, 6—10 p.m.

2ZP **E. A. Perry, Queen Street, Wairoa.** 105 watts, 900 KC., 333.1 m. Transmission hours: Tuesday, 7—9 a.m., 6—10.30 p.m.; Wednesday, Thursday, Friday, Saturday, 7—9 a.m.; Sunday, 7.30—9.30 a.m.

2YN **The National Broadcasting Service, Nelson.** 50 watts. 920 KC. 325.9 m. Transmission hours: Daily 7—10 p.m.

3ZR **The West Coast Radio Society, Greymouth.** 175 watts. 940 KC. 319 m. Transmission hours: Monday to Friday, 7.30—8.30 a.m., 9—10 a.m., noon—2 p.m., 3—5 p.m., 6—10 p.m.; Saturday, 7.30—8.30 a.m., 9—10 a.m., noon—2 p.m., 3—5 p.m., 6—11 p.m.; Sunday, noon—1.30 p.m., 2—5 p.m., 5.30—6.15 p.m., 7—10 p.m.

2ZJ **C.T.C. Hands, 229 Gladstone Road, Gisborne.** 200 watts. 980 KC. 306 m. Transmission hours: Monday, Friday, Saturday, 7—10 p.m.; Tuesday, Wednesday, noon—1.30 p.m., 7—10 p.m.; Thursday, 7—8 p.m.

2YD **The National Broadcasting Service,** Featherston Street, Wellington, C.1. 250 watts. 990 KC. 302.8 m. Transmission hours: Daily, 7—10 p.m.

4ZM **McCracken and Walls, 17 George Street, Dunedin.** 30 watts. 1,010 KC. 296.9 m. Monday, Wednesday, Thursday, 9—11.45 a.m., 1—2 p.m.; Tuesday, 9—11.45 a.m., 1—2 p.m., 6—11 p.m.; Friday, 9—11.45 a.m.; Saturday, 9 a.m.—noon, 5 p.m.—midnight; Sunday, 2—10 p.m.

4ZD **Otago Radio Association, Rattray Street, Dunedin.** 20 watts. 1,010 KC. 296.9 m. Transmission hours: Wednesday, Thursday, 6—11 p.m.; Sunday, 10 a.m.—noon.

1ZB **The National Commercial Broadcasting Service, Queen's Arcade, Auckland, C.1.** 1 KW. 1,090 KC. 275.1 m. Transmission hours : Daily, 6 a.m. —midnight.

2ZB **The National Commercial Broadcasting Service, Dixon Street, Wellington, C.1.** 1 KW. 1,130 KC. 265.5 m. Transmission hours: Daily, 6 a.m. —midnight.

4YO **The National Broadcasting Service, Stuart Street, Dunedin, C.1.** 200 watts. 1,140 KC. 263 m. Transmission hours: Week-days, 5—6 p.m., 7—10.30 p.m.; Sundays, 6—10 p.m.

2ZM **Atwater Kent Radio Service Ltd., 258 Gladstone Road, Gisborne.** 15 watts. 1,150 KC. 260.7 m. Monday, Saturday, 9.15—10 a.m., 8—10.30 p.m.; Tuesday, Wednesday, 9.15—10 a.m.; Thursday, 9.15—10 a.m., 8—11 p.m.; Sunday, noon—1 p.m., 7—11 p.m.

3YL **The National Broadcasting Service, Gloucester Street, Christchurch, C.1.** 250 watts. 1,200 KC. 249.9 m. Transmission hours: Week-days, 5—6 p.m., 7—10.30 p.m.; Sundays, 6—10 p.m.

4ZB **The National Commercial Broadcasting Service, Princes Street, Dunedin,** C.1. 1 KW. 1,220 KC. 245.8 m. Transmission hours: Daily, 6 a.m.—midnight.

1ZM **The National Broadcasting Service, Shortland Street, Auckland.** 750 watts. 1,250 KC. 239.9 m. Transmission hours: Monday to Friday, 5—10 p.m.; Saturday, 1—4 p.m., 5 p.m.—midnight; Sunday, 10 a.m.—6 p.m., 7—10 p.m.; (holidays, 8 p.m.—midnight).

4ZC **J. I. Bilton, Cromwell.** 20 watts. 1,280 KC. 234.2 m. Transmission hours: Daily, 7 p.m.—10 p.m.

1ZJ **John's Ltd., Chancery Street, Auckland.** 65 watts. 1,310 KC. 228.9 m. Transmission hours: Tuesday, noon—2 p.m.; Wednesday, 7.30—9.30 p.m.; Thursday, noon—2 p.m.

3ZB **The National Commercial Broadcasting Service, Christchurch, C.1.** 1 KW. 1,430 KC. 209.7 m. Transmission hours: Daily, 6 a.m.—midnight.

Complete List of BROADCASTING STATIONS IN AUSTRALIA

INCLUDING GOVERNMENT STATIONS OPERATED BY THE NATIONAL BROADCASTING SERVICES AND COMMERCIAL STATIONS PRIVATELY OWNED AND OPERATED.

*Denotes Not Yet in Operation at July 1.

NEW SOUTH WALES.

2AD 265 metres, 1,130 KC., 100 watts. Armidale Newspapers Co. Ltd., Armidale.

2AY 203 metres, 1,480 KC., 200 watts. Amalgamated Wireless (A/sia) Ltd. Studio, Temple Court, Dean Street, Albury.

2BE 201 metres, 1,490 KC., 100 watts. Bega and Far South Coast Broadcasters Ltd., Carp Street, Bega.

2BH 349 metres, 860 KC., 100 watts. Radio Silver City Ltd. Studio, Cnr. Cummins and Zebina Streets, Broken Hill.

2BL 405 metres, 740 KC., 3,000 watts. National Broadcasting Service. Studio, 96-98 Market Street, Sydney.

2BS 200 metres, 1,500 KC., 100 watts. Bathurst Broadcasters Ltd. Studio, 51a Keppel Street, Bathurst.

2CA 286 metres, 1,050 KC., 2,000 watts. Canberra Broadcasters Ltd., Canberra, F.C.T.

2CH 252 metres, 1,190 KC., 1,000 watts. N.S.W. Council of Churches Service. Studio, Grace Building, York and King Streets, Sydney. Station at Dundas.

2CK* 205 metres, 1,460 KC., 200 watts. Coalfields Broadcasting Co. Pty., Ltd. 97 Vincent Street, Cessnock. Station at Cessnock.

2CO 448 metres, 670 KC., 7,500 watts. National Broadcasting Service (Relays 3AR and 3LO). Station at Corowa.

2CR 545 metres, 550 KC., 10,000 watts. National Broadcasting Service. Central regional. Station at Cumnock.

2CY* 353 metres, 850 KC. (Canberra National), 10 KW.

2DU 455 metres, 660 KC., 200 watts. Central Western Radio Services Ltd. Tamworth Street, Dubbo.

2FC 492 metres, 610 KC., 3,500 watts. National Broadcasting Service. Studio, 96-98 Market Street, Sydney.

2GB 345 metres, 870 KC., 1,000 watts. 2GB Broadcasting Station Ltd. 29 Bligh Street, Sydney. Station at Homebush.

2GF 248 metres, 1,210 KC., 200 watts. Grafton Broadcasting Co. Ltd. Station at Turf Street, Grafton.

2GN 216 metres, 1,390 KC., 200 watts. Goulburn Broadcasting Co. Ltd., Auburn Street, Goulburn.

2GZ 303 metres, 990 KC., 2,000 watts. Country Broadcasting Services Ltd., Orange. Studios: Hosking Place, Sydney, and Lord's Place, Orange.

2HD 263 metres, 1,140 KC., 500 watts. Airsales Broadcasting Co., P.O. Box 123, Newcastle.

2HR 441 metres, 680 KC., 300 watts. Hunter River Broadcasters Pty. Ltd., Maitland.

2KA 385 metres, 780 KC., 1,000 watts. Transcontinental Broadcasting Corp. Ltd. Station at Wentworth Falls, near Katoomba.

2KM 306 metres, 980 KC., 100 watts. Radio Kempsey Ltd., 16 Barrack Street, Sydney.

2KO 213 metres, 1,410 KC., 500 watts. Newcastle Broadcasting Co. Pty. Ltd., 70-74 Hunter Street, Newcastle.

2KY 294 metres, 1,020 KC., 1,000 watts. The Labour Council of N.S.W. Studio, 424 George Street, Sydney.

2LF 224 metres, 1,340 KC., 300 watts. Young Broadcasters Ltd., Watson House, 9 Bligh Street, Sydney. Station located at Young, N.S.W.

2LM 333 metres, 900 KC., 500 watts. Richmond River Broadcasters Pty. Ltd., Molesworth Street, Lismore.

2MG 207 metres, 1,450 KC., 100 watts. Mudgee Broadcasting Co. Pty., Ltd., 100 Church Street, Mudgee.

2MO 219 metres, 1,370 KC., 100 watts. 2MO Gunnedah Ltd., Marquis Street, Gunnedah.

2MW 204 metres, 1,470 KC., 100 watts. Tweed Radio and Broadcasting Co. Ltd., Commercial Road, Murwillumbah.

2NC 244 metres, 1,230 KC., 2,000 watts. National Broadcasting Service (Relays 2FC and 2BL). Station at Newcastle.

2NR 429 metres, 700 KC., 7,000 watts. National Broadcasting Service. (Relays 2FC and 2BL). Station at Lawrence, near Grafton.

2NZ 256 metres, 1,170 KC., 2,000 watts. Northern Broadcasters Pty., Ltd., Otho Street, Inverell. Station at Little Plain.

2PK 214 metres, 1,400 KC., 150 watts. Parkes Broadcasting Co. Pty. Ltd., 283 Close Street, Parkes.

2QN 208 metres, 1,440 KC., 100 watts. Deniliquin Broadcasting Co. Ltd., End Street, Deniliquin.

2RG 280 metres, 1,070 KC., 100 watts. Irrigation Area Newspapers Ltd., P.O. Box 388, Griffith.

2SM 236 metres, 1,270 KC., 1,000 watts. Catholic Broadcasting Co., Australia House, Wynyard Square, Sydney.

2TM 231 metres, 1,300 KC., 2,000 watts. Tamworth Radio Development Co. Ltd., Peel Street, Tamworth.

2UE 316 metres, 950 KC., 1,000 watts. Radio 2UE Sydney Ltd., 29 Bligh Street, Sydney.

[Overleaf

Complete List of Australian Broadcasting Stations *(continued)*

2UW 270 metres, 1,110 KC., 750 watts. Commonwealth Broadcasting Corporation Ltd., 49 Market Street, Sydney.

2WG 261 metres, 1,150 KC., 2,000 watts. Riverina Broadcasting Pty. Ltd., 16 Fitzmaurice Street, Wagga.

2WL 210 metres, 1,430 KC., 500 watts. Wollongong Broadcasting Pty. Ltd., Cnr. Church and Edward Streets, Wollongong.

2XL 341 metres, 880 KC., 100 watts. Cooma Broadcasters Pty. Ltd., Cromwell Street, Cooma.

VICTORIA.

3AK 200 metres, 1,500 KC., 200 watts. Melbourne Broadcasters Pty. Ltd., 480 Bourke Street, Melbourne, C.1.

3AR 484 metres, 620 KC., 4,500 watts. National Broadcasting Service. Studio, 120a Russell Street, Melbourne, C.1.

3AW 234 metres, 1,280 KC., 600 watts. 3AW Broadcasting Co. Pty. Ltd., 382 Latrobe Street, Melbourne, C.1.

3BA 227 metres, 1,320 KC., 500 watts. Ballarat Broadcasters Pty. Ltd., 56 Lydiard Street, Ballarat.

3BO 309 metres, 970 KC., 500 watts. Amalgamated Wireless (A/sia) Ltd. Studio, Pall Mall, Bendigo.

3DB 291 metres, 1,030 KC., 600 watts. 3DB Broadcasting Co. Pty. Ltd., 36 Flinders Street, Melbourne, C.1.

3GI 361 metres, 830 KC., 7,000 watts. National Broadcasting Service. (Relays 3AR and 3LO). Station at Longford, near Sale.

3GL 222 metres, 1,350 KC., 500 watts. Geelong Broadcasters Pty. Ltd., National Mutual Buildings, Moorabool Street, Geelong.

3HA 297 metres, 1,010 KC., 750 watts. Western Province Radio Pty. Ltd., 37 Gray Street, Hamilton.

3KZ 254 metres, 1,180 KC., 600 watts. 3KZ Broadcasting Co. Pty. Ltd. (licence owned by Industrial Printing and Publicity Co. Ltd.), 24 Victoria Street, Carlton, N.3.

3LK 275 metres, 1,090 KC., 2,000 watts. 3DB Broadcasting Co. Pty. Ltd. Station at Lubeck.

3LO 390 metres, 770 KC., 3,500 watts. National Broadcasting Service. Studio, 120a Russell Street, Melbourne, C.1.

3MA 221 metres, 1,360 KC., 100 watts. Sunraysia Broadcasters Pty. Ltd., 22 Deakin Avenue, Mildura.

3CV 204 metres, 1,470 KC., 200 watts. Mallee Broadcasters Pty. Ltd., Charlton.

3SH 226 metres, 1,330 KC., 100 watts. Central Murray Broadcasters Pty. Ltd. (license owned by Swan Hill Broadcasting Co. Pty. Ltd.), Campbell Street, Swan Hill.

3TR 242 metres, 1,240 KC., 1,000 watts. Broadcast Entertainments Pty., Ltd., Raymond Street, Sale.

3UL 333 metres, 900 KC., 200 watts. "The Argus" Broadcasting Services Pty. Ltd., Melbourne. Studio, South Road, Warragul.

3UZ 323 metres, 930 KC., 600 watts. Nilsen's Broadcasting Service Pty. Ltd., 45 Bourke Street, Melbourne, C.1.

3WV 517 metres, 580 KC., 10,000 watts. National Broadcasting Service. (Relays 3AR and 3LO). Station at Dooen, near Horsham.

3XY 211 metres, 1,420 KC., 600 watts. Efftee Broadcasters Pty. Ltd., Princess Theatre Buildings, Spring Street, Melbourne.

3YB 248 metres, 1,210 KC., 200 watts. "The Argus" Broadcasting Services Pty. Ltd., 365 Elizabeth Street, Melbourne. Station at Warrnambool.

VLR 31.315 metres, 9,580 KC., 1,000 watts. National Broadcasting Service. Station at Lyndhurst.

QUEENSLAND.

4AK 246 metres, 1,220 KC., 2,000 watts. Brisbane Broadcasting Pty. Ltd., Courier-Mail Building, Brisbane. Station at Oakey.

4AT* 256 metres, 1,160 KC.

4AY 349 metres, 860 KC., 500 watts. Ayr Broadcasters Pty. Ltd., Airdmillan Road, Ayr.

4BC 268 metres, 1,120 KC., 1,000 watts. Commonwealth Broadcasting Corporation (Qld.) Ltd. Studio, Wintergarden Theatre, Queen Street, Brisbane.

4BH 217 metres, 1,380 KC., 1,000 watts. Broadcasters (Aust.) Pty. Ltd., 43 Adelaide Street, Brisbane.

4BK 233 metres, 1,290 KC., 500 watts. Brisbane Broadcasting Pty. Ltd., Courier-Mail Building, Brisbane.

4BU 226 metres, 1,330 KC., 500 watts. Bundaberg Broadcasters Pty. Ltd., 117 Bourbong Street, Bundaberg.

4CA 300 metres, 1,000 KC., 200 watts. Amalgamated Wireless (A/sia) Ltd. Station at Cairns.

4GR 300 metres, 1,000 KC., 500 watts. Gold Radio Service Pty. Ltd., Ruthven Street, Toowoomba.

4IP 208 metres, 1,440 KC., 100 watts. The Ipswich Broadcasting Co. Pty. Ltd., Brisbane Street, Ipswich.

4LG 273 metres, 1,100 KC., 500 watts. Central Western Broadcasting Co. Pty. Ltd., Longreach.

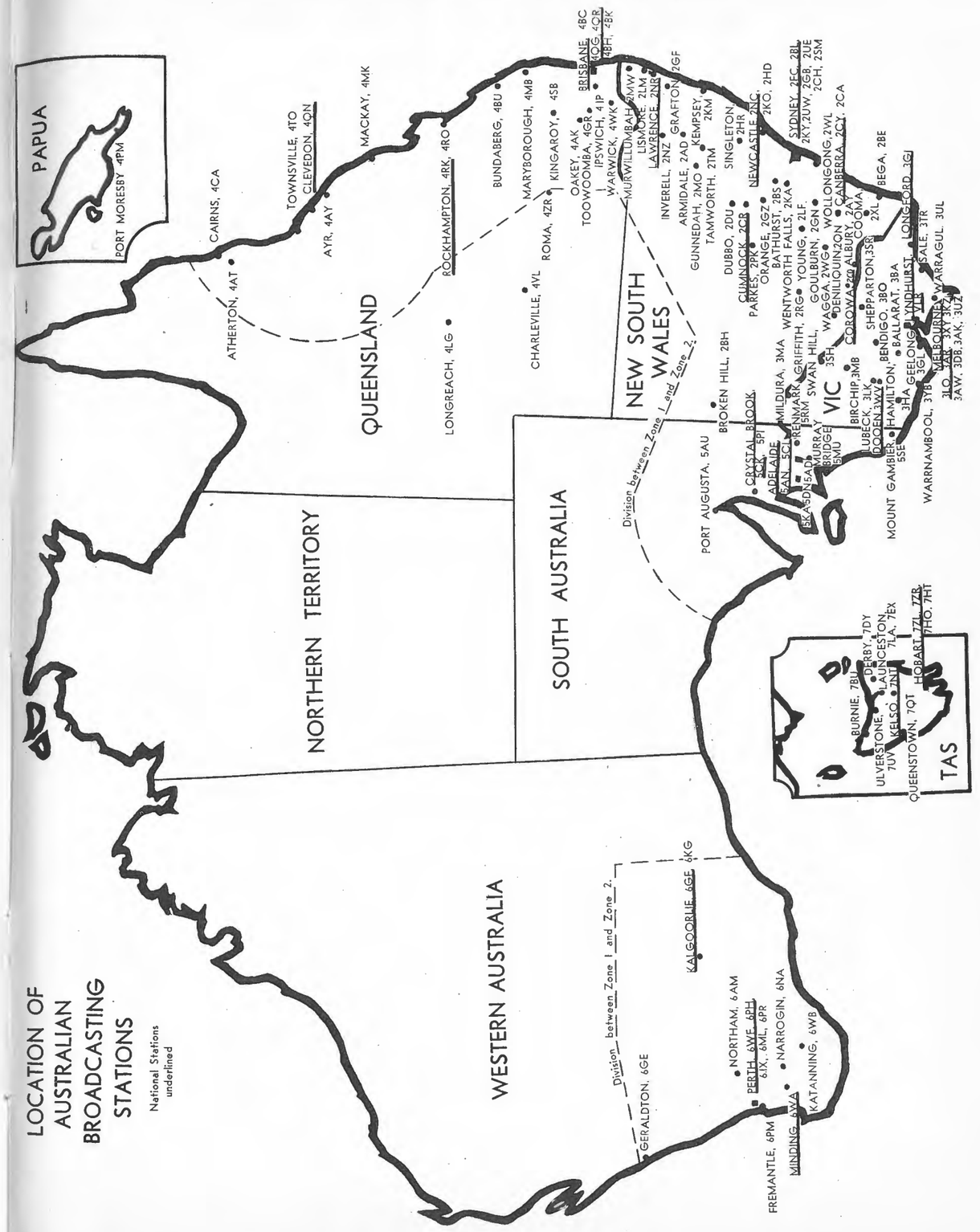
4MB 214 metres, 1,400 KC., 100 watts. Maryborough Broadcasting Co. Ltd., 43 Adelaide Street, Brisbane. Station, Kent Street, Maryborough.

4MK 216 metres, 1,390 KC., 100 watts. Mackay Broadcasting Service, 64 Nelson Street, Mackay.

4PM 221 metres, 1,360 KC., 100 watts. Amalgamated Wireless (A/sia) Ltd. Studio, Musgrave Street, Port Moresby, Papua.

4QG 375 metres, 800 KC., 2,500 watts. National Broadcasting Service. Studio, State Insurance Building, Brisbane.

(Continued on Page 112.)



Complete List of Australian Broadcasting Stations *(continued)*

4QN 476 metres, 630 KC., 7,000 watts. National Broadcasting Service. Station at Clevedon, North Queensland.

4QR 319 metres, 940 KC., 500 watts. Brisbane National.

4RK 330 metres, 910 KC., 2,000 watts. National Broadcasting Service. Station at Rockhampton.

4RO 278 metres, 1,080 KC., 500 watts. Rockhampton Broadcasting Co. Pty. Ltd., 43 Adelaide Street, Brisbane. Station at Rockhampton.

4SB 283 metres, 1,060 KC., 2,000 watts. South Burnett Broadcasting Co. Ltd., Wintergarden Theatre Building, Brisbane, Qld. Station near Kingaroy.

4TO 385 metres, 780 KC., 200 watts. Amalgamated Wireless (A/sia) Ltd. Station at Townsville.

4VL 526 metres, 570 KC., 100 watts. Charleville Broadcasting Service Pty. Ltd., Burke Street, Charleville.

4WK 341 metres, 880 KC., 100 watts. Warwick Broadcasting Co. Pty. Ltd., Cnr. King and Albion Streets, Warwick.

4ZR 201 metres, 1,490 KC., 100 watts. Maranoa Broadcasting Co. Pty. Ltd., Hawthorne Road, Roma.

SOUTH AUSTRALIA.

5AD 229 metres, 1,310 KC., 500 watts. Advertiser Newspapers Ltd., Waymouth Street, Adelaide.

5AN 337 metres, 890 KC., 500 watts. Adelaide—National No. 2.

5AU 214 metres, 1,400 KC., 100 watts. Port Augusta Broadcasting Co. Ltd., Port Augusta.

5CK 469 metres, 640 KC., 7,500 watts. National Broadcasting Service Station at Crystal Brook.

5CL 411 metres, 730 KC., 4,000 watts. National Broadcasting Service. Studio, Hindmarsh Square, Adelaide.

5DN 313 metres, 960 KC., 500 watts. Hume Broadcasters Ltd., 12th floor, C.M.L. Building, King William Street, Adelaide.

5KA 250 metres, 1,200 KC., 500 watts. Sport Radio Broadcasting Co. Ltd., Richards Building, Currie Street, Adelaide.

5MU 207 metres, 1,450 KC., 100 watts. Advertiser Newspapers Ltd., Waymouth Street, Adelaide. Station at Murray Bridge.

5PI 288 metres, 1,040 KC., 2,000 watts. Advertiser Newspapers Ltd., Waymouth Street, Adelaide. Station at Crystal Brook.

5RM 358 metres, 850 KC., 1,000 watts. River Murray Broadcasters Ltd. Station at Renmark. 29 Rundle Street, Adelaide. (Relay station for 5DN).

5SE 219 metres, 1,370 KC., 100 watts. Advertiser Newspapers Ltd., Waymouth Street, Adelaide. Station at Mt. Gambier.

WESTERN AUSTRALIA.

6AM 306 metres, 980 KC., 2,000 watts. 6AM Broadcasters Ltd. Station at Northam.

6GE 219 metres, 1,370 KC., 500 watts. Great Northern Broadcasters Ltd, Marine Terrace, Geraldton.

6GF 417 metres, 720 KC., 2,000 watts. National Broadcasting Service. Station at Kalgoorlie.

6IX 242 metres, 1,240 KC., 500 watts. West Australian Newspapers Ltd., St. George's Terrace, Perth.

6KG 248 metres, 1,210 KC., 500 watts. Goldfields Broadcasters (1933) Ltd., 209 Hannan Street, Kalgoorlie.

6ML 265 metres, 1,130 KC., 500 watts. W.A. Broadcasters Ltd., Lyric House, Murray Street, Perth.

6NA 224 metres, 1,340 KC., 500 watts, Narrogin.

6PH 380 metres, 790 KC., Perth.

6PM 216 metres, 1,390 KC., 100 watts. 6PM Broadcasters Ltd., St. George's House, St. George's Terrace, Perth. Station at Fremantle.

6PR 341 metres, 880 KC., 500 watts. Nicholson's Ltd., 86-90 Barrack Street, Perth.

6WA 536 metres, 560 KC., 10,000 watts. National Broadcasting Service. Station at Minding, near Wagin.

6WB 280 metres, 1,070 KC., 2,000 watts. W.A. Broadcasters Ltd. Station at Katanning.

6WF 435 metres, 690 KC., 3,500 watts. National Broadcasting Service. Studio, Stirling Institute, Perth.

TASMANIA.

7BU 455 metres, 660 KC., 200 watts. The Burnie Broadcasting Service Pty. Ltd., Wilson Street, Burnie.

7DY 214 metres, 1,400 KC., 200 watts. North East Tasmanian Radio Broadcasters Pty. Ltd., Paterson Street, Launceston. Station at Derby.

7EX 300 metres, 1,000 KC., 500 watts. 7EX Pty. Ltd. (Props., W. R. Rolph and Sons Pty. Ltd.), 74 Charles Street, Launceston. Station located at Launceston.

7HO 349 metres, 860 KC., 500 watts. Commercial Broadcasters Pty. Ltd., 82 Elizabeth Street, Hobart.

7HT 278 metres, 1,080 KC., 500 watts. Metropolitan Broadcasters Pty. Ltd., 51 Murray Street, Hobart.

7LA 273 metres, 1,100 KC., 500 watts. Findlay and Wills Broadcasters Pty. Ltd., 67 Brisbane Street, Launceston.

7NT 423 metres, 710 KC., 7,000 watts. National Broadcasting Service. Station at Kelso.

7QT 441 metres, 680 KC., 100 watts. West Coast Broadcasters Pty. Ltd., Conlon Street, South Queenstown.

7UV 205 metres, 1,460 KC., 300 watts. Northern Tasmanian Broadcasters Pty. Ltd., Reibey Street, Ulverstone.

7ZL 500 metres, 600 KC., 1,000 watts. National Broadcasting Service. Studio, Elizabeth Street, Hobart.

7ZR 259 metres, 1,160 KC., 300 watts. National Hobart.

BROADCAST STATION ALTERATIONS DURING 1937

COMMERCIAL BROADCASTING STATIONS

Additions.

	Frequency KC.	Wavelength (m.)	Aerial Power Watts
JANUARY.			
2BS, Bathurst Broadcasters Ltd., Keppell St., Bathurst, N.S.W.	1500	200	100
2NZ, Northern Broadcasters Ltd., Inverell, N.S.W.	1170	256	2,000
APRIL.			
6PM, 6PM Broadcasters Ltd., St. George's Terrace, Perth, W.A.	1390	216	100
7HT, Metropolitan Broadcasters Pty. Ltd., 44 Elizabeth St., Hobart, Tasmania	1080	278	300
MAY			
7QT, West Coast Broadcasters Pty. Ltd., 21 Paterson St., Launceston, Tasmania	900	333	100
JULY			
4ZR, Maranoa Broadcasting Co. Pty., Ltd., Hawthorne Rd., Roma, Qld.	1450	207	100
5SE, South Eastern Broadcasting Co. Ltd., Waymouth St., Adelaide, S.A.	1340	224	100
SEPTEMBER.			
2BE, Bega and Far South Coast Broadcasters Ltd., Carp St., Bega, N.S.W.	1490	201	100
2HR, Hunter River Broadcasters Pty. Ltd., 1 William St., Singleton, N.S.W.	680	441	300
2KM, Radio Kempsey Ltd., 16 Barrack St., Sydney	980	306	100
2MW, Tweed Radio and Broadcasting Co. Ltd., Commercial Rd., Murwillumbah, N.S.W.	1470	204	100
2XL, Cooma Broadcasters Pty. Ltd., Cromwell St., Cooma, N.S.W.	880	341	100
OCTOBER.			
2PK, Parkes Broadcasting Co. Pty. Ltd., 283 Clarinda St., Parkes, N.S.W.	1400	214	100
6GE, Great Northern Broadcasters Ltd., St. George's Terrace, Perth, W.A.	1370	219	500

Cancellations.

JANUARY.

2LV, Inverell—Delete all particulars (replaced by 2NZ).

Alterations.

JANUARY.

3WR, Shepparton—Delete 3WR and insert 3SR.

4TO, Townsville—Delete 1170 KC. (256 m.) and insert 1160 KC. (259 m.).

FEBRUARY.

3YB, Warrnambool—Delete 1060 KC. (283 m.) and insert 1210 KC. (248 m.).

APRIL

2RG, Griffith—Replace "Murrumbidgee Broadcasters Ltd." by "Irrigation Area Newspapers Ltd."

3SH, Swan Hill—Replace 1130 KC. (265 m.) by 1330 KC. (226 m.).

3SR, Shepparton—Replace "Goulburn Valley and Northeastern Broadcasters Pty. Ltd." by "The Argus Broadcasting Services Pty. Ltd."

3YB, Warrnambool—Replace "W. and W. Broadcasters Pty. Ltd." by "The Argus Broadcasting Services Pty. Ltd."

4WK, Warwick—Replace 1360 KC. (221 m.) by 1340 KC. (224 m.).

5AD, Adelaide—Replace 300 watts by 500 watts.

5DN, Adelaide—Replace 300 watts by 500 watts.

5KA, Adelaide—Replace 300 watts by 500 watts.

5MU, Murray Bridge—Replace 1340 KC. (224 m.) by 1450 KC. (207 m.).

6AM, Northam—Replace "Northern Broadcasters Ltd., Princes Chambers, 23 William St., Perth," by "6AM Broadcasters Ltd., St. George's House, St. George's Terrace, Perth."

AUGUST.

2KA, Katoomba—Replace 100 watts by 200 watts.

2WG, Wagga—Replace 1000 watts by 2000 watts.

4CA, Cairns—Replace 100 watts by 200 watts.

4LG, Longreach—Replace 300 watts by 500 watts.

4MB, Maryborough—Replace 1060 KC. (283 m.) by 1400 KC. (214 m.).

4RO, Rockhampton—Replace 50 watts by 100 watts.

NOVEMBER.

2CA, Canberra—Replace 500 watts by 2,000 watts and "A. J. Ryan Broadcasters Ltd." by "Canberra Broadcasters Ltd."

2BH, Broken Hill—Replace 1060 KC. (283 m.) by 860 KC. (349 m.).

2GF, Grafton—Replace 100 watts by 200 watts.

3KA Katoomba—Replace 1160 KC. (259m.) by 780 KC.

2RG, Griffith—Replace 50 watts by 100 watts.

2RG, Griffith—Replace 1470 KC. (204 m.) by 1070 KC. (280 m.).

3BO, Bendigo—Replace 200 watts by 500 watts.

3MB, Birchip—Replace 1490 KC. (201 m.) by 1470 KC. (204 m.).

3YB, Warrnambool—Replace 100 watts by 200 watts.

4BU, Bundaberg—Replace 100 watts by 500 watts.

4CA, Cairns—Replace 1390 KC. (216 m.) by 1000 KC. (300 m.).

4RO, Rockhampton—Replace 50 watts by 500 watts.

4VL, Charleville—Replace 50 watts by 100 watts.

4WK, Warwick—Replace 1340 KC. (224 m.) by 880 KC. (341 m.).

7HO, Hobart—Replace 100 watts by 500 watts.

7HT, Hobart—Replace 100 watts by 500 watts.

7LA, Launceston—Replace 300 watts by 500 watts.

DECEMBER.

2AD, Armidale—Replace 1080 KC. (278 m.) by 1130 KC. (265 m.).

2KA, Katoomba—Replace 1160 KC. (259 m.) by 780 KC. (385 m.).

4BU, Bundaberg—Replace 1480 KC. (203 m.) by 1330 KC. (226 m.).

4MK, Mackay—Replace 1080 KC. (278 m.) by 1390 KC. (216 m.).

4RO, Rockhampton—Replace 1330 KC. (226 m.) by 1080 KC. (278 m.).

4TO, Townsville—Replace 1160 KC. (259 m.) by 780 KC. (385 m.).

NATIONAL BROADCASTING STATIONS

Additions.

	Frequency KC.	Wavelength (m.)	Aerial Power Watts
FEBRUARY.			
3WV, Western Regional Victoria (Dooen, near Horsham)	580	517	10,000
MAY.			
2CR, Central Regional (Cumnock) N.S.W.	550	545	10,000
OCTOBER.			
5AN, Adelaide—National No. 2	890	337	500

(Continued on foot of Page 114.)

POLICING THE AUSTRALIAN ETHER

Valuable Work of the P.M.G.'s Department

THE measurement of the frequencies (wavelengths) of broadcasting stations and other stations was not undertaken on any systematic basis until after the Washington International Radio Congress of 1927. The Washington Convention directed attention to the necessity for frequency control and adopted certain rules as follows:—

Article 4.

(2) The waves emitted by a station must be maintained at the authorised frequency, as exactly as the state of technical development permits, and their radiation must also be as free as practicable from all emissions which are not essential to the type of communication effected.

(3) The administrations concerned fix the tolerance allowed between the mean frequency of the emissions and the notified frequency; they do their utmost to take advantage of technical progress so as to reduce this tolerance gradually.

Five years later at Madrid the International Regulations were enlarged so as to meet the progress which had taken place and to provide for development. A more rigid adherence to stipulated standards was required and tolerances or minimum degrees in inaccuracy were laid down for every type of service, both existing and proposed. Prior to 1933, deviations from a carrier assignment up to 300 cycles were permitted, but for new transmitters after 1933 the maximum allowable drift for broadcasting stations was 50 cycles.

Much attention was given in research laboratories and elsewhere to the design of equipment suitable for checking the transmitter performance and year by year considerable progress was made which resulted in improvements in the stabilisation of control units.

In Australia, systematic attention has been given to the frequency measurements since 1928. Regular measurements of local services were made and occasionally attention was given to the strongest distant interstate stations. In order, however, to apply this essential supervision of frequency maintenance, it became necessary to establish additional equipment in the form of secondary standards at various capital cities. The main installation for this purpose is at Mont Park, Melbourne, but secondary standard instruments, as shown in the illustration attached, have been established at Perth, Adelaide, Brisbane and Sydney during the present year. The result has been that closer attention has been given to the organisation of the frequency measuring centres in collaboration between the checking officers and the station engineers during the adjustment of the apparatus. The principles on which this "remote" control of frequency are based are on the lines of those established at the Brussels Control Centre. These principles may be summarised as follows:

(1) The control must be permanent. It must detect without delay the sudden variations of frequency which, at times, affect even the most modern broadcast transmitters and which frequently escape the vigilance of the operators.

(2) When an error is detected, the licensee must be immediately advised by telegraph or telephone.

(3) The accuracy of measurements must be above criticism and conform constantly with progress in technique of transmission.

(4) All results and information must be centralised so that a true picture of progress can be presented from time to time.

The results of tests made throughout the Commonwealth, together with reports of the action taken to detect and correct irregularities, are forwarded to the Wireless Branch central headquarters in Melbourne. Complete records are kept of each station's performance and a graphical record of the frequency accuracy and stability of all services is kept up to date.

Perhaps the most interesting feature of this service is that statistics have demonstrated conclusively the advantages to be derived from such policing of the ether, with consequent benefits to listeners in the maintenance of a reliable service, particularly on shared channels. The following figures will give some idea of the increasing activity of this work and the advantages accruing to the stations:—

(a) In January, 1936, the centres made a total of 365 checks of frequency, the number being increased to 728 by June, 1936. In the first quarter 1,346 checks were made, the second a total of 2,081. In January, 36 per cent. of checks indicated a frequency drift beyond the permitted deviation; by June this had been reduced to less than 20 per cent., although the number of stations had increased from 74 to 87 over this period.

(b) During the first quarter of 1936, 462 out of a total of 1,346 measurements indicated deviations beyond 50 cycles. For the corresponding quarter of this year, there were only 439 deviations in a total of 5,532, i.e., 7.9 per cent.

(c) A study of last quarter's statistics shows that although the number of measurements had increased to 8,055, due to the increase in the number of stations now operating, the percentage of errors had been further reduced to 5.4 per cent.

The Department appreciates keenly the earnest co-operation which is given by the station managers and technicians and also by plant manufacturers in this important work. The people concerned have evinced a keen interest in the result of the frequency measurements and are aware that the service range and the quality of the transmissions can be seriously marred by wavelength drifts. A strict adherence to the national plan of frequency assignments is essential if listeners are to obtain the maximum grade of service. In this regard it is opportune to record that the stability and accuracy of Australian stations are in keeping with the best practices overseas.

National Broadcasting Station

ALTERATIONS DURING 1937—Cont. **from Page 113.**

APRIL.

3AR, Melbourne—Replace 580 KC. (517 m.) by 630 KC. (476 m.).

AUGUST.

4QN, North Regional, Qld.—Replace 600 KC. (500 m.) by 630 KC. (476 m.).

7ZL, Hobart—Replace 630 KC. (476 m.) by 600 KC. (500 m.)

DECEMBER.

3LR, Lyndhurst—Replace 3LR by VLR.

Dictionary of Radio Production Terms

Ace—one who is at the top in ability among programme producers, announcers or directors.

Across mike—projection of voice or musical sound.

Ad lib—to extemporise, such as lines not written into the script or in music, to play parts not included in the score, material broadcast entirely at the announcer's or musician's discretion.

A.P.R.A.—Australian Performing Rights Association.

Audience broadcast—a broadcast performance before a visual audience.

Audition—a trial of artists or musicians under actual broadcast conditions.

Background—sound, effects, noise or music used behind dialogue or other programme material.

Balance—arrangement of musicians and artists in a studio in such a way as to produce transmission or equal volume from all instruments or voices to effect the most artistic relationship between instruments and voices.

Balance Control Room—a place where input from all sources is controlled through mixers.

Bend the needle—sending an unexpected volume of sound into the microphone so that the needle in the volume indicator at the control panel is moved violently against the stop.

Bit—a small part in a dramatic programme.

Blasting—distortion brought about by allowing more volume into the microphone or other transmitting equipment than it can efficiently take.

Blue gag—an off-colour comedy line, an objectionable gag.

Board—engineer's control panel connected to the studio.

Board fade—the manual and electrical fade-out of a programme on the studio control board.

Breaks—interruptions in radio transmissions.

Bridge—sound effects or music used in a dramatic show indicating the transition from one scene to another.

"Bring it up"—a producer's order commanding an increase in the volume.

Character—casting term referring to a dramatic part requiring characterisation.

Chimes—Musical (?) notes used on most stations for "signing on or off" a session or announcement.

Circuit—a complete electrical channel used for transmission purposes.

Cold—the opening of a radio programme beginning without theme or musical introduction or background.

Cold dramatics—dramatic sketch without music or other sound effects.

Commercial—an advertiser-sponsored programme, sales talk on a radio programme, a sales announcement.

Commercial credit—the commercial announcement relating to the product advertised.

Compere—one who plans a programme and gets it together, arranging each item in its sequence, and presents it.

Corn, corny—unsophisticated.

Continuity—the "copy" prepared for the broadcast programme.

Continuity writer—a member of station staff or advertising agency who writes and prepares the "copy" for advertisement and the general tying-up of one item to another in the programme.

Control room—housing for the monitoring equipment from which the show is both directed and controlled.

Credit—see commercial credit.

Cross-fade—fading-in one sound from one source while a sound from another is faded-out.

Cross talk—interfering conversation originating somewhere along the line between the pick-up microphone and the control panel.

Crowd noises—sound of a crowd produced by an effect-record or people in the studio.

Cue—closing words of an artist's speech as a signal for another artist to enter; or sound, musical or otherwise, or sign signal calling for action before the microphone.

Cue sheet—a complete tabulation of the programme routine containing all cues.

Cut—abruptly stop transmission by either stopping the actors or switching off the microphone at the control board—or the deletion of programme materials to fit a prescribed period of time. A section of programme on disc record.

Dampen the studio—to use sound absorbing material such as rugs or even people, as an aid to the acoustical reaction of the room; to absorb sound produced in the studio.

Dead mike—microphone not connected or one which is out of order.

Definition—clear transmission and reception which makes possible the complete identification of the various musical instruments in an orchestra, etc.

Disc—a transcription or other record, phonograph record, etc.

Dress—final complete rehearsal.

Dressing a programme—the addition of the finishing touches to a programme.

Dubbing—transposing recorded material from one record to another by means of a recording machine.

Dynamic—type of microphone designed as an improvement on the condenser microphone with a higher degree of efficiency.

Engineer—technician who designs, operates or controls the electrical equipment.

Fade—diminishing of the volume.

Fader—device for electrically diminishing volume coming in through the microphone.

Fades—see board fade.

"Fade down"—an instruction to the studio engineer to reduce the volume.

Fade out—manual and electrical diminution of volume coming through the microphone down to zero.

Fake—ad lib.

Feed—transmitting a programme over telephone lines to station or stations taking the broadcast.

Feed back—coupling of input to output of amplifiers either electrically or acoustically; this results in squeal or howl.

Filter—a device used to change tone characteristics by eliminating or augmenting frequencies.

Fluff—missing a cue or muffling a gag.

Free-lance—being not regularly employed by any one station but acting or writing for any one or number of stations.

Fry—Hissing sound caused by defective microphone, amplifiers or other equipment.

Fuzzy—musical instrument or vocal sound lacking in clarity and definition.

Gag—a comic, high-light or jest, etc.

Gain—control of volume used in transmission—monitoring equipment used in this control.

Get hot—ad lib arrangement of popular music, jazzing it up.

Giving credit—acknowledging source of ownership of material used in the programme.

Haywire—temporary equipment or inferior equipment, generally meaning things are disorganised.

Ingenue—female performer with a youthfully pleasant voice, etc.

Interpolation—Musical phrase or chorus added into a selection to make a contrast, or the elaboration of a theme.

DICTIONARY—of Radio Production Terms (Continued from Page 115.)

Jam session—spirited ad lib renditions of standard popular tunes.
Juvenile—(speaks for itself.)
Kill—to stop the rehearsal or broadcast pending further instructions from the director, or omit portions of the programme so indicated to be stopped;—to cancel scheduled programme.
Kill the mike—turn off the electric current feeding a microphone channel.
Landline—telephone line channel used to convey programme from originating point to point of broadcast.
Lead—most important male or female role in a dramatic programme.
Level—a mark of volume audibly noted or electrically measured.
Light and shade—variations from quietness to tenseness, softness to shouting, etc.
Live mike—a microphone into which the current is flowing.
Live studio—one which is acoustically reverberant.
Log—a record of every commercial announcement broadcast and full details of all musical items played, etc. A keeping of such a log is demanded by the regulations governing broadcasting.
MC—Master of ceremonies.
Mike hog—any one of a group of players around a microphone who elbows his way into the foreground nearest the mike.
Mike technique—a performer's ability to control his or her position and actions in relation to the microphone to secure the most effective results.
Mix—combining the input from two or more channels to make a complete balance.
Monitor—a staff engineer who continuously adjusts the volume control to keep it suitable for transmission, or (verb) to check programme by means of audio equipment.
Mixer—a panel for controlling and blending the sounds picked up by microphone.
Mixing—blending sound and effects, etc.
Mob scene—group of players serving as a crowd background.
Mushy—poor musical definition of an orchestral pick-up.
Narrative—story of the script, spoken sections of a script linking scenes.
Narrator—announcer or player speaking the narrative.
O.B.—outside broadcast.
On the cuff—work for which artists receive no pay or compensation.
One shot—single programme which is not one of a series
P.A.—Public address or talk-back system.
Panel—control board of one or more studios.
Peak—the maximum amplitude of sound in electrical energy formed while flying through a circuit; maximum point of a needle-swing on a volume indicator.
Peaks—distortions resulting when the amplitude is too great for the apparatus.
Pick up—location of microphone in relation to programme elements; acoustical value of programme; the origination point of a broadcast; an instrument or device containing an electro-mechanical member which vibrates when it contacts with a moving phonograph record, a modulated electric current for the purpose of making the record audible from a loud-speaker; primary apparatus used to convert sound to electrical energy.
"Pick it Up"—a term used to instruct musicians or players to speed up their delivery.
Pick up a Cue—an instruction to be prompt in speaking lines immediately after the preceding speaker has concluded.
Play Back—the playing of a recording for audition purposes immediately after it has been made.
Producer—one who or the broadcasting company who offers a programme for observation or consideration or who brings a performance before the public, or one who may write a play and oversee it in production.
Production—building, organising and presenting a radio programme.
Programme director—one who is in charge of a radio studio programme generally.
Production Log—tabulated record kept in regard to production.
Programme Balance—this is the arrangement of musical and dramatic units in a programme to secure the maximum of entertainment value; the balancing of a programme so that no one type of material overshadows another to the point of monotony.
Programme monitor—loud speaker or receiving set over which the quality of a programme may be checked.
Relay—distributing a radio programme from one station or point to another.
Repeat—a term denoting the second presentation of a regular studio programme for those stations not served by the original broadcast.
Ribbon—a velocity microphone.
Ride Gain—to control the volume range of a programme electrically in order to transmit it over landlines and equipment within its proper limit.
Run overs—occasions when the programme overruns its allotted time or span.
Rebroadcast—the second presentation of a broadcast item or event from a recording made at the time of the original broadcast.
Scoop—to outwit a rival station in the broadcasting of some event of general interest.
Scratches—noises caused by faulty equipment.
Segue—transition from one musical number to another without a break or any announcement.
Set up—arrangement of musicians, performers, players and sound effects in a studio to get the best acoustical effect.
Show—a radio programme for broadcast.
Signature—the musical number or sound effect which regularly identifies a programme, the same as theme music.
Slap bass—to play a bass violin by slapping the strings.
Sneak in—to bring music in softly and swell it to full behind the dialogue.
Sound effects—various devices or recordings used to produce realistic sound imitations.
Sound man—studio technician who produces either manually or with the aid of recordings the desired sound effects for the programme.
Sound table—movable table for small sound effect properties.
Sound track—graphic record for sound produced on film or sensitized paper.
Sound panel—movable panels of rock wool for sound absorption or hard surfaces for reflection.
Spell—the commercial or advertising copy.
Split channel—two or more stations working simultaneously with different programmes.
Split network—network divided for the simultaneous transmission of two or more programmes for the service of selected stations.
Stand by—substitute programme ready to go on the air in case of emergency; a warning to performers to get ready to take the air.
Stand by group—see above.
Studio—specially constructed room or office fitted with a microphone or other channel to originate a broadcast.
Studio log—see log.
Swell it—an order for the studio engineer to increase the volume.
Tag line—the climax of a dramatic sequence.

(Continued foot of next page.)

NEW CUSTOMS TARIFF

This new Tariff Schedule, which was introduced in the House of Representatives on May 4, 1938, became effective at 9 a.m., May 5, 1938, and supersedes previous tariff ratings published on Page 22 of this BROADCASTING BUSINESS YEAR BOOK.

DIVISION VI—METAL AND MACHINERY.

172 (A) (1)—Clothes washing machines for household use, electrically or power driven. Electrically driven, ad val.—British tariff 12 p.c., intermediate tariff 27½ p.c., general tariff 36¼ p.c. Other than electrically driven, ad val.—12½ p.c., 27½ p.c., 27½ p.c. New rates— £6 each or ad val. 12½ p.c., 27½ p.c., 53¾ p.c., whichever returns the higher duty.

The British, intermediate and general tariff rates are shown in three sets of figures, in that order, after each item. Where intermediate tariff does not yet apply, there are only two sets of figures showing British preferential rate, and general tariff.

172 (A) (2)—Clothes washing machines n.e.i. and mangles, for household use. Old rate—12 p.c., 27½ p.c., 27½ p.c. New rate—as old.

176 (F) (2) (a)—Refrigerators and refrigerator parts. Old rate—42½ p.c. New rate—as old. Refrigerators, electric, up to and including 10 cubic feet gross internal capacity and parts thereof. £5 each, and £2 per cubic foot of gross internal capacity, or ad val. 75 p.c. This also includes refrigerators, including mechanical driving units and apparatus for transmitting power from such driving units to the driven units.

176 (F) (2) (b) (2) (a)—Cabinets. Old rate—75 p.c. G.T. New rate—£2/2/6 each, and per cubic foot of gross internal capacity—17/- or 75 p.c.

176 (F) (2) (b) (2) (b) (1)—Compressors (not forming part of sealed or semi-sealed refrigerating units)—Single cylinder—Old rate—75 p.c. New rate—£1/12/6 each or 75 p.c. Double cylinder—Old rate—75 p.c. New rate—£2 each or 75 p.c.

176 (F) (2) (b) (2) (c)—Evaporators (not forming part of sealed or semi-sealed refrigerating units)—Old rate—75 p.c. New rate—£1 each or 75 p.c. G.T.

176 (F) (2) (b) (2) (d)—Sealed or semi-sealed refrigerating units, including mechanical driving units and apparatus for transmitting power from such driving units to the driven units. Old rate—75 p.c. New rate—£8/10/- each or 75 p.c. G.T.

176 (F) (2) (c)—Refrigerators, electric, exceeding 10 cubic feet gross internal capacity and parts thereof; refrigerators (other than electric) and parts thereof. 75 p.c. general—remains the same.

179 (D) (1) (a) (1) (a)—Dynamo electric machines, A.C. induction type, 1 h.p. and up to and including 150 h.p. 30 p.c., 50 p.c., 65 p.c.—remains the same.

Motors under 1 h.p. are now covered by proposed Item 179 (D) (1) (d).

179 (D) (1) (c) (4) (a)—D.C. and universal machines, 0.746 KW. and up to and including 20 KW. 30 p.c., 50 p.c., 65 p.c.—remains the same.

Motors under 0.746 KW. (i.e., under 1 h.p.) are now covered by proposed Item 179 (D) (1) (d).

179 (D) (1) (d) (1)—N.E.I., 1 h.p. or over, 30 p.c., 50 p.c., 65 p.c.—remains the same.

179 (D) (1) (d) (2)—Dynamo electric machines, ¼th h.p. and over, but less than 1 h.p. Old rate—30 p.c., 50 p.c., 65 p.c. New rate—15/- or 30 p.c., 50 p.c., 65 p.c.

179 (D) (1) (d) (3)—less than ¼th h.p. Old rate—30 p.c., 50 p.c., 65 p.c. New rate—30 p.c., 50 p.c., 75 p.c.

179 (D) (1) (d) (4)—Parts of dynamo electric machines under 1 h.p. when not forming a complete or substantially complete dynamo electric machine. Old rate—30 p.c., 50 p.c., 65 p.c. New rate—30 p.c., 50 p.c., 75 p.c.

179 (D) (3) (a)—Electric fans of the type ordinarily used in offices and the household. 11¼ p.c., 40 p.c., 50 p.c. New rate—11¼ p.c., 40 p.c., 65 p.c.

180 (L) (1)—Condensers, electrolytic. Old rate—30 p.c., 50 p.c., 57½ p.c. New rate—8d. each G.T., or 30 p.c., 50 p.c., 57½ p.c.

180 (L) (2)—N.E.I., condensers, 30 p.c., 50 p.c., 57½ p.c. New rate—remains the same.

181 (A) (2)—Valves for wireless telegraphy and telephony, including rectifying valves, each. Old rate—British 2/3, general 3/6 or 20 p.c., 40 p.c. New rate—British 2/3 or 20 p.c., general 4/- or 40 p.c.

VALVE EXCISE.

Excise Tariff, Item 19—Valves for wireless telegraphy and telephony, including rectifying valves. Rate, prior to May, 1938—2/-. On and after May 5—1/9.

Effect on Radio Industry.

The result of this tariff in the radio industry affects two principal items, (1) Condensers electrolytic, and (2) valves.

On electrolytic condensers, whereas the tariff on American items was 57½ p.c., now the minimum tariff, under the new rates, on foreign condensers under the general tariff, is 8d. each, or 57½ p.c. duty, whichever pays the higher. This means that American condensers coming into Australia are going to be considerably affected.

On valves, it will be noticed that the tariff on British valves remains the same at 2/3 or 20 p.c., whichever is the higher, whilst valves coming under the general tariff, such as the American valves, did pay 3/6, will now pay 4/-, and, of course, the quota system will be lifted. Therefore, American valves can come into Australia providing they can stand the 4/- tariff or the increase of 6d. over the previous rate.

On valves made in Australia, the local excise has been reduced 3d., from 2/- to 1/9. This should substantially help the Australian valve manufacturers.

Realising the value of wireless apparatus to the national position of any country, the prime duty is, naturally, to have these things made in Australia, so that in the case of any trouble, we will have local manufacture "on the spot." That does not mean just local assembly, but the manufacture of the complete article wherever possible.

Australian manufacturers of electrolytic condensers are very pleased with the situation, quite naturally. It is understood that no increase in price is contemplated on the electrolytic condensers, and as the excise tariff has been reduced on Australian-made valves, no doubt their prices will not be increased either, but it is not known at this juncture whether there will be a decrease in the Australian-made valves.

DICTIONARY—of Radio Production Terms

(Continued from Page 116.)

Take it away—cue from studio engineer to engineer of succeeding programme.
Taking a balance—preliminary testing to determine the power and quality of a certain programme or section of it.
Theme—(see signature). Music or sound effects which identify a programme or personality.
Time check—synchronising the watches of all concerned in a broadcast.
Transcription—a recorded programme or section of programme; a recorded drama, serial, etc.
Transition—change from one dramatic scene to another. music or sound effect or silence that is used to suggest the change from one scene to another.
Transmission—a programme; the actual broadcasting of material produced in a studio.
Tying-in—becoming the part of a chain or network programme already in progress; a term used in merchandising for the activities of a sponsor of a programme in other fields of publicity to identify his programme with the product advertised at the point of sale.
Unit—an electrical apparatus devoted to one specific function; one of a number of stations in a network or relay programme.
V.I.—volume indicator.
Velocity—a ribbon type of microphone.
Visual show—a broadcast programme which is also being presented before a visual audience.
Woof—word, sounds used by engineers to check peaks; it is also used for time checking, reverberations, frequency, and the result of certain string instruments.
Wow—fluctuation of musical pitch caused by irregular speed at which recordings are played or recorded.

A Review of Commercial Broadcasting in Australia during 1937 (Continued from Page 3).

mania with 22 per cent., followed by Western Australia with 20 per cent., then Queensland with 19 per cent., New South Wales with 14 per cent., South Australia 12 per cent., and Victoria 11 per cent., while the Commonwealth average was 14 per cent.

Radio Sets Sold During 1937.

THE question of how many radio sets were sold in Australia during 1937 is always a pertinent question. As no actual official figures are obtainable it can only be estimated. The Editor believes that the new licences purchased throughout the year are a very close indicator upon which to make such an estimate.

It is very well known and generally accepted that a new licence means a new set. Also that about 50 per cent. of the sets sold are sold to people who trade in their old set, so on that basis for every new licence taken out on a new set there is another set sold to an existing set owner who has a licence.

Allowing 10 per cent. of the 210,214 new licences as constituting people who had a set some time before taking out a licence, that leaves say 180,000 sets, and to this should be added another 180,000 new sets as having been sold to people already owning a set. Let us be conservative and say that only one of three sales was made to an existing set owner; that would still give us about 100,000 sets to be added to the 180,000 absolutely new sales, making a total of 280,000 sets made and sold during 1937.

Some may disagree with those figures, but it is difficult for them to produce a better basis for calculations except the number upon which patent royalty plates are placed. It is said that during 1937 only about 160,000 receivers were sold and accounted for by patent licence plates. If that is so—and please don't mistake this 160,000 is not official from the patent pool—then a lot of sets must be sold without plates. Nevertheless, in the absence of official figures our basis of reckoning seems fairly right.

Now consider the volume of radio business transacted during 1937. Assuming our basis of 280,000 sets sold is correct, and taking a further conservative estimate of the average selling price of all sets sold at £25 per set, the turnover in set sales alone for the last year reached £7,000,000. On top of that volume of business consider the service and replacement sales of valves, etc., and you can add another million at least, and thus you see there was at least £8,000,000 turnover in the radio sales field for 1937. Some figures certainly—but not far short of the mark.

Important Events During 1937.

In broadcasting circles one of the most interesting events was the opening of the most powerful transmitter in the Southern Hemisphere, January 25, in New Zealand. This 60 KW. broadcaster was manufactured in Australia by Amalgamated Wireless (A.W.A.), and its results were eagerly awaited by everyone in radio. High powered stations are the envy of all Australians, and it is strongly believed that the Australian Government could with advantage to the people permit of much higher power on Australian stations than at present used. Considering there is no national station using over 10 KW., and no commercial station using over 2 KW. for a country as large as the United States, surely there is room for a few 60 KW. stations in Australia.

The national regional station 3WV was opened in February of 1937, and 2CR in April, both operating on 10 KW., and designed for an ultimate power 60 KW., but when that high power will be used is not yet clear.

Early last year the Australian Broadcasting Commission announced its intention of building a modern broadcasting house in Sydney containing 16 studios.

An important announcement was made in January by the Director-General of the P.M.G.'s Department to the effect that television would be rigidly controlled.

Later in the year, the second National station for Adelaide, 5AN, operating on a wavelength of 337 metres, with an aerial power of 500 watts, was opened by the Postmaster-General. This was in furtherance of the Department's policy to have two National stations in each capital city.

The commercial stations during 1937 were added to by the following:—

January—2BS Bathurst, 100 watts, 200 metres; 2NZ Inverell, licensed power 2,000 watts, 256 metres.

April—6PM, Perth, 216 metres, with an aerial power of 100 watts; 7HT Hobart, 278 metres, 300 watts.

May—7QT, located at Queenstown, on a wavelength of 337 metres, with 100 watts.

July—4ZR Roma, 207 metres, 100 watts; 5SE, Mount Gambier, S.A., 224 metres, 100 watts.

September—2BE Bega, 201 metres, 100 watts; 2HR Hunter River, near Singleton, 441 metres, 300 watts; 2KM Kempsey, 306 metres, 100 watts; 2MW Murwillumbah, 204 metres, 100 watts; and 2XL Cooma, 341 metres, 100 watts.

October—2PK Parkes, N.S.W., 214 metres, 100 watts, and 6GE Geraldton, 219 metres, 500 watts.

A considerable increase in power was registered by numerous commercial stations during 1937.

Station 5AD Adelaide was raised from 300 to 500 watts; 5DN and 5KA were also raised from 300 to 500 watts in April. In August 2KA Katoomba went from 100 to 200 watts; 2WG Wagga from 1,000 to 2,000 watts; 4CA Cairns, Q'ld., 100 to 200 watts; 4LG Longreach from 300 to 500 watts; 4RO Rockhampton, from 50 to 100 watts. In November, 2CA Canberra was given a licence to go from 500 to 2,000 watts; 2GF Grafton from 100 to 200 watts; 2KA Katoomba from 100 to 500 watts; 2RG Griffith from 50 to 100 watts; 3BO Bendigo from 200 to 500 watts; 3YB Warrnambool 100 to 200 watts; 4BU Bundaberg from 100 to 500; 4RO Rockhampton, 100 to 500 watts; 4VL Charleville from 50 to 100 watts; 7HO Hobart from 100 to 500 watts; 7HT from 100 to 500 watts; and 7LA Launceston from 300 to 500 watts.

The extent of the development of broadcasting is very evident when one considers the numerous changes in wavelengths that have taken place in Australia during the past year. The number of clear channels available to commercial stations is obviously limited by the broadcasting spectrum, and with additional stations coming on the air, it is necessary that wavelengths be shared by two or more stations. Interference resulting therefrom requires an experimental period, and consequently a considerable number of changes are registered during the year. This is rather upsetting to radio receiver manufacturers who prefer to place the callsign of the station in its exact position on the dial. This is a feature that is well received by the public, and therefore the minimum amount of interference or changes in wavelength is desirable from a public point of view. At the same time, the difficulty of allocating wavelengths is an ever-growing problem.

During 1937 there were 13 new commercial stations put (Continued foot of next page.)

Survey of the Radio Advertising of 70 Leading Australian National Advertisers

With Special Reference to Types of Programme, Length of Programme, and Session Times used

Following is a summarised table of Radio Advertising activities of 70 prominent National Advertisers in Australia.

Summarising the information derived from details supplied by the majority of the Stations of the Commonwealth, we have arrived at the following analysis :—

(I) Number of advertisers using ONLY ONE type of programme: 20 (28 per cent of the total number surveyed).
  (a) Number using scatter announcements only: 15 (21 per cent of the total number surveyed).
  (b) Number using sponsored sessions only: 5 (7 per cent of the total number surveyed).
  (aa) Of the 15 advertisers using scatter announcements only number using recordings: 10 (66 per cent of those using scatter announcements only).
  Number using direct announcements: 5 (34 per cent of those using scatter announcements only).
  (bb) Of the 5 advertisers using sponsored sessions only, those using transcriptions numbered: 5 (100 per cent of those using sponsored sessions only).

(II) Number of advertisers using MORE THAN ONE type of programme: 50 (72 per cent of the total number surveyed).
  (a) Of this group, those who included scatter announcements as well as sponsored sessions of some form numbered: 42 (84 per cent. of Group (II)).
  Of this group of 42:
  Those using recorded announcements numbered: 18 (43 per cent. of Group (II) (a)).
  Those using direct announcements numbered: 24 (57 per cent. of Group (II) (a)).
  (aa) Of the 42 in Group (II) (a), who included scatter announcements amongst their programmes, their sponsored sessions were split up as follows: Transcriptions (musical comedy, drama, etc.), 51 per cent.; live artists, 23 per cent.; musical records, 19 per cent.; talks (recorded or otherwise), 4 per cent.; sponsored news services, 3 per cent.
  (b) Those who used SPONSORED SESSIONS of various types ALONE numbered: 8 (16 per cent. of Group (II)).
  Their programmes were split up as follows:
  Transcriptions (musical, comedy, drama, etc.), 29 per cent.; live artists, 33 per cent.; musical records, 28 per cent.; talks (recorded or otherwise) 5 per cent.; sponsored news services, 5 per cent.
  (c) The WHOLE of the 50 advertisers under Group (II) who used sponsored sessions whether in conjunction with scatter announcements or not, split up their sponsored programmes as follows:

(Continued overleaf.)

A Review of Commercial Broadcasting (continued)

on the air in Australia, making a total at the end of December of 90 as compared to 77 at December, 1936.

Three new National stations were included in the National Service during 1937, making a total of 20 National stations, which, together with the total of 90 commercial stations, makes a grand total of 110 broadcasting stations at the end of December, 1937.

Commercial stations showed much progress during 1937, and the "chain" or "network" system was introduced everywhere. Many existing stations changed ownership and linked into big networks.

In March the Philips' organisation established their own valve making plant in Sydney, thus making two valve factories in Australia.

New factories opened and additions to existing premises went on throughout the year. E.T.C. Industries Ltd. occupied their new Sydney factory in January. Rola speakers in Melbourne extended their factory and are now building an entirely new and larger factory. Continental Carbon occupied a large factory to make Aerovox condensers, etc., in Melbourne.

The huge new Ever Ready factory was completed during the year at a cost of over £50,000. A.W.A. made several additions to their huge plant and factory throughout the year. Breville also removed their factory to larger premises.

Towards the latter end of 1937 the old headquarters of A.W.A. at 47 York Street were demolished and fine new premises are planned to the building limit of Sydney.

As 1937 was Coronation year it was only to be expected that a number of radio executives would travel overseas, but in addition, for business reasons, many went to U.S.A. and Europe. Among those were Sir Ernest Fisk (A.W.A.), Mr. Charles Forrest (International Radio), Mr. H. P. Brown (now Sir Harry), Director-General of Wireless, Mr. Al Freedman (Sales Director Stromberg-Carlson), Mr. Eric Moore (chief radio design engineer, Philips'), Mr. Chas. H. Norville (late partner of Breville Radio), Mr. Arthur Veall and Mr. Herbert Prior (both of Veall's, Melbourne), Mr. A. R. Allen (Vesta Batteries), Mr. A. S. McDonald (chief engineer A.W.A.).

The Coronation Honours included a knighthood for Mr. E. T. Fisk, chairman of directors of Amalgamated Wireless. Sir Ernest Fisk is about the best known man in Australian radio circles, and his knighthood was well deserved for his contribution to wireless in this country.

A major catastrophe occurred with the death of the Marchese Marconi on July 20, 1937. That eminent wireless personality had planned to visit Australia for the World Radio Convention, scheduled for April, 1938, during the celebrations of Australia's 150th Anniversary. His sudden death and passing were mourned by all.

Radio played a big part in the Coronation ceremony last year, and the whole world listened in for the first time to such an event.

SURVEY — of Radio Advertising

(Continued from Page 119.)

Transcriptions (musical, comedy, drama, etc.) 45 per cent.; live artists, 26 per cent.; musical records, 22 per cent.; talks (recorded or otherwise) 4 per cent.; sponsored news services, 3 per cent.

NOTE.—The percentage figures shown in Group (II) Section (aa), Section (b) and , Section (c) do not bear a direct proportion to the totals concerned in those particular Groups and Sections, because in many cases two, three, and at times four different types of sponsored programmes were used. This means that although only 42, 8, and 50 advertisers were surveyed respectively under these sections, the number of different types of programme used in the three cases were resepctively 66, 23, and 89. But by giving, in this case, not the actual number of programmes, but the percentage proportions of any one type of programme to any other, readers are given a true comparative scale of the ratio of total forms of session one to another, irrespective of their ratio to the actual number of advertisers surveyed.

(d) Of the 89 different types of programme used, following is a detailed list giving the percentage of types of programme as used by the 70 leading national advertisers sub-divided into 15 main classes:

Automobile Accessories	per cent.
Comedy (transcription)	22
Drama (transcription)	33
Musical drama (transcription)	11
Musical records	34

Confectionery	
Comedy (transcription)	36
Drama (transcription)	34
Drama (live artist)	30

Cosmetics	
Comedy drama (transcription)	38
Musical records	62

Electric and Radio	
Comedy (transcription)	19
Musical (live artist)	17
Talks (live artist)	15
Musical records	49

Food and Groceries	
Drama (transcription)	25
Drama (live artist)	14
Comedy (live artist)	8
Musical (live artist)	21
Talks (transcriptions)	8
Musical records	24

Hosiery	
Musical (transcription)	40
Talk (transcription)	26
Talk (live artist)	34

Household Utilities	
Drama (transcription)	31
Musical drama (transcription)	21
Drama (live artist)	20
Musical records	28

Liquor	
Drama (live artist)	48
Musical (live artist)	52

Medicines	
Drama (transcriptions)	21
Comedy (transcriptions)	20
Musical (transcriptions)	16
Health talks (transcriptions)	7
Musical records	36

Paints, Lacquers, etc.	
Drama (transcriptions)	42
Comedy (transcriptions)	32
Musical drama (transcriptions)	12
Musical records	14

Petrol, Oil, etc.	
Comedy (transcriptions)	60
Musical (live artists)	40

Wearing Apparel, etc.	
Drama (transcriptions)	16
Drama (live artists)	14
Comedy (transcriptions)	20
Musical (transcriptions)	18
Musical (live artist)	17
Musical records	15

Cigarettes, Tobacco, etc.	
News, dramatised (live artists)	40
Drama (live artist)	28
Musical (transcriptions)	32

Toilet Requisites	
Drama (transcriptions)	35
Comedy (live artist)	20
Musical (live artist)	28
Talks (live artist)	17

Travel	
Drama (transcriptions)	35
Musical records	65

(III) Length of programmes used in sponsored sessions.

(a) For those numbering 5, who used only ONE type of programme:

	per cent.
5 Minutes	20
15 Minutes	80

(b) For those numbering 50, who used MORE THAN ONE type of programme:

	per cent.
5 Minutes	16
7½ Minutes	6
10 Minutes	10
15 Minutes	35
20	3
30 Minutes	19
45 Minutes	4
1 Hour	5
Over one hour	2

(IV) Times of day used.

(a) By those using scatter announcements recorded or otherwise, and whether used alone or in conjunction with other programmes:

	per cent.
Morning alone	4
Morning and evening	30
Morning, afternoon, and evening	22
Afternoon and evening	7
Evening alone	37

SURVEY — of Radio Advertising *(Continued)*

(b) By those who used sponsored sessions of one type or another, whether in conjunction with scatter announcements or not:

	per cent.
Morning and afternoon	4
Morning and evening	22
Morning, afternoon and evening	29
Afternoon and evening	7
Evening alone	38

INFERENCES FROM THE ABOVE FIGURES.

The figures, proportions, ratios and details brought out by the above figures, demonstrate the following outstanding features:—

(1) That the greater proportion of national advertisers do not adhere to one type of programme, but vary their entertainment as location, time or year, facilities for different types of programme, type of product, and, of course, allocation demand.

(2) As to types of programme, when scatter announcements alone or sponsored sessions alone are used, in the greater proportion of cases, recordings and transcriptions respectively are used. But when scatter announcements and sponsored sessions are used in conjunction, direct announcements preponderate in the case of the scatters, while in the case of sponsored sessions under this heading transcriptions are most favoured, being 51 per cent. of the total.

(3) But when sponsored sessions of various types are used without any scatter advertising, transcriptions, live artists and station music are used almost equally, though live artists are slightly ahead of the other two.

(4) Summarising the sponsored sessions over the total number of those who use them whether with scatters or without, transcriptions are only just slightly less than all other forms of entertainment combined.

(5) As to length of sponsored session programmes, the most effective seem to be 5, 15, and 30 minutes, as between them they account for almost 75 per cent. of the total sessions surveyed.

(6) The most individually used time of day both for scatter announcements and for sponsored sessions is the evening, though in the case of scatters, almost as many advertisers combine both morning and evening, and very few less use morning, afternoon and evening in conjunction. In the case of sponsored sessions, following those who use the evening alone, come, not far behind, users of morning, afternoon and evening, and only slightly behind the latter come those who use morning and evening.

The figures given above and the deductions arrived at are by no means complete, but we believe that they give a sufficiently interesting picture to be printed for general information.

LIST OF ADVERTISERS SURVEYED TO ARRIVE AT THE ABOVE FIGURES

Wm. Angliss.
Arnotts Biscuits.
Aspro.
A.W.A.
B.A.L.M.
Bergers and Sherwin-Williams Paints.
Berlei Corsets.
Bex A.P.C.
Bidomak.
Brockhoff's Flour.
Bryant and May.
Bushells.
Carter's Liver Pills.
Cereal Foods.
Clements Tonic.
Colgate-Palmolive.
Cystex.
W. C. Douglass.
Dunlop Rubber Co.
Enos Fruit Salts.
Ever Ready Batteries.
Exide Batteries.
Felt and Textiles.
Fisher's Phospherine.
Hardie Rubber Co.
A. G. Healing.
Junipah Mineral Spring Salts.
Kayser Hosiery.
Kellogg's.
Kleeners Ltd.
Kraft Walker Creese Co.
Kolynos.
Laconia Blankets.
Listerine.
Lustre Hosiery.
Masse Batteries.
Mignon Hosiery.
Nestles Chocolates.
Nestles Cream.
Orient Steamship Co.
Pelaco.
Pepsodent.
Peter's Ice Cream.
Godfrey Phillips.
Philips Lamps.
Philips Radio.
P.M.U.
Preservene Soap.
Purina Grain Foods.
Potter and Moore.
Reckitt's Ltd.
Robur Tea Co.
Sanitarium Health Foods.
Saunders Malt Extract.
Schumann Salts.
Frederick Stearns (Nyal Products).
Seppelts.
Shell Co.
Bruce Small.
Swallow and Ariells.
Tucker and Co.
Vacuum Oil Co.
Victorian Government Tourist Bureau.
Vincent's A.P.C.
F. S. Walton.
Widdis Diamond Dry Cells.
W. D. & H. O. Wills.
Wrigley's.
W. E. Woods Ltd. (Nivea).
Wood's Peppermint Cure.

Australian Factory Activity For 1936-37

THE Commonwealth Statistician (Dr. Roland Wilson) issued (July 5) a statement giving a preliminary survey of the statistics of factory production for the year ended June 30, 1937. The figures disclose that the upward trend which followed after 1931-32, the year in which secondary industries reached their lowest level of production output, etc., during the economic depression, has been maintained. Measured by employment with the year 1931-32 as base = 100, the progress for the subsequent years has been as follows: 1932-33, 110; 1933-34, 121; 1934-35, 134; 1935-36, 146; and 1936-37, 156. The value of salaries and wages paid increased by 61 per cent. from £55.9 million in 1931-32 to £90.1 million in 1936-37; whilst the value of production increased by 60 per cent. from £111 million to £177.7 million. Fluctuations in prices, however, should be taken into account when comparing these money-values. A brief summary of the principal items included in the factory statistics is given hereunder.

Number of Factories.

The number of factories operating in Australia during 1936-37 was 25,668, compared with 24,894 in 1935-36 and 21,657 in number in 1931-32. This is the greatest number yet recorded. Although not the best index, it affords some indication of the recent expansion in manufacturing activity.

Employment in Factories.

In the year 1936-37 the number of persons engaged in factories was 523,824. This is the greatest number ever recorded in factory employment in any year. It exceeds that reached in the peak pre-depression years of 1926-27 by nearly 72,000 persons, or 16 per cent., and the lowest point reached during the depression year of 1931-32 by more than 187,000 or 56 per cent. The number of males engaged in the year 1936-37 totalled 381,471, and females 142,353, there being 268 males employed for every 100 females. Comparisons between the years 1926-27, 1931-32 and 1936-37 indicate that the number of males employed fell during the first period from 337,433 to 237,915 and subsequently rose during the second period to 381,471, representing a decline of nearly 30 per cent. and an increase of 60 per cent. respectively. A similar comparison for females shows that for the same years employment fell from 114,751 to 98,743 and then rose to 142,353, representing a decline of 14 per cent. and subsequent increase of nearly 44 per cent., respectively. The chief industries affording employment to females are those associated with the textile and clothing trades. These were not affected by the industrial depression to the same extent as other manufacturing industries, where males are employed almost exclusively.

Particulars of the number employed, the numerical fluctuation in employment and the rate per cent. of such fluctuation are given for each year since 1928-29 in the following table.

Monthly Employment in Factories—1936-37.

(WORKING PROPRIETORS OMITTED.)

The actual numbers of persons employed in factories (excluding working proprietors) on the pay-day nearest to the 15th of each month are available for 1936-37. These are shown in the following table together with distribution according to age groups on or about the 15th June, 1937.

Month	Males	Females	Total
1936	No.	No.	No.
July	343,622	133,117	476,739
August	346,209	136,419	482,628
September	350,638	139,408	490,046
October	356,643	141,248	497,891
November	359,746	141,561	501,307
December	360,595	139,249	499,844
1937.	No.	No.	No.
January	351,878	131,287	483,165
February	362,568	142,418	504,986
March	367,964	144,887	512,851
April	370,221	143,893	514,114
May	371,214	141,633	512,847
June	373,246	140,042	513,288

Distribution of Employees According to Age as on June 15, 1937.

Sex	Under 16 years No.	Per cent. of total %	16 years & under 21 No.	Per cent. of total %	21 years and over No.	Per cent. of total %
Male	16,354	4.37	72,851	19.48	284,749	76.15
Female	15,770	11.26	53,248	38.03	70,991	50.71
Total	32,124	6.25	126,099	24.53	355,740	69.22

Employment in Factories.

YEAR	MALES Number Employed	MALES Numerical Increase or Decrease on previous year	MALES Rate per cent. on previous year	FEMALES Number Employed	FEMALES Numerical Increase or Decrease on previous year	FEMALES Rate per cent. on previous year	PERSONS Number Employed	PERSONS Numerical Increase or Decrease on previous year	PERSONS Rate per cent. on previous year
	No.	No.	%	No.	No.	%	No.	No.	%
1928-29	333,110	—	—	117,372	—	—	450,482	—	—
1929-30	308,235	—24,875	— 7.47	110,959	— 6,413	— 5.46	419,194	—31,288	— 6.95
1930-31	245,944	—62,291	—20.21	92,899	—18,060	—16.28	338,843	—80,351	—19.17
1931-32	237,915	— 8,029	— 3.26	98,743	+ 5,844	+ 6.29	336,658	— 2,185	— 0.65
1932-33	261,515	+23,600	+ 9.92	109,212	+10,469	+10.60	370,727	+34,069	+10.12
1933-34	289,249	+27,734	+10.60	116,660	+ 7,448	+ 6.82	405,909	+35,182	+ 9.49
1934-35	322,465	+33,216	+11.48	127,133	+10,473	+ 8.98	449,598	+43,689	+10.76
1935-36	356,554	+34,089	+10.57	136,217	+ 9.084	+ 7.15	492,771	+43,173	+ 9.60
1936-37	381,471	+24,917	+ 6.99	142,353	+ 6,136	+ 4.50	523,824	+31,053	+ 6.30

Minus sign (—) signifies decrease. Plus sign (+) signifies increase.

Australian Factory Activity (continued)

Salaries and Wages Paid.

Salaries and wages paid in factories in Australia during the year 1936-37 totalled £90.2 million. Excluding working proprietors and the amounts drawn by them, this represents average earnings for the year of £179.25 per employee. This information for 1936-37 is compared with certain previous years in the following table:—

Year	Total amount paid (a) £	Average per employee (a) £
1926-27	90,575,166	208.65
1931-32	55,931,818	174.84
1932-33	59,416,436	168.19
1933-34	64,444,660	166.36
1934-35	72,823,703	169.34
1935-36	82,098,288	173.66
1936-37	90,157,818	179.25

(a) Exclusive of working proprietors and amounts drawn by them.

Earnings per employee reached their highest level in 1927-28 with an average of £212.12. From that year there was an almost uninterrupted drop to £166.36 in 1933-34, representing a decline of 22 per cent. over the period. Thereafter the average rose each year to £179.25 in 1936-37, but this wage is still 15.5 per cent. below that of the record year 1927-28.

Value of Output and Production.

The gross value of the output of factories, which represents the value at the factory of all commodities produced, amounted to £451.8 millions in 1936-37, as compared with £420.4 millions, the output during the peak pre-depression year of 1928-29, and with £281.6 millions, the value of output at the trough of the depression in the year 1931-32. The value of output, however, does not constitute a true measure of total productivity largely because of the duplication between industries. A better measure is obtained by deducting from the value of output the cost of raw material, containers, power, fuel, light, oil, water, tools replaced, and repairs to plant. Depreciation should also be deducted, but owing to the difficulty experienced in obtaining satisfactory data no deduction has been made on account of this item. The value of production thus obtained represents the value added in production by the manufacturing industries. It is from this value that such items as wages, interest, profits, insurance, advertising and other sundry charges are met. The value of production for the year 1936-37 amounted to £177.7 million. This is the greatest contribution made by the manufacturing industries in any year; it exceeds that of the peak pre-depression year of 1928-29 by £10 million or 6 per cent., and represents an increase of £66.7 million or 60 per cent. from the depression year of 1931-32.

Value of Output and Cost of Production.

Full details of the costs of production are not collected and consequently the amount of profit resulting from total factory production for the year cannot be compiled. The table at foot of page indicates for selected years the balance available for overhead expenses, interest and profit, etc., after the payment for cost of materials, fuel and wages.

Power Employed to Drive Machinery.

The power equipment of factories is now obtained in more extensive detail than hitherto. In the following table particulars are given of the rated horse-power of engines employed in factories during 1936-37 distinguishing between that ordinarily in use and that held in reserve or idle. On account of the change in the information collected, however, comparison with previous years cannot be made.

Particulars	Rated Horse Power of Engines Ordinarily in use H.P.	Rated Horse Power of Engines In reserve or idle (a) H.P.
Steam Engines—Reciprocating	265,087	89,232
Turbine	1,183,539	440,149
Internal Combustion Engines—		
Gas	42,768	12,442
Light oils	16,894	4,206
Heavy oils	149,979	36,101
Water	125,180	4,015
Total prime movers	1,782,447	586,145
Motors driven by electricity—		
Purchased	789,706	237,497
Own generation	238,280	82,752
Total electric motors	1,027,986	320,249

(a) Subject to revision.

The development of the use of electricity in factories, as a source of power, is indicated by the fact that the horse-power of electric motors ordinarily in use amounted to 1,027,986, while 320,249 h.p. were in reserve or idle. It should be noted, however, that the source of the power generated to drive these motors has already been included in the prime movers in the table above.

Value of Land and Buildings and Plant and Machinery

The value recorded for these items during the year 1936-37 was £119.2 million for land and buildings, and £127.0 million for plant and machinery. The former shows an increase of £4.6 million over the year 1935-36, and exceeds the previous record of 1929-30 by £1.2 million. The value of plant and machinery advanced by £1.7 million on the figure recorded for the previous year (£125.2 million). This is the second successive increase, but it is still about £600,000 below the record figure of £127.6 million attained in 1929-30. The figures shown for each of these items are the book values, and are determined by adding to the amounts shown at the 30th June, 1936, the value of additions and replacements and subtracting any amounts written off in the year 1936-37. The values are therefore nominal.

Item of Expenditure	1928-29 Value £'000	1928-29 Percentage on total %	1931-32 Value £'000	1931-32 Percentage on total %	1936-37 Value £'000	1936-37 Percentage on total %
Materials used	238,939	56.83	161,199	57.23	260,534	57.67
Fuel and light	13,883	3.30	9,465	3.36	13,610	3.01
Salaries and wages	90,987	21.64	55,932	19.86	90,158	19.95
All other expenditure, interest and profit	76,636	18.23	55,050	19.55	87,527	19.37
Total value of output	420,445	100.00	281,646	100.00	451,829	100.00

Technical Progress in Australian Broadcasting

THE technical responsibilities of the Postmaster-General's Department in connection with the Australian broadcasting system may be summarised briefly as follow:—

(a) The construction, maintenance, and operation of a chain of transmitting stations for the national broadcasting service, together with the provision and operation of technical equipment for their associated studios.

(b) The provision, maintenance and operation of an extensive network of land line communication channels for distributing programmes both to national and commercial broadcasting stations.

(c) Technical investigatory work to ensure that modern developments are applied in such a manner as to maintain both of the abovementioned services in a high state of efficiency.

(d) The administration of the technical provisions of the Wireless Telegraphy Regulations in relation to commercial broadcasting stations.

(e) The investigation into causes and location of source of interference to broadcast reception.

There are now twenty-three national broadcasting transmitters, two additional stations—5AN Adelaide and 4QR Brisbane having been brought into service during the past twelve months. In addition, four further stations are under construction, two of them being situated outside metropolitan areas—in the Federal Capital Territory and in the Darling Downs district of Queensland. The remaining two are to provide alternative outlets for the national service in the cities of Perth and Hobart. Construction work is also proceeding to replace the existing transmitters at Stations 2FC Sydney, and 3LO Melbourne, the new equipment for each station being capable of high quality performance with a radiated power of 10 KW. On the completion of this construction programme towards the end of 1938, the number of stations in the national network will have been increased to 27, distributed among the various States as follow:—

New South Wales (inc. F.C.T.)	7
Victoria (inc. short wave station VLR)	5
Queensland	5
South Australia	3
Western Australia	4
Tasmania	3

Field investigations to determine the location of several other regional stations have been concluded, and steps are now being taken to acquire the necessary sites.

For all new stations the radiating systems take the form of a vertical mast radiator. For regional and the new Sydney and Melbourne stations these radiators conform to the practice of providing structures electrically equivalent to an approximate half wave length to ensure a maximum ground field strength and greatest possible non-fading area. A feature of the Sydney and Melbourne radiators, the erection of which will be commenced shortly, and the heights respectively of which are 730 feet and 700 feet, is that it is intended that they be utilised ultimately for the simultaneous radiation of two programmes on two different frequencies, i.e., in Sydney the one radiator will be used for both stations 2FC and 2BL and in Melbourne the one structure will serve for both Stations 3AR and 3LO.

The usefulness of short wave broadcasting for outback regions of the Commonwealth has been further demonstrated and the operating hours of the national short wave station VLR have consequently been increased considerably. Within the next few months the transmitting equipment at this station will be increased in power and the aerials will be considerably improved to provide better directive radiation over those portions of Australia which the station is intended to serve. The provision of a national short wave transmitter for Perth has been further advanced. This station will also be provided with directive aerials, and in common with the new VLR it will be capable of operating on more than one frequency so that the wavelength of the emissions from the station may be changed to suit varying propagation conditions during the day and from season to season.

Extensive additions have been made to the technical equipment of all capital city studios of the national broadcasting service. In making these additions, opportunity has been taken to adopt the practice of making each and every studio self-contained in that each unit is provided with a control booth equipped with facilities for permitting broadcast productions, rehearsals and auditions being made independently of operations in other studios. Each main studio block is being provided with a central switching room through which all studios are routed for connection to the network, and automatic relay switching arrangements are being installed to permit of the rapid switching of any studio to the network, together with safeguarding facilities to obviate any incorrect switching. Preliminary work has been undertaken on the design of equipment for the new block of studios in Sydney, the erection of which is contemplated at an early date. A feature of all new studio amplifying equipment is that it is operated direct from the mains, safeguards being provided to ensure that at least a portion of the equipment is available for use should the outside power supply fail.

Equipment has been purchased for the provision at all studios of disc recording equipment to permit of the instantaneous recording of such programmes as it may not be opportune to broadcast at the time they are being produced. Improvements have been made in studio monitoring facilities by providing high fidelity loudspeaker units. The latest type of phonograph pick-up equipment has been purchased and steps are in train for the installation of improved types of phonograph turntables. Supplies of the latest type of microphones have, during the year, been brought into use in all studios.

The broadcast programme line network has been greatly extended, particularly in the direction of providing greater facilities for the many commercial stations which are undertaking more extensive and more frequent chain broadcasts. In association with these extensions, repeaters of high amplification and performance characteristics well in advance of those hitherto used are being installed. Many intricate network broadcasts were set up during the year, the most interesting perhaps being that for the simultaneous broadcast of the commentary on the Coronation of His Majesty King George VI. For this broadcast 96 national and commercial broadcasting stations were linked to common sources of programme production, necessitating approximately 20,000 miles of land-line connections.

Continued use is made of the departmental high-frequency receiving centre at Mont Park, Victoria, where broadcasts from the Empire stations and programmes of interest from other international transmitters are picked up for relay through the national network. If interesting programme matter is offering from this source at times when it is not convenient to broadcast it through the network, it is recorded for use at a later time. A limited amount of use has been made of a corresponding station situated near Perth, W.A. By use of this station it is possible, due to the fact that optimum propagation conditions occur at a time different from that for the eastern pick-up point. to obtain programmes which could not otherwise be made available. This station also serves as a standby for West Australian listeners in the event of trouble occurring on the broadcast programme channel connecting Adelaide and Perth.

The Department's obligations under the International Convention necessitate a constant check being kept on the frequency of transmitting stations throughout the Commonwealth. The Department's fundamental standard of frequency is operated in conjunction with the research laboratories and the Mont Park receiving station. Subsidiary units are installed at various points throughout the Commonwealth, and by these means adequate control can be exercised to ensure that all transmitters comply with international requirements.

(Continued from Page 124.)

RULES FOR GUIDANCE OF LICENSED BROADCASTERS

Issued by the Postmaster-General's Department, Commonwealth of Australia

ALTHOUGH every licensed broadcasting station in Australia doubtless possesses a copy of the P.M.G.'s "Rules for the Guidance of Licensed Broadcasters," these rules are of such general interest that we present them herewith for the benefit of those who are not licensed broadcasters, but are, nevertheless, intimately connected with the broadcasting industry and require a fairly complete knowledge of the conditions under which stations are operated. The data included in these rules will also be of interest when regarded in conjunction with the information presented in the various articles which comprise the technical section of this YEAR BOOK.

THE P.M.G.'s "Rules for the Guidance of Licensed Broadcasters" are divided into five sections, as follow:—

Part I—Introduction.
Part II—Definitions.
Part III—Preliminary details regarding establishment of new stations.
Part IV—Station plant and equipment. Technical requirements.
PART V—General.

These sections are presented herewith in the sequence given above.

PART I.—INTRODUCTION

These rules are intended for the use of licensed broadcasters, and applicants for licences, as a guide to the requirements of the Postmaster-General's Department in its control of the radio services. The principal requirements are set out in the rules, but the further co-operation of the broadcasters may be found necessary from time to time in order to regulate the services on a satisfactory basis in the general interest of listeners and broadcasters.

The rules may be varied from time to time, and shall in no way be construed as limiting the authority of the Postmaster-General under the Wireless Telegraphy Act and Regulations.

The following extracts from the regulations are of special interest:—

Inspection of Licence.

"47. (2) A licensee shall make his licence available for inspection by any authorised officer as and when required.

Commencement of Service.

"49. A broadcasting station licensee shall commence a satisfactory service in accordance with these regulations within three months from the date of issue of the licence or within such further period as the Postmaster-General approves.

Licensed Installation to be to the Satisfaction of the Postmaster-General.

"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.

(Continued overleaf.)

Rules for Guidance of Licensed Broadcasters (contd.)

Power of Stations.

"51. The power of a broadcasting station shall be as approved by the Postmaster-General, and shall not be altered without his consent.

Operating Frequency.

"52. (1) The frequency (wavelength) 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.

Location and Periods of Operation of Station.

"53. The location of a broadcasting station and the periods of operation thereof shall be subject to the approval of the Postmaster-General.

Reservation of Right to Postmaster-General to Vary Conditions of Licence.

"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 (wavelength), and the 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.

Operation of Station.

"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.

Inspection of Licensed 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.

Station to have Telephone Installed.

"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.

Licensee to Keep Accounts, Records, etc.

"62. A broadcasting station licensee shall:—

. . . . . .

(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."

PART II.—DEFINITIONS

"Broadcast station" means a station used for the dissemination of wireless communications intended to be received by the public.

"Auxiliary transmitter" means a transmitter maintained only for transmitting the regular programme of a station in case of failure of the main transmitter.

"Authorised power" or "licensed power" means the power assigned to a station by the Postmaster-General and specified in the licence.

"Maximum rated carrier power" means the aerial input power determined by the design of a transmitter and type and number of vacuum tubes used in the last radio stage. This power is to be distinguished from the operating power; in general, it is the maximum power at which the transmitter can be operated satisfactorily.

"Operating power" means the aerial input power of the station. This power is determined by one of several methods hereinafter set out. (See paragraph 26, Part III). The operating power shall be the same as the licensed power.

"Aerial input power" or "Aerial power" means the the power derived by computation, as in paragraph 26, Part III, or the product of the total aerial resistance and the square of the aerial current at the operating frequency.

"Anode input power" means the product of the direct voltage measured between anode and cathode of the valves in the last radio stage, and the total direct current flowing in this circuit. These measurements are to be made without modulation applied.

"Last or final radio stage" means the radio-frequency power amplifier stage that supplies power to the transmission line or aerial system.

"Modulated stage" means the radio-frequency amplifier or amplitude of a radio wave is varied in accordance with a sound wave.

"Modulated stage" means the radio-frequency amplifier stage to which the modulator is coupled for modulation purposes.

"Percentage modulation" means the ratio of half the difference between the maximum and minimum amplitudes of a modulated wave to the average amplitude, expressed in percentage.

"Maximum percentage of modulation" means the greatest percentage of modulation that may be obtained by a transmitter without producing in its output more than 10 per cent. combined audio harmonics.

"Combined audio harmonics" means the sum of the amplitudes of all the various harmonic components.

"High level modulation" means that the plate circuit of the last radio stage is modulated.

"Low level modulation" means that a radio stage before the last one is modulated, and that the last radio stage operates only as a linear power amplifier.

"Grid bias modulation in the last radio stage" means that the grid bias of the last radio stage is varied by the audio-frequency power supplied by the modulator. If such modulation is employed in other than the last radio stage, it is low-level modulation.

"Suppressor grid modulation" means that the voltage of the suppressor-grid of the valve or valves in the modulated stage is varied by the audio-frequency output of the modulator. If such modulation is employed in other than the last radio stage, it is low-level modulation.

"Aerial resistance" means the total resistance of the transmitting aerial system at the operating frequency and at the point at which the aerial current is measured.

"Aerial current" means the radio-frequency current in the aerial with no modulation.

PART III.—PRELIMINARY DETAILS REGARDING ESTABLISHMENT OF NEW STATIONS

Licensees shall, after receiving the approval for the issue of a licence, supply the department with the following technical details:—

(i) Two copies of a comprehensive circuit diagram of proposed installation. The drawing should bear the name of the manufacturer and type number of the equipment. References should also be included concerning—

(a) Electrical values for condensers, inductances and resistances, as well as the secondary voltage ratings (r.m.s.) for all transformers;

(b) position in circuit of all measuring instruments (including manufacturer, type number or other identification), together with normal working readings, as proposed in the circuit design;

(c) manufacturer's name, type and power rating (input to anode) of all valves under proposed operating conditions;

(d) complete circuit details of grid, filament and high tension power supplies.

(ii) Detailed specification of the proposed installation with particular reference to:—

(a) Arrangement for maintenance of frequency stability (including a description of the complete crystal unit and thermo chamber, showing proposed operating temperature, temperature co-efficient of crystal, limits of temperature variation and facilities for varying frequency within desired limits);

(b) frequency checking devices;

(c) system and percentage of modulation, and equipment to be used for checking modulation capability;

(d) overall fidelity expected from the transmitter;

(e) description of proposed aerial and earth systems, showing type, directivity and physical dimensions of masts and radiator;

(f) particulars of transmission line (if any);

(g) source of primary power;

(h) particulars of emergency equipment (if any).

(iii) The exact geographical location of the transmitter site, or sites if alternative sites are considered. The distance from the nearest post office and the population within radii of ½, 1, 2, 3 and 5 miles respectively from the proposed site should be supplied. (Definite requirements regarding sites in general are not laid down, but before giving approval for a site the department will give careful consideration to the various factors involved. Special attention will, of course, be given to the "blanket area" aspect, with the object of ensuring that a minimum of the population is within that area. The general definition of the degree of signal from a station which may constitute a "blanket signal" is not desirable, but it may be of interest to note that in some administrations the area within the 125 mV/m contour is regarded as the "blanket area.")

(iv) Details of the provision proposed to be made to safeguard the operating and maintenance personnel against contact with apparatus upon which dangerous voltages may exist.

An official inspection and a preliminary test of frequency accuracy and stability of each new station will be made before the station is put into service. Ample notice of the readiness of the station for the inspection should be given to the department, and it is most desirable that no public announcement of a definite date of opening should be made until an official inspection has been completed.

PART IV.—STATION PLANT AND EQUIPMENT TECHNICAL REQUIREMENTS

1. The power at which a broadcasting station may be operated is that shown in the licence, and the station must not be operated at a power differing appreciably from that authorised power.

2. In some cases, a broadcaster may desire to instal a transmitter capable of being operated at power in excess of the authorised value. The department does not agree agree with such a procedure, which may be uneconomical, but where the broadcaster's reasons for so doing are explained to the department's satisfaction, approval may be granted for the installation of excess power. This would be known as the maximum rated carrier power, and in general will not be permitted to exceed the authorised operating power by more than 50 per cent.

3. The maximum rated carrier power of a broadcast transmitter shall be the same as the sum of the power ratings of all the valves in the last radio stage, depending on the class of operation and the system of modulation employed.

Rules for Guidance of Licensed Broadcasters (contd.)

4. No licensee shall make any changes to the approved circuit arrangements of the transmitter, or change the number of valves, or change to valves of different power rating or class of operation, or change the system of modulation, except upon written application to, and the written authority of, the department.

5. All applicants for new, additional or different broadcast facilities, and all licensees requesting permission to change the site of the station, shall specify a radiating system which makes the best possible use of licensed power. No application for increased power, etc., will be considered while the licensee continues to use a radiator which, in the department's opinion, is inefficient.

6. No broadcast station licensee shall change the physical height of the transmitting aerial, or supporting structures, or make any changes in the radiating system which will measurably alter the radiation patterns except upon written application to, and authority from, the department.

7. The design of the aerial and/or supporting structure shall also be subject to any regulations administered by the Civil Aviation Branch of the Defence Department.

8. The transmitter proper and associated transmitting equipment of each broadcasting station shall be designed, constructed and operated in accordance with good engineering practice in all phases not otherwise specifically included in these rules.

9. The transmitter shall be wired in accordance with good engineering practice and shall be provided with safety features in accordance with the requirements of the appropriate electric supply authority, and other rules laid down by the department from time to time.

10. The transmitter panels or units shall be wired in accordance with standard switchboard practice, either with insulated leads properly cabled and supported or with rigid bus bar properly insulated and protected. Wiring between units of the transmitter with the exception of circuits carrying radio frequency energy shall be installed in conduits or approved fibre or metal raceways to protect them from mechanical injury. Circuits carrying low-level radio frequency between units shall be of either concentric tube two-wire balanced lines or properly shielded to prevent the pick-up of modulated radio frequency energy from the output circuits.

11. Adequate provision shall be made for the protection of the maintenance and operating personnel against contact with apparatus upon which exist dangerous voltages. Preferably all such apparatus shall either be completely enclosed with covers of safe insulating material, or by covers or cages of earthed metal, or shall be placed so as normally to be out of reach. Equipping with safety switches the doors or gates of enclosures surrounding live apparatus will remove from the apparatus all dangerous voltages, including those due to charges on condensers, before access to the enclosures can be obtained. Merely closing the doors or gates shall not cause those voltages to be re-applied; some other definite act must be performed and such act shall be performable only on the safe side of the enclosure, and where an operator can observe the effect of his actions.

12. In general, the transmitter must be constructed either on racks and panels or in totally enclosed frames protected as described above. The final stages of high-power transmitters may be assembled in open frames, providing the equipment is enclosed by a protective fence. Means must be provided for making all tuning adjustments, requiring voltages in excess of 750 volts to be applied to the circuit, from the front panels with all access doors closed. Proper bleeder resistors should be installed across all condenser banks to remove any charge which may remain after the high voltage circuit is open-

Rules for Guidance of Licensed Broadcasters (contd.)

ed. All meters which have more than 1,000 volts potential to ground to the movement should be protected by a cage or cover, in addition to the regular case, even if of bakelite.

13. All plate supply and other high voltage equipment, including transformers, filters, rectifiers, and motor generators, must be protected so as to prevent injury to operating personnel. This protection should preferably include commutator guards on all high voltage rotating machinery.

14. Any departure from the foregoing rules concerning the safety of operating personnel must receive the special approval of the department.

15. The station equipment shall be so operated, tuned and adjusted that emissions are not radiated outside the authorised band which cause, or are capable of causing, interference to the services of other stations. The spurious emissions, including radio-frequency harmonics and audio-frequency harmonics, shall be maintained at as low a level as required by good engineering practice. The audio-frequency range, programme distortion, carrier hum, noise level, and other essential phases of the operation which control the external effects shall at all times conform to the requirements of good engineering practice.

16. Each stage (including the oscillator) preceding the modulated stage shall be properly shielded and filtered to prevent feedback from any circuit following the modulated stage. An exception to this requirement will be made in the case of high-level modulated transmitters of approved manufacture which have been properly engineered to prevent re-action.

17. The crystal chamber, together with the conductor to the oscillator circuit, must be totally shielded. The crystal chamber should be so constructed, insulated and temperature-controlled that the maximum temperature variation at the crystal shall not be greater than 0.1 degree Centigrade. An exception would be made in the case of transmitters employing so-called "AT" or zero coefficient crystals wherein the maximum allowable temperature variation at the crystal is 1.0 degree Centigrade. An approved thermometer must be installed in such a manner that the temperature at the crystal can be accurately measured and the temperature logged each hour in accordance with paragraph 5, Part V. It is preferable that the tank circuit of the oscillator tube be installed in the temperature-controlled chamber. In case an excessive shift in frequency is found during warm-up periods, the crystal oscillator must be operated continuously. Exceptions will be made regarding certain types of crystals which have proved high standard performances without resorting to special temperature control arrangements. Each broadcasting station shall be so operated that the frequency is maintained between the limits of 50 cycles per second above, to 50 cycles per second below, the assigned frequency.

18. The control equipment should include apparatus permitting of the speedy adjustment of frequency without the necessity of closing down the station. Such methods as a variable vernier air gap or small isolantite variable parallel condenser across the crystal would meet requirements, but the method of mounting should be carefully considered to bring about the desired ease of control.

19. The national standard of frequency maintained by the Research Laboratories of the Postmaster-General's Department shall be the basis for all frequency measurements, and assignments will be made on the basis of this standard. The standard will be derived from an internationally recognised time source.

20. Provided the licensee installs a crystal control unit capable of maintaining the frequency within plus or minus 20 cycles of the nominal frequency at all times, the department will relieve the licensee from the responsibility imposed under Regulation 52 (3) of installing equipment for indicating the accuracy of the operating frequency.

21. The radio frequency energy operating a frequency monitor, if installed, must be obtained from some stage in the transmitter prior to the modulated stage and the monitor circuits must be such that the monitor can be operated continuously without heterodyning the carrier. In addition, the monitor and the radio frequency line from the transmitter must be thoroughly shielded to prevent regeneration in the transmitter.

22. The transmitter power supply shall be so constructed that the maximum plate voltage regulation between no modulation and 100% modulation shall not exceed 5%. Adequate provision shall be made for varying the transmitter power output between sufficient limits to compensate for excessive variations in line voltage, or other factors which may affect the power output.

23. A complete set of spare tubes for the transmitter should be on hand at all times.

24. The operating power of a broadcasting station will be determined either by direct measurement, or indirect measurement, by means of the anode input power to the last or final radio stage, but unless specifically authorised by the department to do otherwise, the licensee of the broadcasting station shall compute its operating power by the indirect method.

25. Any licensee who has at any time been authorised by the Department to compute operating power by any other method (e.g., by aerial input direct measurement) shall, upon making any change in the aerial system or in the aerial current measuring instruments, or any other change which may alter the characteristics of the aerial, revert to the use of the indirect measurement of aerial input until further order of the Department.

26. When the operating power is determined by the indirect method, it shall be derived from the anode input power of the last radio stage by multiplying the plate voltage (E_p) measured between anode and cathode of the vacuum tube or tubes in the final amplifier by the total plate current of the last radio stage (I_p), and by the proper factor (F) given in the following tables according to the system of modulation used, that is:—

$$\text{Operating power} = E_p \times I_p \times F.$$

Factor to be used in determining the operating power from the anode input power of the final stage.

	Factor (F)
A. High level modulation	= 0.66
B. Low level modulation—all systems excepting those systems employing Doherty linear amplifiers in last stage	= 0.33
C. Grid bias modulation in the last or final radio stage	= 0.20
D. Suppressor grid modulation in the final radio stage	= 0.25
E. Low level modulation with Doherty amplifiers in the final stage	= 0.60

27. In computing operating power by indirect measurement, the above factors shall apply in all cases and no distinction will be recognised, due to the operating power being less than the maximum rated carrier power.

28. The aerial input power determined by direct measurement is the square of the aerial current times the aerial resistance at the point where the current is measured and at the operating frequency. Direct measurement of the aerial input power will only be accepted as the operating power of the station when the method of obtaining the data on the aerial resistance measurements meets with the department's approval. The aerial current shall be measured by an ammeter of accepted accuracy. The aerial ammeter shall not be changed to one of different type, maximum reading or accuracy without the authority of the department.

29. A licensee of a broadcasting station shall ensure that the transmitter is capable of delivering satisfactorily the authorised power with a modulation of at least 80 per cent. When the transmitter is operated with 80 per cent. modulation, not over 10 per cent. combined audio-frequency harmonics shall be generated by the transmitter.

30. The operating percentage of modulation of all stations shall be maintained as high as possible consistent with good quality of transmission and good broadcast practice, and in no case less than 80 per cent. on peaks of frequent recurrence during any selection which normally is transmitted at the highest level of the programme under consideration.

31. If a broadcaster claims a greater percentage of modulation than the fundamental design indicates can be procured, he shall submit full data showing the aerial input power by direct measurement and complete information, either oscillograms or other acceptable data, to show that a modulation of 85 per cent. or more, with not over 10 per cent. combined audio harmonics, can be obtained with the transmitter operated at the authorised or licensed power.

32. The operating power of a station shall be maintained in accordance with the licensed power at all times except in an emergency when, due to causes beyond the control of the licensee, it becomes impossible to operate with the full licensed power. In such a case, the station may be operated at such reduced power and for such a period as the department may approve. In any such emergency, the requisite approval must be obtained without delay.

33. Each broadcasting station shall be equipped with suitable indicating instruments of accepted accuracy to measure the aerial current, direct anode circuit voltage, and the direct anode circuit current of the modulator and last radio stage. These indicating instruments shall not be changed or replaced without the authority of the department, except by instruments of the same type, maximum scale reading, and accuracy.

PART V.—GENERAL

Auxiliary Transmitter.

1. Upon showing that a need exists for the use of an auxiliary transmitter in addition to the regular transmitter of a broadcasting station, approval may be given for the establishment of such auxiliary equipment, provided that:

(a) All regulations applying to broadcast transmitting equipment shall apply also to the auxiliary transmitter;

(b) the auxiliary transmitter shall be installed only at the same location as the main transmitter, except that upon satisfactory showing of technical necessity therefor, the department may authorise another location;

(c) a licensed operator shall be in control whenever the auxiliary transmitter is placed in operation;

Rules for Guidance of Licensed Broadcasters (contd.)

(d) the auxiliary transmitter shall be maintained so that it may be put into immediate operation at any time upon failure of the main transmitter, or upon request by a duly authorised radio inspector;

(e) the auxiliary transmitter shall be tested at least once each week to determine that it is in proper operating condition, and that it is adjusted to the proper frequency. A record shall be kept of the time and result of the test;

(f) the auxiliary transmitter shall be equipped with satisfactory control equipment, which will enable the maintenance of the frequency emitted by the station within the limits prescribed by these rules.

2. Within two days after each use of the auxiliary transmitter, except for testing, the department shall be notified in writing of the date, time and power at which the auxiliary transmitter is operated and the reasons for each use.

Licence to be Available for Inspection at the Station.

3. The licence shall be exhibited in the room in which the transmitter is installed, together with the latest approved circuit diagrams of the station, to facilitate the inspection of the licence referred to in Regulation 47.

Qualified Operators to be Employed.

4. The licensee of each station shall keep a fully qualified operator (as determined by the department) on duty for the operation of the transmitter, during all periods of actual operation at the place where the transmitting equipment is located.

Operating Log to be Maintained.

5. The licensee of each broadcasting station shall maintain an operating log in which entries shall be made as follows:—

(a) Time the station begins to supply power to the antenna, and the time it stops;

(b) time the programme begins and ends;

(c) each interruption to the carrier wave, its cause and duration;

(d) an entry of the following each 60 minutes:—

(i) Operating constants of last radio stage (total anode current and anode voltage);

(ii) aerial current;

(iii) frequency check (when frequency monitor installed);

(iv) temperature of crystal control chamber;

(v) voltage of main or primary power supply.

6. Each log shall be kept by the person or persons competent to do so, having actual knowledge of the facts required, and who shall sign the log when starting duty and again when going off duty. The log shall be made available upon request by an authorised officer of the department.

7. The exact form of log is not prescribed, but it shall be kept in an orderly manner, and in such detail that the information required is readily available. Key letters or abbreviations may be used if the explanation of each is given plainly in the log.

CHOOSING YOUR STATION SITE

Transmitter Location An All-Important Factor

IT would be difficult to overstate the importance of the "site" factor when planning the installation of a broadcast transmitter. This fact is generally appreciated nowadays, and the locations of several of the new Australian stations opened during the past year or so provide ample evidence that careful consideration has been given to the problem.

To deal fully with the factors involved in station location would require a text-book several times the size of this entire publication and, even then, the matter would only have a limited appeal (to those engineers entrusted with the determination of suitable transmitter sites). However, a general knowledge of the factors involved and the usual recommendations will be of interest to all engaged in the broadcasting industry and we present below an article which summarises the recommendations and general observations of the Federal Communications Commission of U.S.A., which body is responsible for the proper technical conduct of broadcasting in America. This article was presented in the 1937 edition of the BROADCASTING BUSINESS YEAR BOOK under a different heading to that now employed, and is reprinted in an endeavour to ensure that the material is kept fresh in the minds of our readers.

IT is only during the past few years that the importance of selecting the proper site for broadcast transmitters has been fully realised. The effective coverage of a broadcast station is dependent in a large measure upon selecting the proper site which may directly determine the efficiency of the radiating system and the field intensity throughout any desired centre of population.

Recent engineering surveys of transmitters reveal that the efficiency of radiating systems vary from approximately 5.7 per cent. to 57 per cent., the location of the transmitter and the antenna being in a large measure responsible for this wide variation. A 1,000-watt station with a 57 per cent. efficient antenna would be equivalent to a 10,000-watt transmitter with 5.7 per cent. antenna efficiency, other conditions being the same.

It has been found that certain low-power stations are much more successful in covering centres of population than high-powered stations, due to the efficiency of the radiating system and the location of the transmitter. If data were available on the primary coverage of all broadcast stations and tabulated according to power, it would undoubtedly reveal that power alone is of minor importance in determining the coverage and that there are other factors which are more influential.

As a matter of fact, the percentage of modulation is more important than power, and the effectiveness of the site and antenna efficiency of the radiating system are more important than either.

The operating power of a station and the minimum percentage of modulation are fixed by the F.C.C. in U.S.A., and every licensee of a broadcast station should select a site from which a maximum city and rural service may be had and the minimum amount of interference produced with other stations.

Under the F.C.C.'s plan of allocation, power is allocated by steps which increase by approximately twice the next lower step. A study of the transmitter locations and radiating systems indicates that these two factors may have a materially greater effect than these small power steps. A station assigned 500 watts may by the mere expediency of selecting a suitable location and efficient radiating system increase the effective coverage much more than by increasing the power by twice or even more as given in the above example.

Primary Objectives.

The three primary objectives to be attained in the selection of a site for the transmitter of a broadcast station are as follow:

1. To serve adequately the centre of population in which the studio is located and give maximum coverage to adjacent areas.

2. To produce minimum crosstalk interference to the receptions of other stations assigned to adjacent channels.

3. Pass the requirements of the Federal Communications Commission.

If a site is engineeringly correct, presumably it will pass the requirements of the Federal Communications Commission.

The table herewith is offered as a general guide to be used in determining the approximate site of broadcast transmitters. That is, from this table it may be determined whether or not the station should be located in the centre of the city or a some distance from the city.

In case the power and the population of the city are such that it should be located at some distance from the centre of the city, the approximate distance is given as well as the population of the so-called "blanket area." The "blanket area" of a broadcast station is defined as that area in which the **average** broadcast receiver would not receive satisfactorily, without cross-talk, other stations operating on a frequency separated by 50 kilocycles or more. If the city under consideration is of irregular shape, the table may not apply, but the general principles set out will still hold.

Another factor to be considered is the relation of the site to airports and airways. There are no regulations or laws with respect to distance from airports and airways, but a distance of three miles from each is used as a guide. In case a suitable location is found at less distance than this, it may be satisfactory if the towers are suitably painted and lighted in conformity with local aeronautic requirements or if the towers are not higher than the surrounding objects. The latter is poor radio engineering. In selecting a site, the local aeronautical authorities should always be consulted if there is any question concerning erecting a hazard to aviation, and in case of towers over 200 feet high this should always be done.

(Continued on Page 132.)

Choosing Your Station Site (*continued from page 130*)

Sites Within Cities.

In selecting a site in the centre of a city, it is usually necessary to place the radiating system on top of a building. This building should be large enough to permit the necessary spacing and height of towers. Great care must be taken to avoid selecting a building surrounded by taller buildings or any building higher than the antenna and in the direction which it is desired to serve. Such a building will tend to cast shadows in the field intensity, which may materially reduce the coverage of the station in that direction.

Sites Outside Cities.

If, from the table, it is determined that a site should be selected removed from the city, then there are several general conditions to be followed in determining the exact site. The table gives the approximate distance from the centre of the city. Three maps should be given consideration if available:

1. Map of the density of population and number of people by sections in the area.
2. Geographical contour map with contour intervals of 20 to 50 feet.
3. Map showing the type, nature and depth of the soil in the area, with special reference to the condition of the moisture throughout the year.

From these maps a site should be selected that is approximately the required distance from the city with a minimum population in the "blanket area" and with a minimum number of intervening hills between it and the centre of the city. In general, because of ground conditions, it is better to select a site in a low area rather than on top of a hill, and the only condition under which a site on top of a hill should be selected is when it is only possible by this means to avoid a substantial number of hills, with consequent field shadows, between the site and the centre of a city.

If a compromise must be made between probable field shadows from intervening hills and locating the transmitter on top of a hill, it is generally better to compromise in favour of the lower area where an efficient radiating system may be erected and take the losses due to shadows being caused by the hills if not too numerous or too high. Several transmitters have been located on top of hills, but so far as is known not a single installation has given the average efficiency of propagation and coverage.

Ideal Broadcast Transmitter Locations.

The ideal location of a broadcast transmitter is in a low area of marshy or "crawfishy" soil, or an area which is damp the maximum percentage of time and from which a straight line view over the entire centre of population may be had, and in such a direction that the tall buildings in the business section of the city would cast a shadow across the minimum residential area.

The type and condition of the soil or earth immediately around a site is very important. Important, but to a less extent, is the soil or earth between the site and the principal area to be served. Sandy soil is considered the worst type, with glacial deposits and mineral ore areas next. Alluvial, marshy areas and salt water bogs have been found to have the least absorption of the signal. One is fortunate to have available such an area, and, if not available, the next best condition must be selected.

If a site is to be selected to serve a city which is on a general sloping area, it is generally better to select a site below the city than above the city.

"Blanketing" Considerations.

Careful consideration must be given to selecting a site, so that the number of people in the "blanket area" is a minimum. The last column of the site guide table gives the percentage of the total population of the city or metropolitan area that may be permitted in the "blanket area." In general, broadcast transmitters operating with approximately the same power can be grouped in the same approximate area and thereby reduce the crosstalk interference between them.

It is an established F.C.C. policy that stations serving the same area must have a frequency separation of 50 kilocycles, and this practice is observed in practically all cases. It is presumed that owners of any radio receiving sets would have no difficulty in separating signals separated in frequency by 50 or more kilocycles when the receiver is located not in the "blanket area" of either station. This is not strictly true, however, of some old receiving sets (or any set in a poor state of repair and alignment) as such receivers may not have the capability of separating stations operating on frequencies 50 or even more kilocycles separated. This is specially true when the transmitters of the stations are so located that in certain areas there are large differences in the field intensities from each, and on the higher frequencies. If this condition could be alleviated without impairing the coverage of the stations and at the same time protect all receivers, this would be desirable.

In cases of several stations serving large cities, the principle of grouping transmitters could not be advantageously applied to all stations located in the area because generally any station has some field shadow and accordingly may not well serve certain parts of the city. Another station with the transmitter across the city would serve this area well, so that between the two they would serve all the areas well.

The ideal arrangement would be to group the transmitters of the stations operating nearest in frequency and between which there may be some possibility of crosstalk interference.

If the city is of irregular shape, it is often possible to take advantage of this in selecting a suitable location that will give a maximum coverage and at the same time maintain a minimum of people within the "blanket area." The three maps previously referred to, under the heading "Sites Outside Cities," will be of value in this respect. The map giving the density of population will be a key to this. The map giving the elevation by contours will be a key to the obstructing hills between the site and the city. The map of the soil conditions will assist in determining the efficiency of the radiating system that may be erected and the signal absorption likely to be encountered in the surrounding area.

Efficiency of Radiators.

In finally selecting the site consideration must be given to the required space for erecting an efficient radiating system. It is the general practice to use direct grounds consisting of radial buried wire system. If the area is such that it is not possible to get such a ground system in soil that remains moist throughout the year, it probably will be found better to erect a counterpoise. A counterpoise properly erected may be as efficient as the best possible ground, and, if it is not possible to secure an excellent ground the counterpoise should always be given consideration. It, like the antenna itself, must of course be designed properly for the operating frequency and other local conditions.

Field Intensity Surveys.

An independent check on the suitability of a proposed station site is always highly desirable and, whenever possible, a field intensity survey should be made to determine that the site selected will come up to expectations and meet the requirements. Often two or more sites may be selected that appear to be of equal promise. It is only by means of field intensity surveys taken with a transmitter at the different sites that it can be determined which is more desirable. There are many considerations of inefficiency that cannot be determined by any other method. An engineer with experience in selecting a site can generally do a good job by inspection, but he can never be certain without the survey.

(Continued on foot of next page.)

THE AERIAL SYSTEM
and its Effect on Coverage

CLOSELY interlinked with the transmitter site as the major factor in the determination of a station's coverage for a given power, is the radiating system employed. According to the F.C.C. of U.S.A., power is a relatively unimportant factor in the operation of a broadcasting station, and cases have been cited where a 1KW. station has radiated the same effective signal as one rated at ten times its power; due purely to the low radiation efficiency of the higher-powered station. The problems involved in site choice are dealt with elsewhere in this YEAR BOOK, and the following article is devoted solely to the question of aerial design.

THE necessity for an efficient radiating system if maximum coverage is to be realised from a broadcasting station of given power is best emphasised by quoting a few well-authenticated figures. The usual basis for comparison of the characteristics of different aerials is their "figure of merit." This is the field strength in millivolts per metre obtained at a distance of 1 kilometre (about five-eighths of a mile) from an aerial when it is fed with 1 kilowatt of power.

In order to establish a standard of relativity, the "figure of merit" for a low (below one-quarter wavelength in height) vertical aerial is usually cited. Providing that a first-class earth system is employed and the soil conductivity is good, the "figure of merit" for an aerial such as this will be 300 mV./m. As a contrast to this, the "figure of merit" for a vertical radiator with a height equal to five-eighths of its operating wavelength is 440 mV./m. This value is nearly 50% greater than that for the "comparison" aerial, and is equivalent to a power increase of somewhat over 100%. This improvement is due to aerial height alone, and when the other possible variables (such as soil conductivity and earthing system characteristics) are taken into account, it is quite easy to see how the ten-to-one power ratio cited in the introduction to this article could arise.

The question of aerial system efficiency is regarded so seriously in U.S.A. that the opening paragraph of Rule 131 of the F.C.C. Regulations governing broadcasting reads:—

> **"All applicants for new additional, or different broadcast facilities and all licensees requesting authority to move the location of the station shall specify a radiating system the efficiency of which complies with the requirements of good engineering practice for the class and power of the station."**

This Rule has been elaborated upon in some explanatory notes issued by the F.C.C., and it will be of interest to quote portion of these notes:—

> "It is the obligation of the licensee of every station to make efficient usage of the assignment granted by the Commission. It is not the in-

(Continued overleaf.)

Choosing Your Station Site

(Continued.)

The field survey should prove the following things:

1. A minimum field intensity of 10 to 25 millivolts per meter will be obtained over the business area of the city.
2. A minimum field intensity of at least 2 to 5 millivolts per meter will be obtained over the residential section.
3. The absorption of the signal is the minimum of any obtainable sites in the area. As a guide in this respect the absorption of the signals from other stations in that area should be followed as well as the results of tests on other sites.
4. The field intensity at the outer limit of the blanket radius does not exceed 100 to 125 millivolts per meter.

In the absence of field surveys, the average conditions are presumed to prevail. If a compromise must be made between sandy soil, high elevations, and intervening territory, a field intensity survey should be made from several sites.

In conclusion, let it be said that there are now many stations licensed to operate with specific powers which could undoubtedly gain a better coverage of their primary areas by selecting more suitable sites and erecting efficient radiating systems than could be obtained by a one or two step increase in power. As commercial surveys become more popular this fact will become evident throughout the industry.

In making the final determination of a site, it is impossible to stress too much the need for a field intensity survey to establish the exact conditions and the consideration of the results with the field intensities considered in comparison not only with other sites in the same area but with other existing stations in the same and other areas. The selection of a proper site for a broadcast station is an important engineering problem and can only be done properly by experienced radio engineers.

GUIDE FOR DETERMINING STATION SITES

Power of Station	Population of City or Metropolitan Area	Radius of "Blanket Area" 100 to 125 MV/M	Site Distance from Centre of City (Business or Geographical)	Maximum Percentage of Total Population in "Blanket Area"
50-100 w.	5,000-50,000	0.3 to 0.4 mile	½ to 2 miles or centre	0.50
50-100 w.	75,000 and up	0.3 to 0.4 mile	of business section	...
250-500 w.	5,000-150,000	0.6 to 0.9 mile	1 to 3 miles or centre	0.75
250-500 w.	200,000 and up	0.6 to 0.9 mile	of business section	...
1,000 w.	5,000-200,000	1.25 miles	2 to 5 miles or centre	0.75
1,000 w.	250,000 and up	1.25 miles	of business section	...
5-10 kw.	All	2.7 to 3.75 miles	7.5 to 10 miles	1.0
25-50 kw.	All	4.5 to 6.0 miles	12.0 to 20 miles	1.0

The Aerial System and its Effect on Coverage

(Continued from Page 133.)

tention of the Commission at this time to require all stations with questionable radiating systems to install antennas having the required efficiency, but it is the intention not to grant additional facilities to licencees of broadcast stations unless they are making efficient usage of the assignment already granted. That is, the licensee of a broadcast station requesting more power, change in time of operation, different frequency, or move of the transmitter, must have an antenna for the assignment requested that meets with the minimum requirements before favourable consideration will be given."

Further to the above, the Commission issued a graph showing the minimum aerial heights which would be permitted for new assignments or should extensions of facilities be requested. This graph is reproduced herewith as Fig. 1, and it will be noted that although an alternative is available, this alternative is fairly stringent and could not be realised by an aerial system lower in height than that indicated, except in cases where propagation conditions are practically ideal. We reproduce the F.C.C.'s explanatory notes on the graph as a further indication of the official American viewpoint on aerial system efficiency:—

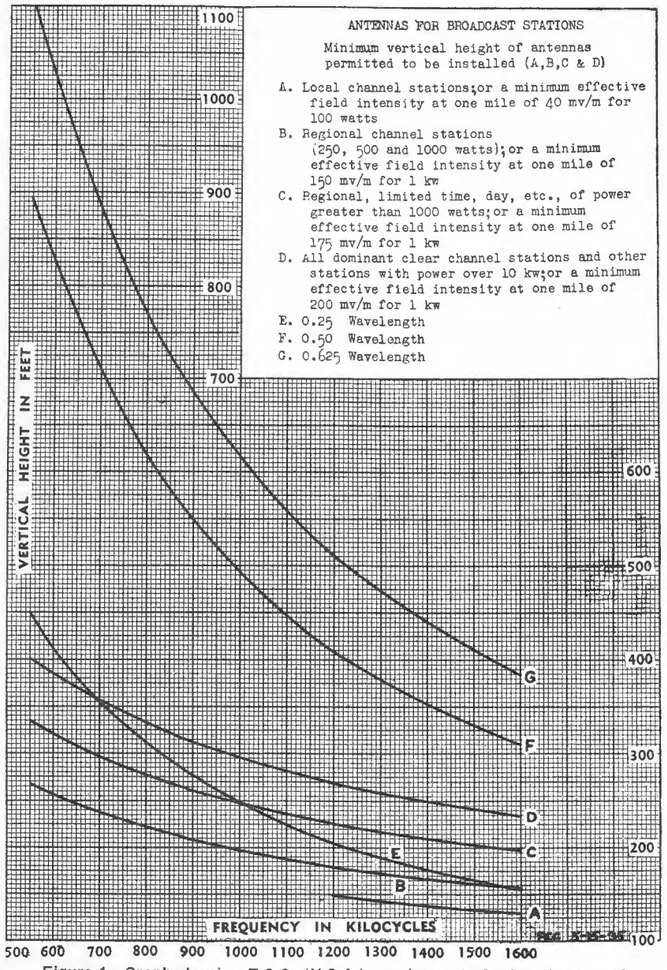


Figure 1. Graph showing F.C.C. (U.S.A.) requirements for broadcast station aerial systems. Curves A, B, C, and D are fully covered in the text. Curves E, F, and G show the actual height of vertical radiators for the wavelength ratios indicated over the broadcast band, and are included for reference and comparison purposes only.
Advice received after this data had been prepared indicates that this graph has been superseded by more stringent requirements. A new graph, based on the latest F.C.C. Ruling, will be found on Page 138.

"The minimum actual physical vertical heights of antennas permitted to be installed are shown by curves A, B, C and D of Fig. 1 as follow:—

A—Local Channel Stations, 100 watts night and day or 100 watts night and 250 watts day; or a minimum effective field intensity at one mile of 40 mV./m. for 100 watts.

B—Regional Chanel, limited time. day, etc., stations 250 watts to 1,000 watts night and day; or a minimum effective field intensity at one mile of 175 mV./m for one kilowatt.

C—All stations other than Dominant Clear Channel Stations having an operating power night or day greater than 1 kilowatt and less than 25 kilowatts; or a minimum effective field intensity at 1 mile of 175 mV./m. for one kilowatt.

D—All Dominant Clear Channel Stations and all other stations having a maximum operating power night or day of over 10 kilowatts; or a minimum effective field intensity at 1 mile of 200 mV./m. for 1 kilowatt.

"The heights given on the graph for the antenna apply regardless of whether the antenna is located on the ground or on a building. Except for the reduction of shadows locating the antenna on a building does not necessarily increase the efficiency. In applying these curves the maximum operating power shall determine which curve is applicable.

"In case it is contended that the required antenna efficiency can be obtained without antennas of the height specified, a complete field intensity survey must be supplied to the Commission showing that the field intencity at a mile without attenuation fulfills at least the minimum requirements. This field survey must be made by a qualified engineer using equipment of acceptable accuracy.

"To obtain the maximum efficiency of which any antenna is capable, a good ground or counterpoise system must be employed.

"At the present state of the art, it appears that where a vertical radiator is employed the ground system should consist of radial wires at least one-quarter wavelength long. There should be as many of these radials as practicable and in no event less than 70. These wires should be buried only deep enough to provide mechanical

The Aerial System and its Effect on Coverage

(Continued.)

protection (not greater than 12 inches). However, they should not be permitted to rest on the surface.

"In many cases a counterpoise or combination counterpoise and ground system may be superior to a ground., especially where a good ground cannot be obtained.

"It should be borne in mind that the above specifications are the minimum and where possible better antenna and ground systems should be installed."

Further light on the relationship between aerial height and signal strength is given by the curve shown in Fig. 2. This curve appeared in an article by N. Wells, of the English Marconi Co., and, while it may not be accurate under all circumstances, it does at least demonstrate that substantial gains in signal strength may be obtained merely by increasing aerial height.

The Problem of Fading.

While the above data establish the necessity for an effective aerial system, they do not take into account the important question of fading. Fading is caused by the interference between the normal horizontal, or ground, wave radiated by an aerial and the indirect, or sky, radiation which is reflected back to earth by the ionised regions in the upper atmosphere.

It is generally recognised that the most troublesome waves in this respect are those radiated from an aerial at angles of 45 degrees or more from the horizontal, as these come back to earth at points well before the ground wave is fully attenuated. It follows from this that the most desirable aerial system is one which confines its radiation to angles less than 45 degrees from the horizontal, and experience shows that here again height is the important factor if fading-free reception at points within the ground-wave (primary) coverage is desired. The set of curves shown in the three sections of Fig. 3 is of interest in this respect, and it can be seen that the optimum aerial height, from an anti-fading viewpoint, is somewhere between half and five-eighths of a wavelength. As far as purely horizontal radiation goes, the five-eighth wavelength aerial appears to be ideal as the bulk of the radiation is restricted to angles below 30 degrees from the horizontal. Unfortunately, however, a secondary loop is developed between 50 and 70 degrees, and this results in fairly pronounced short distance fading. (When reading the curves in Fig. 3 it should be noted that the diagonal lines shown are calibrated in degrees from vertical, and these calibrations must be transposed into degrees from horizontal if a comparison such as the one we have just cited is required.)

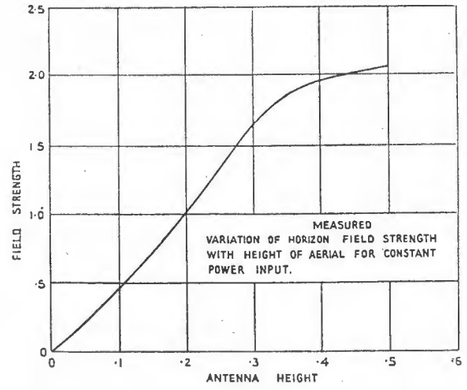


Figure 2. This curve demonstrates the advantages of extra aerial height very clearly. Over 0.4 wavelength the increase in signal strength is gradual, but prior to this point, the relationship between height and signal strength is very nearly linear.

Actual practice has shown that the best aerial height for reduction of fading is very close to 0.56 of the operating wavelength. An aerial of this height naturally has a somewhat lower "figure of merit" than one of optimum "field strength" height (0.625 wavelength, which was previously cited as having a merit figure of 440 mV./m.) and tests have indicated that this figure for an 0.56 wavelength aerial is somewhere around 410 mV./m. Even this is equivalent to a power increase of nearly 90 per cent. when compared to the radiation from a low vertical aerial, and constitutes an even greater effective gain when the anti-fading properties are considered.

"Capacity-top" Aerials.

Although the case for a vertical aerial something over a half-wavelength in height appears to be fairly well established, it is an unfortunate fact that the ever-present problem of economics will usually prevent the erection of such an aerial, however desirable it might be. A little calculation will soon show that an 0.56 wavelength aerial for operation at 1,000 KC. will have a physical height of very nearly 550 feet and the cost of such a structure would be considerable.

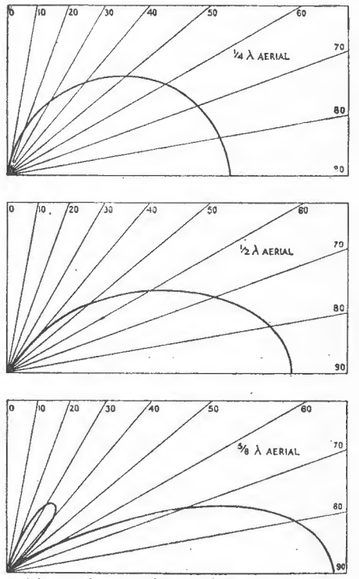


Figure 3. Further weight is added by these curves to the case for increased aerial height. The significance of these curves is fully described in the text.

This factor has led to the concentration of attention on means for increasing the electrical height of aerial systems and research has shown that the vertical radiation characteristics of an 0.56 wavelength aerial can be realised with an aerial having a physical height of only 0.25 wavelength. This is done by insulating sections of the structure and inserting reactive loading, but unfortunately the losses in such an arrangement are fairly high—experimental results indicating that about 30 per cent. of the power fed to the aerial would be wasted in the loading arrangement.

A compromise is possible, however, and engineers of the Australian P.M.G.'s Department have demonstrated that 0.56 wavelength aerial characteristics can be duplicated in a structure with a physical height of only 0.36 wavelength, and that the power loss in such an arrangement is under five per cent. This is quite a noteworthy achievement, as it means a reduction of nearly 200 feet in the physical height of the 1,000 KC. aerial referred to previously. Aerial systems of this type are now being

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used by at least four Australian national stations, and others are in course of erection.

In the above instance, the compromise between economic aerial height and efficiency was effected with very little loss in efficiency, and none in radiation characteristics. However, a physical height of 0.36 wavelength is not always economically practicable and a further compromise must be attempted.

It has been pointed out that a quarter-wavelength aerial can be constructed which has the same radiation characteristics as a structure with the optimum height of 0.56 wavelength, but only at the expense of power efficiency. As the utmost in power efficiency must be realised in order to deliver maximum service to listeners in the area between the station and its normal fading zone (primary coverage area), it follows that no loss of power can be tolerated. The alternative, then, is to discover some means whereby maximum power efficiency can be realised from an 0.25 wavelength aerial, while still retaining a better vertical radiation characteristic than a plain 0.25 wavelength system.

This can be done and the means usually employed for doing it is known as the "folded top" (sometimes known as "inverted quarter-wave") aerial system. This type of aerial requires two masts for its erection, each of which must be slightly over a quarter-wavelength high. Between these two masts a wire, insulated at each end, is strung and from the centre of this wire a vertical wire to act as aerial is suspended. The aerial is electrically connected to the flat-top but, as long as the two halves of the flat-top are each less than a quarter-wavelength in length, the major part (all, in a perfect case) of the radiation is from the vertical section. The two halves of the flat-top provide inductive and capacitive loading and so modify the radiation characteristics of the vertical quarter-wave aerial that an "anti-fading" characteristic little inferior to that of a half-wave aerial system, is achieved. (In actual practice, the vertical radiation characteristic is about midway between those plotted for quarter and half-wave aerials in Fig. 3.) Such an aerial system has a high power efficiency, and its improved vertical radiation characteristic has quite a marked effect on reception at points which would be in the fading zone of a plain quarter-wavelength system.

At some frequencies in the broadcast band it is impossible to obtain the required amount of inductance and capacity by means of a simple flat-top without exceeding the quarter-wavelength limitation for each leg. In such a case, the two halves of the flat-top are folded back on themselves and the desired effect is obtained; this expedient is also useful where restricted space between masts is available and even the normal quarter-wavelength limitation cannot be achieved.

Although, in theory, the operation of a "folded-top" or "inverted quarter-wavelength" aerial is identical with that of a self-radiating mast with a small percentage of loading inserted near its top, the erection of the two-mast type is usually much simpler and is less expensive. Although a height of one-quarter wavelength was specified in the above description of the folded-top aerial, this height can be increased, with a resultant improvement in radiation characteristics. However, it will usually be found that if the erection of a folded-top aerial much more than a quarter-wavelength in height is attempted, the cost of the two masts will be greater than that of a single self-radiating structure with a loaded top. As it happens, this ties in very well with the fact that a self-radiating structure 0.36 wavelength in height can be loaded to give 0.56 wavelength results with very little loss of efficiency.

From the above details it would appear, then, that for physical heights up to about 0.3 wavelength the two-mast folded-top type of aerial has much to commend it, while if economic factors permit an increase over this height it is just as well to use an 0.36 wavelength self-radiating structure with a loaded top.

Directional Aerials.

The aerial systems so far dealt with have been substantially omnidirectional in their ground-wave radiation patterns. It is a moot point as to whether an omnidirectional pattern is always desirable—it is when the station is located at a point which is fairly central with relation to the population of the district it is intended to serve, but in any other location the question of ground-wave radiation pattern bears close examination.

Many examples of "off-centre" locations are to be found among the broadcasting stations in Australia, and it would appear that the service rendered by these stations could be improved materially by scientific treatment of their ground-wave radiation patterns.

An example which will tend to clarify the position in this respect is found in the case of a station located a short distance from a coastline. In such a case, it is quite obvious that if an omnidirectional aerial system is employed at least half the power radiated will be wasted over the ocean. While it might be very nice to provide programmes for ships at sea, the population density in those quarters is not particularly high and what there is of it doesn't help programme sponsors much. For a location on the coastline, it is quite a simple matter to devise a directional aerial system which will augment the land signal at the expense of that previously being wasted at sea.

The Aerial System and its Effect on Coverage

(Continued.)

So far as is known, only one Australian broadcasting station is taking advantage of the properties of a direc tional aerial system, but in U.S.A., such systems are becoming increasingly common practice—so much so, in fact, that the F.C.C. is ordering their use by many applicants for increased power and other extensions of facilities. Careful study of F.C.C. Rule 131 and its explanatory notes, as quoted previously, will show that such a requirement is adequately covered.

In addition to its unquestioned power conserving properties, the directional aerial system has another advantage in that it can be arranged to minimise interference between stations. For example, if two stations on nearby frequencies are so placed geographically that they just avoid creating serious mutual interference, it is obvious that an increase in the power of either will cause that interference which has previously been avoided. Frequently, however, it is necessary to increase the power of one station in order to improve its service in portions of its coverage area which do not lie in the general direction of the adjacent station. One way out of the difficulty is, of course, a change of operating frequency, but if this is impossible (or inconvenient) a directional aerial system is the ideal solution. The characteristics of this can be so arranged that the field strength in the "unwanted" direction is the same as it was prior to the power increase, while that in other directions is augmented to a level somewhat in excess of that due to increased power alone.

A first-class American example, which will serve as an illustration of the point made in the preceding paragraph, is provided by the case of Station WJAR in Providence, R.I. This station was operating on 500 watts with a normal aerial system in the heart of the city. However, the arrangement was not providing adequate coverage of two neighbouring towns—Woonsocket and Fall River, distant only 12 and 15 miles away, respectively. Plans were therefore made to shift the transmitter to a more favourable site on the outskirts of Providence, and to erect a half-wave vertical radiator. This would have enabled the desired coverage to be obtained, but, unfortunately, a radiator 600 feet high would have been necessary. Neighbouring commercial airways made a structure of this height undesirable, and it became necessary to restrict the height of the proposed radiator to 320 feet —slightly over a quarter wavelength for WJAR's frequency. This brought matters back to very nearly their original state, because the coverage improvement by the change of site alone was not sufficient.

The next alternative was an increase in power, which would have settled the difficulty nicely, but this also was impracticable under normal circumstances because of the interference which would result with a station in Fairmount, West Virginia. This interference would be of the "sky wave" type, and would not be present if it were possible to obtain the required coverage by erecting a half-wavelength radiator (as originally projected), due to the fact that a half-wave radiator improves the ground-wave coverage and diminishes the upper angle radiation. This point is illustrated in Fig. 3 and its accompanying text.

Eventually it was decided to erect a directional aerial system giving an oval radiation pattern. As it happened, in this case, the two towns where extra coverage was required lay in a line at right angles to the direction of the West Virginian station. By directing the radiation along the line between the two poorly-covered towns it became possible to cover them with a stronger signal, while still retaining a signal at the original level in the "unwanted" direction.

Plans for an installation along these lines were submitted to the F.C.C. and a construction permit for higher power was issued. The type of aerial system erected and its effect on the radiation pattern is shown in Figs. 4 and 5. As can be seen from Fig. 4, three aerials are used, a vertical wire suspended between the two insulated towers forming the third.

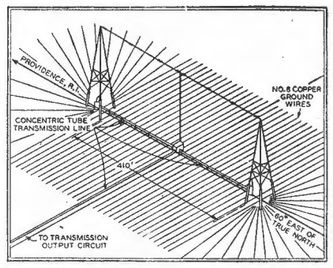


Figure 4. This shows the directional aerial system employed at WJAR to achieve the pattern shown in Figure 5.

The effect on the radiation pattern is shown in Fig. 5, and is most interesting. The circle drawn in dashes shows the pattern obtained with 500 watts using a normal single aerial, while the dotted circle shows the 1,000 watt pattern under similar conditions. The solid line oval shows the pattern with the directional

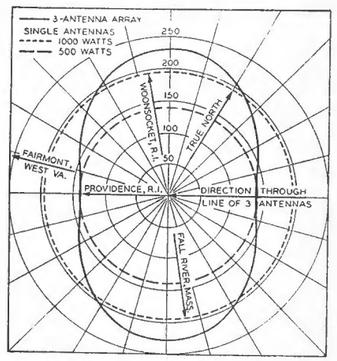


Figure 5. The directional radiation pattern at WJAR, compared with patterns obtained from single aerial at two different powers.

system. As can be seen, the signal strength in the "unwanted" direction is exactly the same as if 500 watts were being fed to a single aerial, while the signal in the "wanted" direction is actually stronger than could be obtained with 1,000 watts and a single radiator. Tests indicated that the actual signal in the "wanted" direction is equal to that which would be obtained from 1,400 watts if a single aerial were used.

The conditions described above are exactly the same as those applying in many Australian stations. In some cases, the station in West Virginia is replaced by the sea, where coverage is not wanted; in other cases, the station on the same frequency is there. Whatever the circumstances, it is abundantly evident that good use can be made, in very many instances, of a radiator system which concentrates the signal from a station on the areas where it will do most good.

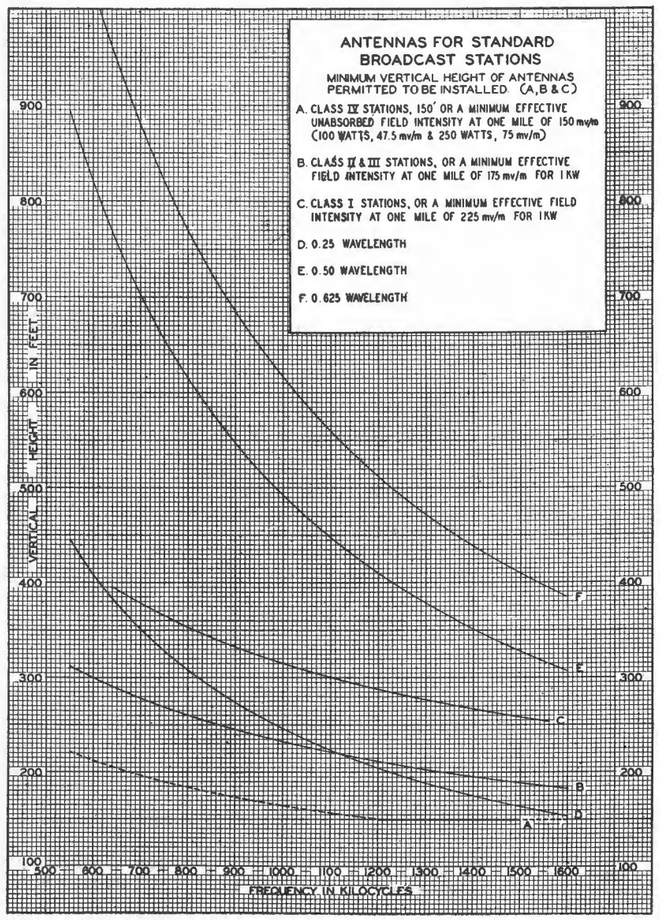
Minimum Heights for Broadcast Radiators

New F.C.C. Ruling from U.S.A.

TO hand from U.S.A. is a copy of the latest F.C.C. Ruling regarding minimum heights for broadcast station radiators. The information available is incorporated in the graph presented herewith.

This information arrived after the article on aerial design had gone to press and as the new Ruling shows a decided "tightening-up" of the F.C.C.'s requirements, it was decided to leave the original article exactly as it stood, and append this new material in order to permit of direct comparison between the two sets of data. A comparison of the two graphs is most instructive, as it shows how the requirements in U.S.A. have been tightened up since the earlier graph was compiled. Also of interest, although not included in the graph, is the fact that the previously recommended earthing system (70 radials, each 0.25 wavelength long) is no longer considered adequate. The new Ruling states that "the number of earth radials desirable is 120, each 0.25 wavelength long."

It is difficult to imagine that any Australian broadcast station licensee will disregard this new American ruling on radiator heights and earthing systems. The increase in effective coverage which can be obtained by proper attention to a station's radiating system is too pronounced for the matter to be treated as being of merely general interest, and it is perhaps not being unduly prophetic to regard the release of these new American requirements as being something in the nature of "the writing on the wall" as far as Australia is concerned.



For the benefit of those who may be inclined to doubt the advantages of a more efficient radiating system, the following figures, from an unimpeachable engineering source, will be of interest:—

(a) Assume a 100 watt station operating on 1,400 KC.'s to have an aerial height of 95 feet, and a reasonably efficient earth system; then the field strength at one mile should be approximately 47.5 mV/m. If now, the aerial is increased to 166 feet, the field at one mile should be approximately 60 mV/m., i.e., the same as might be expected, when using the 95 feet radiator, but with a power input of about 175 watts;

(b) Assume a 500 watt station operating on 1,000 KC.'s to have an aerial 120 feet high, then the field strength at one mile should be approximately 100 mV/m. By increasing the aerial height, to say 250 feet, the field strength at one mile should be increased to approximately 130 mV/m., i.e., the field to be expected from the same station, operating on 850 watts. using the lower radiator.

The importance of a good radiator is, therefore, quite evident, and those licensees who have not already realised the possibilities in this direction, will doubtless take steps to increase the efficiency of the radiating systems of their stations in the very near future.

MONITORING FOR PEAK EFFICIENCY

THE final factor to be taken into consideration when endeavouring to realise optimum broadcast transmitter efficiency is the monitoring, or level adjustment, of the programme itself. This factor ranks in importance equally as high as the transmitter location and radiating system—both of which have been dealt with fairly exhaustively in articles appearing elsewhere in this Year Book—because careless or unskilful monitoring can nullify the best efforts of any transmitter installation engineer.

Until recently, programme monitoring has been purely a manual operation—something which had to be left to the tender mercies of the control operator—with the result that no degree of uniformity could be achieved even by one station. Recently, however, methods have been developed which enable some of the load to be taken from the control operator's shoulders and a generally more effective job to be done. The following article deals with the effect of inefficient monitoring on station coverage and outlines the means whereby some of the present deficiencies can be overcome and greater overall station efficiency—and coverage—realised.

FOR many years, a major problem in radio broadcasting has been how to utilise as effectively as possible the available power of a broadcasting station so as to render the best service to the maximum number of listeners. Although improvements to the radiating system employed at the transmitter and the choice of a suitable location for the transmitter will ensure that the station's carrier wave will cover the maximum possible area, this carrier wave is inaudible on a normal broadcast receiver until it is modulated by programme material of some kind. It follows from this, then, that the strength of the signal heard by the listener is a direct function of the modulation level, providing, of course, that the carrier wave intensity is kept constant. In other words—if a station operating from a given location with a given transmitter and radiating system wishes to increase its signal strength it must modulate its programme matter at a higher level.

This procedure sounds simple enough, but, in practice, it is somewhat more involved than the statement "increase the modulation level" would seem to indicate. This is because broadcast programme material does not consist of equal intensity sounds. Instead, it consists of sounds which vary over an extremely wide range of loudness and, furthermore, this loudness range must be adhered to fairly closely if the eventual reproduction by the receiver is to sound anything like the original. Actually, of course, it is not possible to adhere exactly to the original sound intensity relationships, even on one particular item of material—disregarding the variation which exists normally between the sound intensity from a speaker and that from a brass band or symphony orchestra—because the acoustic power variations in a "heavy" orchestral selection (to cite one example) may extend over a range of one million to one (60 decibels). Even the best broadcast transmitters can barely handle a power range such as this, while the average transmitter cannot come within 10 db. of it. Furthermore, even if the full volume range encountered in the original programme matter was radiated, it would be wasted because the average broadcast receiver cannot reproduce power variations greater than about 1,000—1 (30 decibels), so that whatever happens the programme material must be distorted (from a volume range viewpoint) before transmission.

This essential distortion of the programme volume range is one of the functions of the control operator. In addition, he must judge the **average** volume level of the programme and feed this to the transmitter at such an electrical level that volume peaks in the programme do not overmodulate the transmitter and soft passages still remain audible to the listener (who has, besides the limitations of his receiver, a prevailing noise or static level to contend with).

From the above sketchy outline of the problems to be contended with before a programme can be radiated, it should be quite obvious why the modulation level of a transmitter cannot be easily raised. In practice, of course, the average modulation level of a transmitter is continually shifting in accordance with the type of material being broadcast, but it will usually be found extremely difficult for the control operator to keep the average modulation level uniformly high and still retain some semblance of volume range in the radiated programme. This last item is quite important, especially when "good" music is being broadcast, as most of the beauty of an orchestral rendition is lost if the muted strains of a violin are reproduced at a level not far below that of the entire orchestra on a fortissimo passage.

An analysis of the problem reveals that most of the difficulty lies in the high, instantaneous peaks which are encountered in all forms of music. It is a fairly simple matter for the control operator to bring up the low passages when necessary or to let them look after themselves, by adjusting the average level so that almost any sound in the studio is reproduced at an audible level by the receiver—in any case, the energy ratio between the softest passages encountered and the average level of the same selection is comparatively small and rarely requires much adjustment.

On the other hand, the energy ratio between peaks and the average level is considerable and a large amount of "gain riding" is necessary to keep this ratio within the limits permissible. Furthermore, most of these peaks are of such short duration that unless the control operator has been present at a rehearsal, or is familiar with the musical score, he is unable to lower the gain rapidly enough to avoid overmodulation. The effects of overmodulation—carrier shift, distortion, adjacent channel interference—are so serious that, in order to avoid it as much as possible, the average modulation level is kept considerably below where it should be for highest efficiency and greatest coverage. This applies under nearly all conditions, the degree of undermodulation depending largely on the complexity of the programme material.

Overseas investigations into the degree of undermodulation—and resultant loss of station coverage—resulting from the inherent difficulty of manually monitoring the level of a programme revealed some rather startling facts. To summarise, these showed that the average modulation level of a number of stations varied between 2 db. and 7 db. below what might be termed the optimum level. Translating these figures into terms of relative power, they mean that stations were virtually wasting from one-

Monitoring for Peak Efficiency *(continued)*

third to four-fifths of their available power.

An investigation into the prime cause of this enormous power wastage was then commenced and the results of this provided still more food for thought, because it was found that the high-intensity instantaneous peaks occupied only about one per cent. of the total duration of a given musical item. This finding was confirmed by a number of tests on various types of programme matter, and proved conclusively why even the most skilful control operator had to set the average modulation level low in order to avoid "cracking the carrier" when these peaks occurred. A little thought will show why this is so because if the aggregate peak duration is only one per cent. of the total "playing" time, the time taken by **one** peak is so small that it cannot be followed manually.

At this point it might be asked why there is any need to worry about the peaks if they are of such short duration. The reason why is that although the peak itself takes an almost negligible amount of time, its effects, once it breaks the carrier wave, last many times longer—so much so, in fact, that if a number of peaks occur fairly close together their after-effects may merge and give the same effect as a sustained period of over-modulation.

Having determined the nature and duration of the peaks which had been causing control operators so much trouble and station owners to lose valuable coverage, the investigators then turned their attention to the problem of devising some means whereby these peaks could be rendered innocuous. Some automatic form of volume range compression was the obvious way out of the difficulty, but even this presented its own particular problems because such a system would tend to bring all sounds **down** to the same level as that of lowest intensity. This was obviously undesirable, as normal monitoring practice requires soft sounds to be brought **up** in level as well as the loud ones to be brought **down.**

Equipment could be designed to do this but it could not be designed to perform the other functions of the monitor—that is, to adjust to average level to suit widely-varying types of programme material and to select the desired output from a number of pick-up points—so that, whatever happened, the control operator could not be dispensed with. This meant that the most desirable form for the equipment to take was as a device to supplement the efforts of the control operator on peaks only. As a result, the "Peak Limiter" or "Limiting Amplifier" made its appearance.

The peak limiter, which is rapidly becoming a standard item of equipment in American broadcasting stations, is purely and simply a delayed volume compressor system. This is inserted in the regular speech amplifier chain and is so arranged that the modulation characteristics of the transmitter remain unchanged until volume levels equivalent to about 80 per cent. modulation are reached. The limiter then commences operation and progressively attenuates the high-level signals; the degree of attenuation being dependent on the amount by which the peak exceeds the predetermined (80 per cent.) level.

The first commercial "limiter" system to be introduced to the American market was the Western Electric type 110A programme amplifier, and an outline of the characteristics of this item of equipment will provide an excellent illustration of the effectiveness of such devices.

A simplified circuit diagram of the W.E. 110A programme amplifier is shown in Fig. 1. As can be seen, the arrangement is very similar to that of a conventional line amplifier, the difference lying in the volume control network and its associated rectifier system. An additional feature, obtained as a by-product, of the limiter system, is the "flashing lamp" indicator. This consists of a miniature lamp wired in the plate circuit of a gas-filled relay valve (type 885 or similar), the grid of which is connected to the limiter network in such a manner that peaks equal to 100 per cent. modulation, or more, "trigger" the valve and allow sufficient plate current to flow to light the lamp. This feature is extremely useful as it provides an ever-present reminder for the control operator if he gets tired and relies on the limiter to do all the work.

The operation of the system is quite simple. Portion of the signal voltage is tapped off from the amplifier at a point **after** the volume control network and fed through an independent single stage amplifier to a delayed rectifier. The delay, or bias, voltage on the rectifier is so arranged that no rectification can take place until sufficient signal voltage is present at the output of the complete amplifier to drive the transmitter to a modulation depth of 80 per cent. Until this point is reached the volume control network merely passes the signal on without attenuation and, consequently, the system functions as a normal line amplifier.

Once the peak voltage available exceeds the delay point the position is entirely altered. The rectifier starts to pass current and voltage is developed across the resistor "R" and fed to the grid of the D.C. amplifier. This amplifier is, strictly speaking, portion of the volume control network as its plate current provides the polarising voltage upon which the operation of the network depends.

The network proper consists of a bridge arrangement of special resistors (known as "varistors") which can be varied in value by placing a D.C. polarising voltage across them. This network is so adjusted that when the normal static plate current of the D.C. amplifier is flowing, no attenuation is provided by the network. When voltage from the rectifier is supplied to the D.C. amplifier grid, the plate current of the amplifier changes and with it the balance of the bridge network. As a result, attenuation is introduced and the signal output from the amplifier is reduced. This automatically reduces the voltage supplied to the biased rectifier system and allows the volume control network to

(Continued on Page 142.)

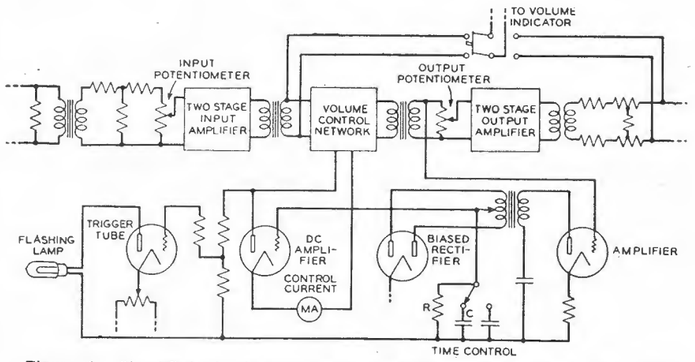


Figure 1. Simplified circuit arrangement of the Western Electric type 110A peak limiting programme amplifier.

Monitoring for Peak Efficiency *(continued)*

resume its normal balance until another peak comes along.

It should be apparent from the above details that the time constant of the system plays an extremely important part in its operation. Since the primary purpose of the device is to prevent overmodulation by programme peaks, the time required for the volume control network to operate must be sufficiently short to permit these peaks to be materially reduced. On the other hand, it must not be so short that the sudden stoppage in signal growth becomes noticeable to those listening to the programme. In addition, the time required for the control network to come back to normal must be made long enough so that its operation will not follow cyclic variations in the programme at the lowest frequencies which it is desired to transmit, and short enough so that there will be no noticeable growth in background noise as the programme circuit gain is restored during the silent period immediately following a crescendo.

As a result of the above factors, it is obvious that the selection of constants for the time-control circuit must be a compromise. In the 110A programme amplifier, two alternative time-constants are provided, either of which may be selected at will. On the first position, 20 milliseconds (0.02 sec.) are required for the network to operate and 250 milliseconds (0.25 sec.) for it to return to normal. On the second position, these figures are halved, the figures being 0.01 sec. and 0.125 sec., respectively.

The performance of the W.E. 110A programme amplifier is rather interesting. As mentioned previously, operation is linear up to a modulation depth of 80 per cent. At this point, a level increase of 2 db. would normally be sufficient to raise the modulation depth to 100 per cent.; instead, the limiting action introduced is such that a 2db. increase in level only raises the modulation depth to 90 per cent. and a total level increase of 5 db. is required to fully modulate the transmitter. This 5 db. rise would normally result in the transmitter being overmodulated by about 40 per cent., so that the value of the limiting circuit can readily be appreciated. A further point of interest is that the limiting action becomes relatively more pronounced as the amplitude of the programme peaks increases and, finally, no peak, no matter how high, can modulate the transmitter to a greater depth than 108 per cent.

Even if the limiting amplifier possessed no other advantage than that of practically eliminating the possibility of overmodulation, its use would be more than justified, but a little thought will indicate that it provides another feature which is, if anything, even more valuable. We refer, of course, to the increase in average modulation level which becomes possible.

Reference back to the general characteristics of the 110A programme amplifier will show why this is so. It was pointed out that the limiting characteristics of this equipment are such that a 5 db. increase in level is required to raise the modulation depth from 80 per cent. to 100 per cent. Normally, only 2 db. is required to do this, which means that a loss of 3 db. is present. As the characteristics of the transmitter proper remain constant whether the limiter is in use or not, it follows that the modulating signal level required for 100 per cent. modulation is the same in each case.

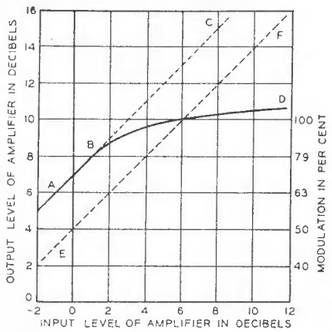


Figure 2. Input/Output characteristic of the W.E. 110A programme amplifier. These curves, which are fully described in the text, show clearly how a peak limiting amplifier doubles the effective power output of a station.

But 3 db. loss is inserted by the limiter between the 80 per cent. and 100 per cent. levels, which means that the level must be 3 db. higher than normal up to 80 per cent. modulation in order to provide for this loss. This is made quite clear by the curves in Fig. 2, where the dotted line EF represents the characteristics of a normal amplifier and the curved solid line ABD represents the characteristics of the limiting amplifier. As can be seen, a given input to the limiting amplifier results in a higher modulaton percentage, at all depths up to 80 per cent., than would be obtained from the normal amplifier. At 80 per cent., the limiting network commences to operate and from then on to 100 per cent. modulation the curve tapers off until the same input is required to each amplifier in order to fully modulate the transmitter.

The extra gain required to provide this increase in modulation depth at levels up to 80 per cent. is provided by the limiting amplifier itself so that no alteration to either studio equipment or transmitter is necessary. The limiting amplifier is merely installed at the transmitter house instead of the usual line amplifier and the 3 db. gain in average modulation level automatically results. The importance of this 3 db. gain in average modulation level will be appreciated when it is remembered that an increase of this order means that the sideband power being radiated is **doubled.** This in turn means that the **effective** power of the station using the limiter is doubled, and its effective coverage is improved considerably—in some cases, the useful service area will be more than doubled.

The Western Electric type of limiting amplifier was described above because this type represents the original attempt at logical treatment of the modulation level problem. This equipment has proved extremely effective in practice and is enjoying widespread popularity in the United States. Other types of limiting amplifier (notably the R.C.A. and Gates products) have been introduced which use a valve network instead of the polarised resistance arrangement employed by W.E. These also have proved to be extremely effective in operation and by way of providing a little practical assistance for those Australian broadcast station engineers who would like to try the effect of a limiter system on their own stations, we present some details of a limiting amplifier which will provide an excellent basis for experimentation.

The circuit arrangement is shown in Fig. 3 and is a fairly conventional speech amplifier system capable of supplying sufficient power to drive the grids of a pair of Class B operated 50-watt modulators.

The first valve in the amplifier is purely a voltage amplifier and can be omitted if the system is to be employed as a line amplifier. The second valve is more important as this acts as a phase inverter for the push-pull stage which follows: Providing care is taken to avoid stray magnetic fields the circuit arrangement of this stage can be altered to use a normal centre-tapped transformer for coupling to the push-pull 6J7 grids.

The next stage is the limiter stage. This uses a pair of 6J7 valves wired normally except for their suppressor grids—these are paralleled and taken to the rectifier network. At levels below the point at which the limiting action begins, the suppressors of the 6J7's are at ground potential and only slightly negative with respect to the 6J7 cathodes. As soon as current is passed by the 6H6 rectifier, voltage is developed across the resistor R22, the suppressors are made more negative, and the gain of the push-pull stage is reduced accordingly.

Monitoring for Peak Efficiency *(continued)*

Following the limiter stage is a pair of 2A3 triodes in Class AB1 push-pull. These feed a transformer (T3) which should be chosen to match the circuit into which the amplifier is working and to present a plate-to-plate load of 5,000 ohms to the 2A3's.

The secondary of this transformer is shunted by the primary of another transformer (T2) which serves the 6H6 diode rectifier. The secondary of the diode transformer must be centre-tapped and its ratio should be 1.5 to 1 (primary to whole secondary) if the 2A3 coupling transformer is feeding the grids of a Class "B" modulator. If the secondary load of T3 (the 2A3 output transformer) is a 200 or 600 ohms line, a step-up ratio will be required for T2; the exact ratio will have to be determined by experiment, but 1 to 5 (primary to whole secondary) will be a good ratio to start with.

The type 6H6 diode rectifier fed by T2 is wired in a fairly conventional delayed circuit. Delay bias for the cathode is provided by the voltage divider R23, R24 and the slider on the latter enables any desired adjustment to be made. The diode load resistor is R22 and the value of this, together with its shunt condenser C14, provides the necessary time control. The values given result in a time constant which will meet most requirements but should faster operation be required the value of C14 may be reduced.

To adjust the limiting action of this amplifier, the system should be wired into the transmitter in the same manner as a normal amplifier and checked for operation with the bias potentiometer R24 adjusted to its maximum (positive) setting. Under these conditions the operation should be quite normal and over-modulation of the transmitter should be possible. While the preliminary tests are being made, care should be taken to see that a correct impedance match is made by T3, because this adjustment must not be touched once the limiter is brought into operation; otherwise the limiter setting will have to be readjusted also.

The next step is to open-circuit the earthed end of R22 and insert an 0-100 D.C. microammeter in series, with its positive terminal going to earth. A steady tone of 400 or 1,000 cycles should then be fed into the amplifier and its level adjusted so that the transmitter is being modulated to a depth of 80 per cent.—the modulation depth can be checked by any of the usual methods.

At this level, no current flow should be indicated by the microammeter in series with R22; if there is, it is an indication that either the ratio of T2 is too high or else the positive bias on the 6H6 cathode is not high enough. The former of these two alternatives is more likely to be the trouble, but as it will usually be more convenient to adjust the bias this may be increased by **reducing** the value of R23 slightly from 50,000 ohms, or, conversely, by **increasing** the value of R24. The main idea, whatever is done, is to have enough diode bias in hand to just stop rectification at the 80 per cent. modulation level. Should the first premise of this paragraph apply (i.e., no current is flowing through R22 at the 80 per cent. modulation level) the bias control (R24) should be adjusted to a point where current will flow if the modulation level is increased slightly. This adjustment is fairly critical because the operation of the entire system depends largely on the fact that the peak limiting action is delayed until a modulation level of 80 per cent. is passed. Obviously, if the limiting action starts much before the 80 per cent. modulation level the system will be acting more as a volume compressor than a peak limiter and the tendency will therefore be to merely reduce the level of all signals.

Having satisfactorily made the necessary adjustments to prevent diode current flowing until the 80 per cent. modulation level is passed, the output of the generator supplying the test tone should be noted. The input should then be stepped up until the modulation depth indicator shows that the transmitter is being fully modulated. If the limiter is operating satisfactorily, the tone input will now be

(Continued on foot of Page 146.)

COMPONENT VALUES FOR PEAK LIMITING AMPLIFIER

CONDENSERS.

C1, C5—10 mfd., 25 v. electro.; **C2, C9**—0.5 mfd., 400 v., paper; **C3, C6, C12, C13**—8 mfd., 450 v., electro.; **C4, C7, C8, C10, C11**—interstage coupling condensers; value should be chosen in accordance with response required but high insulation resistance is essential; **C14**—0.1 mfd., 400 v. paper; **C15**—1.0 mfd., 400 v., paper.

RESISTORS.

R1—value depends on signal input device used, is unnecessary if transformer coupling is employed unless transformer is to be loaded, in which case value will be determined by load required; **R2, R9**—5,000 ohms, 1 W.; **R3, R8, R10, R19, R23**—50,000 ohms, 1W.; **R4, R5, R11, R12, R14, R15, R16, R17, R18, R22**—250,000 ohms, 1 W.; **R6**—10,000 ohms, 1 W.; **R7**—500,000 ohms potentiometer; **R13**—2,000 ohms, 1 W.; **R20**—750 ohms, 1W.; **R21**—20,000 ohms, 1 W.; **R24**—15,000 ohms potentiometer (rectifier delay bias control).

TRANSFORMERS & CHOKES.

T1—Power transformer. H.T. sec., 750 v. C.T., 150 mA. Rect. fil., 5 v., 3 a. Amp. fils., 6.3 v., 2 a. Output fils. 2.5 v., 5 a.; **T2—Diode coupling transformer.** Standard audio type, for ratio see text; **T3—Amplifier output transformer.** To match load to 2A3 plates, must present 5,000 ohms plate-to-plate load to 2A3's; **CH1**—gapped core type first filter choke, to carry 150 mA.; **CH2**—standard type 20 henry 150 mA. filter choke; **SW**—optional power line switch.

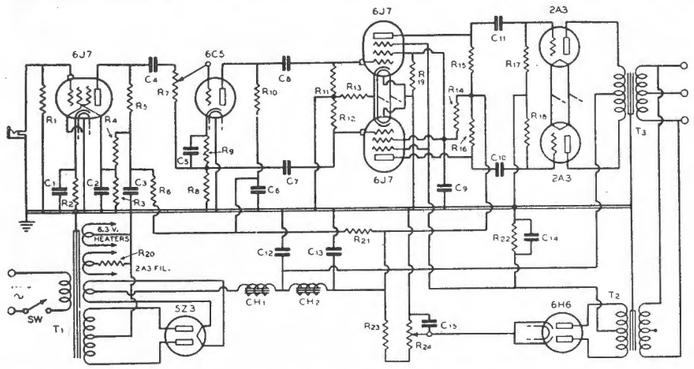


Figure 3. Practical circuit diagram of a speech-limiting amplifier which will provide a useful basis for experimentation. A key to the component values is given herewith.

Broadcast Station Separation

American F.C.C. Tables Provide Useful Guide

IN Australia complaints are often heard concerning the allocation of adjacent or nearly adjacent channels to broadcast stations which are relatively closely located geographically. It is safe to say that the majority of these complaints are based on reports from listeners who are not usually in a position to pass a reliable opinion. Nevertheless, the complaints still persist, and it is of interest to examine portions of the Australian medium-wave broadcasting spectrum in the light of accepted engineering recommendations and practice.

The United States of America are fortunate in possessing a Federal control body for the purpose of dealing with radio station power and frequency allocations. This body is known as the Federal Communications Commission, and an important part of its constitution consists of a very highly qualified Board of Radio Engineers. Furthermore, this Board works in close collaboration with the engineers of commercial organisations and is therefore in a position to express a reliable opinion on matters related to the technical side of broadcasting.

Some few years ago, the American ether was in a chaotic state and the F.C.C. was faced with the job of straightening matters out. One of the first steps in this procedure was the making of a wide survey and the preparation of a set of "average station separation" tables which could be used as a guide for future frequency and power allocations. These tables take into account night and day transmission and provide a valuable indication of the distances by which stations of given power and frequency separation should be separated geographically if objectionable interference is to be avoided.

A portion of the American F.C.C. "average night separation" table is shown in the accompanying chart. This takes into account stations varying in power between 50 watts and 10,000 watts and operating on frequencies ranging up to 40 KC. (four channels) apart. It is assumed that the frequency control equipment of the stations is capable of maintaining their carrier frequencies constant within plus or minus 50 cycles.

Inspection of the chart will show that the chart is divided into seven main sections, vertically and horizontally; these correspond to the powers of the stations. The horizontal sections are further subdivided into five groups, corresponding to frequency separations of zero, 10, 20, 30 and 40 kilocycles. The remaining figures are the distances in miles by which stations of given power and frequency difference should be separated to avoid objectionable interference when both are operating at night. The "day" tables are similar to this, the major point of difference being that the permissible geographical separations are smaller, due to less effective transmission during daylight hours.

As an example of the application of the chart, we will take two stations, each of 100 watts, separated in frequency by 10 KC.

Looking down from the top in the second "power" column until we come to the horizontal line commenced by the "10" inside the "100 W." bracket. At this point we see the number "53" and this is the minimum geographical separation in miles of these two stations which can be tolerated from an interference point of view. Going further down the same column, we see that if the stations are separated in frequency by 20 KC., their geographical separation may be reduced to 21 miles without risk of interference.

It should be remembered that these tables are only intended as "averages"; modifying factors such as the local topography and the actual location of the stations in the medium-wave band also enter into the problem, and must be considered.

However, the figures tabulated are the result of much serious research on the part of a responsible body of engineers and, as such, may be taken as a reliable guide.

Therefore, next time a controversy regarding the frequency allocation of a station, with relation to another "nearby" transmitter, crops up, take time off to examine the case on its engineering merits, and judge how much of the complaint can be discounted. Don't forget that there are still such items as overmodulation, carrier instability and unselective radio receivers to take into account—each of which alone can give rise to more complaints of interference than the fact that another station on a nearby frequency seems to be a few miles closer than it should be.

Class & Power	Freq. Diff. Kc.	Local		Regional			High Power Regional	
		50	100	250	500	1 kw	5 kw	10 kw
Local 50 w	0	130	185	.....	.....	.....	.....	.....
	10	40	50	82	90	107	180	220
	20	15	18	41	49	57	85	100
	30	9	12	30	38	46	74	89
	40	8	11	28	36	44	72	87
100 w	0	185	185	.....	.....	.....	.....	.....
	10	50	53	98	106	114	183	225
	20	18	21	46	54	62	90	105
	30	12	13	32	40	48	76	91
	40	11	11	28	36	44	72	87
Regional 250 w	0	.....	.....	640	800	1000	.....	.....
	10	82	98	126	153	185	290	345
	20	41	46	55	65	78	110	145
	30	30	32	35	43	51	79	94
	40	28	28	29	37	45	73	88
500 w	0	.....	.....	800	800	1000	.....	.....
	10	90	106	153	160	190	300	355
	20	49	54	65	74	85	127	150
	30	38	40	43	46	54	82	97
	40	36	36	37	39	47	75	90
1 kw	0	.....	.....	1000	1000	1000	.....	.....
	10	107	114	185	190	200	305	360
	20	57	62	78	85	94	135	160
	30	46	48	51	54	58	86	100
	40	44	44	45	47	48	76	91
High Power Regional 5 kw	0	.....	.....	.....	.....	.....	1600	2000
	10	180	183	290	300	305	335	390
	20	85	90	110	127	135	163	187
	30	74	76	79	82	86	102	117
	40	72	72	73	75	76	83	98
10 kw	0	.....	.....	.....	.....	.....	2000	2000
	10	220	225	345	355	360	390	405
	20	100	105	145	150	160	187	203
	30	89	91	94	97	100	117	128
	40	87	87	88	90	91	98	102

Minimum station separation mileages are listed by F.C.C. (U.S.A.). The "Local," etc., classifications are those used in U.S.A.

METERING BROADCAST TRANSMITTER OUTPUT

FOR the benefit of station engineers who require a lead on transmitter output measurement as practised overseas, the information given below is presented. These dates are rulings of the Broadcast Division, Federal Communications Commission, U.S.A., and may therefore be regarded as the recommended specifications for measuring instruments used on broadcast transmitters in that country. These rulings are designed to ensure that each station shall have accurate, standardised means of measuring its aerial input power.

Final Stage Measurements.

Instruments indicating the plate current or plate voltage of the latest radio stage (linear scale instruments) shall meet the following specifications:

1. Length of scale shall not be less than 2 3/10 inches.
2. Accuracy shall be at least two per cent. of the full scale reading.
3. The maximum rating of the meter shall be such that it does not read off scale during modulation.
4. Scale shall have at least 40 divisions.
5. Full scale reading shall not be greater than five times the minimum normal indication.

Aerial Current Measurements.

Instruments indicating the antenna current shall meet the following specifications:

1. Instruments having logarithmic or square law scales.

(a) Shall meet same requirements as 1, 2 and 3 above for linear scale instruments.

(b) Full scale reading shall not be greater than three times the minimum normal indication.

(c) No scale division above one-third full scale reading (in amperes) shall be greater than 1/30 of the full scale reading. (Example: An ammeter meeting requirements (a) above having full scale reading of six amperes is acceptable for reading currents from two to six amperes provided no scale division between two and six amperes is greater than 1/30 of six amperes, 0.2 ampere).

2. Radio frequency instruments having expanded scales.

(a) Shall meet same requirements as 1, 2 and 3 for linear scale instruments.

(b) Full scale reading shall not be greater than five times the minimum normal indication.

(c) No scale division above 1/5 full scale reading (in amperes) shall be greater than 1/50 of the full scale reading. (Example: An ammeter meeting the requirement (a) above is acceptable for indicating currents from one to five amperes provided no division between one and five amperes is greater than 1/50 of five amperes, 0.1 ampere).

(d) Manufacturers of instruments of the expanded scale type must submit data to the Commission showing that these instruments have acceptable expanded scales, and the type number of these instruments must include suitable designation.

3. Antenna ammeters employing vacuum tube rectifiers are acceptable provided:

(a) The indicating instruments meet all the above requirements for linear scale instruments.

(b) Data are submitted under oath showing the unit has an overall accuracy of at least two per cent. of the full scale reading.

(c) Thermocouple-type ammeter meeting above requirements 1 (a), (b) and (c) is installed at the same point in the antenna circuit as the vacuum tube ammeter.

(d) The calibration of the vacuum-tube ammeter is checked against the thermocouple ammeter at least once a week (the thermocouple ammeter may be so connected that it is short circuited or open circuited when not actually being read).

4. Remote reading ammeters.

(a) Shall meet the same requirements as for the regular instruments.

(b) Shall be connected at the same point in the circuit.

(c) The calibration shall be checked against the regular meter at least once a week (the regular meter may be so connected with a switch that it is short circuited or open circuited when not actually being read).

(d) All remote reading instruments, including the vacuum type, shall be connected to the antenna circuit through a properly designed electrostatically shielded current transformer except in case a shunt excited antenna is employed, in which case the transmission line current meter may be considered as the remote meter provided the transmission line is terminated direct into the excitation circuit feed line which shall employ series tuning only (no shunt circuits of any type shall be employed) and insofar as practicable the type and scale of the transmission line meter should be the same as those of the excitation circuit feed line meter. Any method of providing a remote meter different from the above shall be submitted to and approved by the Commission before the indications thereof may be logged as the antenna current.

Stations determining power by the indirect method may log the transmission line current in lieu of the antenna current, provided the instrument meets the above requirements for antenna ammeters, and further provided that the ratio between the transmission line current and the antenna current is entered each time in the log. In cases where the station is authorised for the same operating power for both day and night-time operation, this ratio shall be checked at least once daily. Stations which are authorised to operate with night-time power different from the daytime power shall check the ratio for each power at least once daily.

Replacement of Instruments.

No instrument indicating the plate current or plate voltage of the last radio stage, the antenna current (or the transmission line current when logged in lieu of the antenna current) shall be changed or replaced without written authority of the Commission, except by instruments of the same make, type, maximum scale readings and accuracy. Requests for authority to change an instrument may be made by letter or telegram giving the manufacturer's name, type number, serial number and full scale reading of the proposed instrument and the values of current or voltage the instrument will be employed to indicate. Requests for temporary authority to operate without an instrument or with a substitute instrument may be made by letter or telegram stating the necessity therefor and the period involved.

Repairs to Instruments.

No instruments, the seal of which has been broken, shall be employed. Repairs and recalibration of instruments shall be made by the manufacturer, by an authorised instrument repair service of the manufacturer or by some other properly qualified and equipped instrument repair service. In either case the instrument must be resealed with the symbol or trade mark of the repair service and a certificate of calibration supplied therewith.

Since it is usually impractical to measure the actual antenna current of a shunt excited antenna system, the current measured at the input of the excitation circuit feed line is accepted as the antenna current.

A DICTIONARY OF TECHNICAL TERMS

Abac. An alignment chart by which formulae can be enumerated and results read off by the simple expedient of placing a ruler between appropriate columns and noting the points of intersection with other columns.

Acoustical Labyrinth. An absorbent conduit attached to the rear of a loud speaker to prevent sound pressure waves radiated by the back of the cone from interfering with the sound pressure waves radiated from the front. Actually, any properly proportioned chamber lined with sound absorbent material will do this, but in order to reduce space requirements, the acoustic labyrinth is arranged so that the conduits are folded upon themselves.

Active Current. The "in-phase" component of an alternating current flowing in a circuit. The product of this and the voltage gives the true power.

Admittance. Denoted by the letter "Y," is the reciprocal of the impedance of an alternating current circuit.

Antenna Resistance. Given by the power supplied to the entire antenna circuit divided by the square of the antenna current (measured at the point where the power is supplied to the antenna).

Amplification Factor. A change in grid-cathode or input voltage of a tube will produce a corresponding change in plate-cathode or output voltage. The amplification factor is defined as the ratio between these voltages.

Amplifier, Class "A". A class "A" amplifier is one in which the bias and exciting grid voltages are such that plate current through the valve flows at all times. The ideal class "A" amplifier is one in which the alternating component of the plate current is an exact reproduction of the form of the alternating grid voltage, and the plate current flows 360 electrical degrees. The characteristics of a class "A" amplifier are low efficiency and output.

Amplifier, Class "B". A class "B" amplifier is one in which the grid bias is approximately equal to the cut-off value so that the plate current is virtually zero when no exciting grid voltage is applied, and so that the plate current in each tube flows during approximately one-half to each cycle when an exciting grid voltage is present. The ideal class "B" amplifier is one in which the alternating component of plate current is an exact replica of the alternating grid voltage half-cycle when the grid is positive with respect to bias voltage, and the plate current flows 180 electrical degrees. The characteristics of a class "B" amplifier are a medium efficiency and output.

Amplifier, Class "C". A class "C" amplifier is one in which the grid bias is appreciably beyond the cut-off so that the plate current in each valve is zero when no exciting grid voltage is present, and so that the plate current flows in each valve for appreciably less than one-half of each cycle when an exciting grid voltage is present. Class "C" amplifiers find application where high plate circuit efficiency is the paramount requirement and where departures from linearity between input and output are permissible. The characteristics of a class "C" amplifier are high plate circuit efficiency and high power output.

Angular Frequency. If the frequency of an A.C. wave is "f" c.p.s., the rotating vector by which it can be represented makes "f" revolutions per second, and, therefore, rotates through an angle of $2_{\pi}f$ radians per second. This is known as the angular frequency and is usually denoted by a small Greek "omega," or a small Greek "rho". (See "Radio Symbols" section, also table of Greek symbols in "Resistance Calculation" section.)

Apparent Inductance. The effective inductance of a coil. This is the inductance of the winding plus the extra inductance which is brought about by self-capacity in the winding.

Atmospherics. Strays produced by atmospheric conditions. The term static has come to be used quite generally as a synonym for atmospherics.

Attenuation. The reduction in magnitude of a wave with increasing distance from its source or from a specified point of reference.

Autodyne Reception. A system of heterodyne reception through the use of a device which is both an oscillator and a detector.

Automatic Volume Control. A system whereby the output of a receiver is held virtually constant over wide variations of signal input.

B/H Curve. A graph showing the relation between the magnetising force (H) and the resultant magnetic flux density (B) produced (usually in iron). The ratio B/H is known as the permeability of a material.

Beating. A phenomenon in which two or more periodic quantities of different frequencies react to produce a result having pulsations of amplitude. The resultant complete cycle of pulsations is known as a "beat."

Bias. A term used to denote the potential difference, usually negative, existing between cathode and control grid of a tube.

Biotron. A combination of two tubes connected so as to produce a particularly steep characteristic curve.

Bridge. A balanced measuring device in which two parallel paths, one of which contains an unknown quantity (of resistance, inductance or capacity), are provided for the flow of current. Balance of the two paths indicates that the unknown section of one path is equal in value to a known section in the other path. The bridge method of measurement was first introduced by Wheatstone as a resistance measuring device, but has since been adapted for the measurement and comparison of inductance or capacity.

Monitoring for Peak Efficiency

(Continued from Page 143.)

from 5 db. to 7 db. higher than it was when the previous check was made at the 80 per cent. mark. No further adjustment is required if this is the case and the bias control and ratio of T2 can be left as they are.

There are two obvious alternatives to this, however. The first is that the additional input required to raise the modulation depth from 80 per cent. to 100 per cent. is less than 5 db. If it is, the limiter rectifier is obviously not developing enough voltage. There are two ways to overcome this. The first is to increase the ratio of T2 and thus make more voltage available for rectification; this will also necessitate an adjustment of R24. The other method is to increase the value of R22 (the diode load resistor). This will make more voltage available but it should be remembered that this resistor is also part of the time control circuit and if it is altered, C14 must be altered in the reverse direction (e.g., if R22 is increased, C14 must be decreased).

The alternative fault is that a tone input increase of more than 7 db. is required to raise the modulation depth to 100 per cent. If this is so, the limiter action is obviously too sudden and the voltage developed by the 6H6 rectifier must be reduced. The means for doing this are the reverse of those for increasing the rectifier voltage, which means that the fault can be corrected by either reducing the ratio of T2 or decreasing the value of R22.

The limiter amplifier described above was designed by Mr. Ray L. Dawley, Technical Editor of "Radio" (U.S.A.) and is claimed to be quite effective in operation. We cannot claim to have any personal experience of the operation of this particular system, but we can say that the principle of operation is theoretically sound and should give excellent results.

Technical Terms (contd.)

Cathode Rays. Streams of electrons emitted by the cathode or negative electrode of a thermionic valve. See also under "Oscillograph."

Centimetre Units (of inductance and capacity). The C.G.S. (metric) units of inductance and capacity. One microhenry is equivalent to 1,000 centimetres of inductance, and one centimetre of capacity is equal to 1.1 microfarads.

Coercive Force. The magnetising force which must be applied in the reverse direction to a magnetised body in order to remove its magnetism.

Codan. Initials of "Carrier operated device, antinoise." A muting system arranged to suppress noise during breaks in carrier. Specially developed for communications services.

Conversion Transconductance. The ratio of the intermediate frequency current in the primary of the I.F. transformer to the applied radio frequency voltage producing it. Used to determine performance of a frequency changer valve.

Coupling Co-efficient. The ratio of the mutual or common impedance component of two circuits to the square roots of the product of the total impedance components of the same kind in the two circuits. The impedance components may be inductive, capacitative, or resistive.

Cross Modulation. Due to modulation of the carrier of a desired signal by an undesired signal.

Decibel. The decibel is the practical transmission unit in which gains or levels are expressed. The gain of an amplifier in decibels is numerically equal to ten times the common or "base 10" logarithm of the ratio of the output power to the input power. (See section "The Decibel System" for further details.)

Decrement of a train of waves is the ratio of one peak value to that immediately succeeding it in the same direction.

Detection. Any process of operation on a modulated signal wave to obtain the signal imparted to it in the modulation process.

De-modulation. A term applied to the process of modulation carried out in such a manner as to recover the original signal. In radio reception the term "detection" is commonly used for this process.

Dielectric. Insulating material used between the plates of a condenser.

Differential Resistance. The ratio of a change of applied voltage to the resultant change of current in any electrical device where the two are not related as in Ohm's Law. This applies in particular to the plate resistance of a valve.

Diode. A type of thermionic valve containing two electrodes and which passes current wholly or predominantly in one direction.

Direction Finder. A radio receiving device which permits determination of the line of travel of radio waves as received.

Distortion. A change in wave form occurring in a transducer or transmission medium. The principal sources are (a) non-linear relations between input and output at a given frequency; (b) non-uniform transmission at different frequencies, and (c) phase shift not proportional to frequency.

Doublet Antenna. One consisting of two elevated conductors substantially in the same straight line and of approximately equal lengths with the power delivered at the centre.

Dynatron. A valve operated with a low plate voltage and a high grid or screen voltage so that the plate impedance is virtually negative due to secondary emission. Oscillation will occur if the plate circuit is tuned, no feed back to the grid circuit being necessary.

Eddy Currents are those induced in a solid conductor due to a varying magnetic field, as, for example, in the core of a power transformer.

Electron. This is the fundamental particle of elec, tricity, negative in sign.

Electron Multiplier. A special valve-like device which utilises secondary emission principles.

Facsimile Transmission. The electrical transmission of a graphic record having a limited number of shade values.

Farad. The unit of capacity. The normal unit used in radio is the "microfarad" (one millionth of a farad).

Fidelity. The degree to which a system, or any portion of a system, accurately reproduces at its output the form of the signal which is impressed upon its input.

Field Intensity. The effective (root-mean-square) value of the electric or magnetic field intensity at a point due to the passage of radio waves of a specified frequency. It is usually expressed in terms of electric field intensity in microvolts or millivolts per metre. When the direction in which the field intensity is measured is not stated, it is assumed to be measured in the direction of maximum field intensity.

Filter, Band-Pass. A combination of inductances and condensers designed to pass a pre-determined band of frequencies with a sharp cut-off at each end of the band.

Filter, High-Pass. A filter circuit arranged to permit only frequencies above a certain value to pass.

Filter, Low-Pass. A filter circuit arranged to permit only frequencies below a certain value to pass.

Flux Density. The number of lines of magnetic force per unit area of cross section of a magnetic circuit. Usually expressed as "lines per square (inch or centimetre)." Symbol is "B."

Forced Oscillations. Those maintained in a tuned circuit by an outside source of energy, always at the frequency of the supply.

Free Oscillations. Those which occur in a tuned circuit at the natural or resonant frequency of the circuit.

Fundamental Frequency. The lowest component frequency of a periodic wave or quantity.

Gauss or "Maxwell." The unit of field strength or magnetic flux density used for comparative purposes or for calibration. Is a flux density of one line per square centimetre. Thus a flux density of 10,000 lines per sq. cm. would be expressed at 10,000 Gauss.

Gilbert. The unit of magnetomotive force.

Grid Rectification. The use of a valve for de-modulating high frequency transmission by utilising the one-way conductivity of the grid filament circuit. During the impact of a train of waves, the resultant flow of current through the grid leak depresses the mean voltage of the grid, and so reduces the value of the plate current at an audible frequency corresponding to modulated components in the original wave.

Harmonic. A component of a periodic wave or quantity having a frequency which is a multiple of the fundamental frequency. For example, a component whose frequency is twice the fundamental frequency is called the second harmonic.

Henry. The unit of inductance.

Heterodyne Reception. The process of receiving radio waves by combining in a detector a received voltage with a locally generated alternating voltage. The frequency of the locally generated voltage is usually different from that of the received voltage. This system is sometimes known as beat reception.

Heaviside Layer. A stratum or layer of ionised particles in the upper regions of the atmosphere. This layer serves to reflect and/or refract electro-magnetic sky waves which would otherwise escape into space.

Homing Device. A direction-finder system for aircraft use, comprising a fixed loop and a trailing aerial. Manipulation of a switch indicates whether the aircraft is on or off the course, determined by a radio beacon.

Hysteresis. The tendency of magnetisation to lag behind the magnetising force, as, for example, in the case of an iron-cored transformer. This produces the transformer iron loss which is directly proportional to the area

Technical Terms (contd.)

of the hysteresis loop for the particular sample of iron in use.

Image Ratio. A term used in the assessment of superheterodyne receiver selectivity. Is the ratio of the signal strength increase required to produce the same output, when the receiver is detuned twice the I.F. from resonance with the signal, as when the receiver is tuned to resonance.

Impedance. The opposition offered by a circuit to the passage of alternating current due to the combined effects of inductance, resistance, and capacity.

Inductance. The property of a circuit by virtue of which it opposes any alteration in the value of the current, and hence offers opposition to alternating current.

Inverse Feed-Back. Also termed "negative" or "reversed" feed-back. A system whereby portion of the output from a valve amplifier is fed back to the input in reverse phase, thus setting up degeneration. Useful for the reduction of distortion and resonance effects.

Inverse Voltage, Peak. The highest voltage that a rectifier valve can safely stand in the direction opposite to that in which it is designed to pass current.

Ionisation. The process of splitting up molecules into their component ions carrying positive or negative charges. The ions so produced thus act as carriers of electricity through the liquid or gas.

Kilocycle Per Second. A unit of frequency equal to 1000 cycles per second. The frequency corresponding to any wave-length may be found by dividing the wavelength in metres into the constant 300,000. Conversely, to obtain the wave-length in metres, divide the constant 300,000 by the frequency in kilocycles per second.

Linear Detection. That form of detection in which the output voltage under consideration is substantially proportional to the carrier voltage throughout the useful range of the detecting device.

Litzendraht (Litz). A stranded conductor in which each strand is insulated from every other strand. Radio frequency resistance is reduced by this means.

Magnetron. A diode valve having a straight filament surrounded by a cylindrical anode, a powerful magnetic field being applied coaxially with the filament. Used as a generator of ultra-high frequencies.

Magnetising Force. The magnetic field strength in lines per sq. cm. at a point where no iron or other magnetic material is present. Symbal is "H."

Megacycle Per Second. A unit of frequency equal to one million cycles per second.

Mho. The unit of admittance (A.C.) and also of conductance (D.C.).

Modulation. The process whereby the frequency or amplitude of a wave is varied in accordance with a signal wave.

Modulation Capability. The maximum percentage of modulation that is possible without objectionable distortion.

Mutual Conductance. The ratio of change in plate current of a valve to the change in the control grid voltage producing it, under the condition that all other voltages remain unchanged. The unit may be expressed in milliamperes per volt, or micromhos.

Neper. A transmission unit somewhat similar to the decibel, but is calculated on the Napierian or base "e" scale of logarithms.

Octode. A dual-purpose valve containing 6 grids in addition to a heater, cathode and anode. Usually employed as a frequency changer in superheterodyne circuits; similar to the pentagrid.

Oscillator. A non-rotating device for producing alternating current, the output frequency of which is determined by the characteristics of the device.

Oscillograph. An instrument for showing visually, or recording photographically, the wave-form of alternating or other periodically changing currents and voltages. In the electro-magnetic type, a mirror is attached to a small coil suspended in a magnetic field. In the cathode-ray type, a stream of electrons is controlled by electro-static and/or electro-magnetic fields. (See measuring instrument section for full definition of all terms used in cathode-ray oscillograph operation.)

Pentagrid. A dual purpose valve containing 5 grids in addition to a heater, cathode and anode. Usually employed as a frequency changer in superheterodyne circuits, where electronic modulation provides the coupling between the oscillator and amplifier portions of the valve.

Pentode. A 5 electrode valve incorporating between screen and plate a suppressor grid which is usually connected to the cathode. By this means the effect of secondary emission in the vicinity of the plate is avoided.

Percentage of Modulation. This is 100 times the ratio of half the difference between the maximum and minimum amplitudes of a modulated wave to the average amplitude.

Permeability. The ratio of the magnetic flux produced in any substance to the applied magnetising force, which is itself equal to the magnetic flux in air. The measure of magnetic conductivity.

Picture Transmission. The electrical transmission of a picture having a gradation of shade value.

Piezo-electric Effect. A phenomenon exhibited by certain natural crystals (such as Rochelle Salt, quartz or tourmaline) as a result of which physical stresses in the crystal are set up by the application of an electrical potential. The reverse also applies.

Power Detection. That in which the power output of the detecting device is used to supply a substantial amount of power, directly to a device such as a loudspeaker or recorder.

Power Factor. The ratio of the true power (watts) in an alternating current circuit to apparent power (volt-amperes). It is always less than unity, since the voltage and current are not in phase.

Preselector. A selective tuned circuit preceding the radio frequency amplifier in a receiver, in order to avoid cross modulation troubles and lack of selectivity. Sometimes referred to as a band-pass filter.

Proximity Effect. One of the factors which tend to increase the R.F. resistance of a conductor wound into a coil. Is set up by interference between the magnetic fields of adjacent turns.

Quartz Crystal Oscillator. One utilising the piezo-electric effect of a quartz crystal plate. The mechanical oscillations of the quartz plate are maintained by means of a thermionic valve, a high degree of frequency stability being obtained.

Radiation Efficiency. The ratio of the power radiated to the total power supplied to an antenna.

Radiation Resistance. This is obtained by dividing the power radiated from an antenna by the square of the antenna current, measured at the point where the power is supplied to the antenna.

Radio Beacon. A transmitting station in a fixed geographic location which emits a distinctive or characteristic signal for enabling mobile stations to determine bearings or courses.

Radio Compass. A direction-finder used for navigational purposes.

READING THE FREQUENCY/WAVELENGTH CONVERSION CHART ON NEXT PAGE

The chart on the following page shows the equivalent frequencies, in kilocycles per second, of the band of wavelengths between 10 and 100 metres. As will be seen, wavelengths are to be found in the column marked "M" and the equivalent frequency is shown in the adjacent right hand column marked "KC."

As the relationship of wavelength and frequency always remains constant, conversion for any wavelength or frequency outside the range of the chart may be effected by the use of a **multiplying** factor on one column and a **divisor** of the same value on the other. A factor of 10 will prove to be the most useful as the procedure is then simplified to a matter of shifting the decimal point.

Example: The equivalent frequency of 1,000 metres is required. 1,000 metres is ten times 100 (the highest wavelength on the chart). The equivalent frequency is therefore (2,998 kc/sec. **divided** by 10) 299.8 kc/sec.

The reverse operation is quite as simple, and to illustrate this we will find the equivalent wavelength of 60 megacycles (60,000 kc/sec.). The nearest sub-multiple of this figure on the chart is 5,996 kc/sec., the frequency equivalent for 50 metres. 60,000 kc/sec. is very nearly ten times 5,996 kc/sec., so that it will be necessary to **divide** the wavelength equivalent of 5,996 kc/sec. by ten. This will give 5 metres (approximately) as the wavelength equivalent to 60 megacycles.

FREQUENCY/WAVELENGTH CONVERSION CHART

M.	KC.	M.	KC.	M.	KC.	M.	KC.	M.	KC.	M.	KC.	M.	KC.	M.	KC.	M.	KC.
10.1	29,690	20.1	14,920	30.1	9,961	40.1	7,477	50.1	5,984	60.1	4,989	70.1	4,277	80.1	3,743	90.1	3,328
10.2	29,390	20.2	14,840	30.2	9,928	40.2	7,458	50.2	5,973	60.2	4,980	70.2	4,271	80.2	3,738	90.2	3,324
10.3	29,110	20.3	14,770	30.3	9,895	40.3	7,440	50.3	5,961	60.3	4,972	70.3	4,265	80.3	3,734	90.3	3,320
10.4	28,830	20.4	14,700	30.4	9,862	40.4	7,421	50.4	5,949	60.4	4,964	70.4	4,259	80.4	3,729	90.4	3,317
10.5	28,550	20.5	14,630	30.5	9,830	40.5	7,403	50.5	5,937	60.5	4,956	70.5	4,253	80.5	3,724	90.5	3,313
10.6	28,280	20.6	14,550	30.6	9,798	40.6	7,385	50.6	5,925	60.6	4,948	70.6	4,247	80.6	3,720	90.6	3,309
10.7	28,020	20.7	14,480	30.7	9,766	40.7	7,367	50.7	5,913	60.7	4,939	70.7	4,241	80.7	3,715	90.7	3,306
10.8	27,760	20.8	14,410	30.8	9,734	40.8	7,349	50.8	5,902	60.8	4,931	70.8	4,235	80.8	3,711	90.8	3,302
10.9	27,510	20.9	14,350	30.9	9,703	40.9	7,331	50.9	5,890	60.9	4,923	70.9	4,229	80.9	3,706	90.9	3,298
11.0	27,260	21.0	14,280	31.0	9,672	41.0	7,313	51.0	5,879	61.0	4,915	71.0	4,223	81.0	3,701	91.0	3,295
11.1	27,010	21.1	14,210	31.1	9,641	41.1	7,295	51.1	5,867	61.1	4,907	71.1	4,217	81.1	3,697	91.1	3,291
11.2	26,770	21.2	14,140	31.2	9,610	41.2	7,277	51.2	5,856	61.2	4,899	71.2	4,211	81.2	3,692	91.2	3,288
11.3	26,530	21.3	14,080	31.3	9,579	41.3	7,260	51.3	5,844	61.3	4,891	71.3	4,205	81.3	3,688	91.3	3,284
11.4	26,300	21.4	14,010	31.4	9,548	41.4	7,242	51.4	5,833	61.4	4,883	71.4	4,199	81.4	3,683	91.4	3,280
11.5	26,070	21.5	13,950	31.5	9,518	41.5	7,225	51.5	5,822	61.5	4,875	71.5	4,193	81.5	3,679	91.5	3,277
11.6	25,850	21.6	13,880	31.6	9,488	41.6	7,207	51.6	5,810	61.6	4,867	71.6	4,187	81.6	3,674	91.6	3,273
11.7	25,630	21.7	13,810	31.7	9,458	41.7	7,190	51.7	5,799	61.7	4,859	71.7	4,182	81.7	3,670	91.7	3,270
11.8	25,410	21.8	13,750	31.8	9,428	41.8	7,173	51.8	5,788	61.8	4,851	71.8	4,176	81.8	3,665	91.8	3,266
11.9	25,200	21.9	13,690	31.9	9,399	41.9	7,156	51.9	5,777	61.9	4,844	71.9	4,170	81.9	3,661	91.9	3,262
12.0	24,990	22.0	13,630	32.0	9,369	42.0	7,139	52.0	5,766	62.0	4,836	72.0	4,164	82.0	3,656	92.0	3,259
12.1	24,780	22.1	13,570	32.1	9,340	42.1	7,122	52.1	5,755	62.1	4,828	72.1	4,158	82.1	3,652	92.1	3,255
12.2	24,580	22.2	13,510	32.2	9,311	42.2	7,105	52.2	5,744	62.2	4,820	72.2	4,153	82.2	3,647	92.2	3,252
12.3	24,380	22.3	13,440	32.3	9,282	42.3	7,088	52.3	5,733	62.3	4,813	72.3	4,147	82.3	3,643	92.3	3,248
12.4	24,180	22.4	13,380	32.4	9,254	42.4	7,071	52.4	5,722	62.4	4,805	72.4	4,141	82.4	3,639	92.4	3,245
12.5	23,990	22.5	13,330	32.5	9,225	42.5	7,055	52.5	5,711	62.5	4,797	72.5	4,135	82.5	3,634	92.5	3,241
12.6	23,800	22.6	13,270	32.6	9,197	42.6	7,038	52.6	5,700	62.6	4,789	72.6	4,130	82.6	3,630	92.6	3,238
12.7	23,610	22.7	13,210	32.7	9,169	42.7	7,022	52.7	5,689	62.7	4,782	72.7	4,124	82.7	3,625	92.7	3,234
12.8	23,420	22.8	13,150	32.8	9,141	42.8	7,005	52.8	5,678	62.8	4,774	72.8	4,118	82.8	3,621	92.8	3,231
12.9	23,240	22.9	13,090	32.9	9,113	42.9	6,989	52.9	5,668	62.9	4,767	72.9	4,113	82.9	3,617	92.9	3,227
13.0	23,060	23.0	13,040	33.0	9,086	43.0	6,973	53.0	5,657	63.0	4,759	73.0	4,107	83.0	3,612	93.0	3,224
13.1	22,890	23.1	12,980	33.1	9,058	43.1	6,956	53.1	5,646	63.1	4,752	73.1	4,102	83.1	3,608	93.1	3,220
13.2	22,710	23.2	12,920	33.2	9,031	43.2	6,940	53.2	5,636	63.2	4,744	73.2	4,096	83.2	3,604	93.2	3,217
13.3	22,540	23.3	12,870	33.3	9,004	43.3	6,924	53.3	5,625	63.3	4,736	73.3	4,090	83.3	3,599	93.3	3,214
13.4	22,370	23.4	12,810	33.4	8,977	43.4	6,908	53.4	5,615	63.4	4,729	73.4	4,085	83.4	3,595	93.4	3,210
13.5	22,210	23.5	12,760	33.5	8,950	43.5	6,892	53.5	5,604	63.5	4,722	73.5	4,079	83.5	3,591	93.5	3,207
13.6	22,040	23.6	12,700	33.6	8,923	43.6	6,877	53.6	5,594	63.6	4,714	73.6	4,074	83.6	3,586	93.6	3,203
13.7	21,880	23.7	12,650	33.7	8,897	43.7	6,861	53.7	5,583	63.7	4,707	73.7	4,068	83.7	3,582	93.7	3,200
13.8	21,730	23.8	12,600	33.8	8,870	43.8	6,845	53.8	5,573	63.8	4,699	73.8	4,063	83.8	3,578	93.8	3,196
13.9	21,570	23.9	12,540	33.9	8,844	43.9	6,830	53.9	5,563	63.9	4,692	73.9	4,057	83.9	3,574	93.9	3,193
14.0	21,420	24.0	12,490	34.0	8,818	44.0	6,814	54.0	5,552	64.0	4,685	74.0	4,052	84.0	3,569	94.0	3,190
14.1	21,260	24.1	12,440	34.1	8,792	44.1	6,799	54.1	5,542	64.1	4,677	74.1	4,046	84.1	3,565	94.1	3,186
14.2	21,110	24.2	12,390	34.2	8,767	44.2	6,783	54.2	5,532	64.2	4,670	74.2	4,041	84.2	3,561	94.2	3,183
14.3	20,970	24.3	12,340	34.3	8,741	44.3	6,768	54.3	5,522	64.3	4,663	74.3	4,035	84.3	3,557	94.3	3,179
14.4	20,820	24.4	12,290	34.4	8,716	44.4	6,753	54.4	5,511	64.4	4,656	74.4	4,030	84.4	3,552	94.4	3,176
14.5	20,680	24.5	12,240	34.5	8,690	44.5	6,738	54.5	5,501	64.5	4,648	74.5	4,024	84.5	3,548	94.5	3,173
14.6	20,540	24.6	12,190	34.6	8,665	44.6	6,722	54.6	5,491	64.6	4,641	74.6	4,019	84.6	3,544	94.6	3,169
14.7	20,400	24.7	12,140	34.7	8,640	44.7	6,707	54.7	5,481	64.7	4,634	74.7	4,014	84.7	3,540	94.7	3,166
14.8	20,260	24.8	12,090	34.8	8,616	44.8	6,692	54.8	5,471	64.8	4,627	74.8	4,008	84.8	3,536	94.8	3,163
14.9	20,120	24.9	12,040	34.9	8,591	44.9	6,678	54.9	5,461	64.9	4,620	74.9	4,003	84.9	3,531	94.9	3,159
15.0	19,990	25.0	11,990	35.0	8,566	45.0	6,663	55.0	5,451	65.0	4,613	75.0	3,998	85.0	3,527	95.0	3,156
15.1	19,860	25.1	11,950	35.1	8,542	45.1	6,648	55.1	5,441	65.1	4,606	75.1	3,992	85.1	3,523	95.1	3,153
15.2	19,720	25.2	11,900	35.2	8,518	45.2	6,633	55.2	5,432	65.2	4,598	75.2	3,987	85.2	3,519	95.2	3,149
15.3	19,600	25.3	11,850	35.3	8,494	45.3	6,619	55.3	5,422	65.3	4,591	75.3	3,982	85.3	3,515	95.3	3,146
15.4	19,470	25.4	11,800	35.4	8,470	45.4	6,604	55.4	5,412	65.4	4,584	75.4	3,976	85.4	3,511	95.4	3,143
15.5	19,340	25.5	11,760	35.5	8,446	45.5	6,589	55.5	5,402	65.5	4,577	75.5	3,971	85.5	3,507	95.5	3,139
15.6	19,220	25.6	11,710	35.6	8,422	45.6	6,575	55.6	5,392	65.6	4,570	75.6	3,966	85.6	3,503	95.6	3,136
15.7	19,100	25.7	11,670	35.7	8,398	45.7	6,561	55.7	5,383	65.7	4,563	75.7	3,961	85.7	3,498	95.7	3,133
15.8	18,980	25.8	11,620	35.8	8,375	45.8	6,546	55.8	5,373	65.8	4,557	75.8	3,955	85.8	3,494	95.8	3,130
15.9	18,860	25.9	11,580	35.9	8,352	45.9	6,532	55.9	5,364	65.9	4,550	75.9	3,950	85.9	3,490	95.9	3,126
16.0	18,740	26.0	11,530	36.0	8,328	46.0	6,518	56.0	5,354	66.0	4,543	76.0	3,945	86.0	3,486	96.0	3,123
16.1	18,620	26.1	11,490	36.1	8,305	46.1	6,504	56.1	5,344	66.1	4,536	76.1	3,940	86.1	3,482	96.1	3,120
16.2	18,510	26.2	11,440	36.2	8,282	46.2	6,490	56.2	5,335	66.2	4,529	76.2	3,935	86.2	3,478	96.2	3,117
16.3	18,390	26.3	11,400	36.3	8,260	46.3	6,476	56.3	5,325	66.3	4,522	76.3	3,929	86.3	3,474	96.3	3,113
16.4	18,280	26.4	11,360	36.4	8,237	46.4	6,462	56.4	5,316	66.4	4,515	76.4	3,924	86.4	3,470	96.4	3,110
16.5	18,170	26.5	11,310	36.5	8,214	46.5	6,448	56.5	5,307	66.5	4,509	76.5	3,919	86.5	3,466	96.5	3,107
16.6	18,060	26.6	11,270	36.6	8,192	46.6	6,434	56.6	5,297	66.6	4,502	76.6	3,914	86.6	3,462	96.6	3,104
16.7	17,950	26.7	11,230	36.7	8,170	46.7	6,420	56.7	5,288	66.7	4,495	76.7	3,909	86.7	3,458	96.7	3,101
16.8	17,850	26.8	11,190	36.8	8,147	46.8	6,406	56.8	5,279	66.8	4,488	76.8	3,904	86.8	3,454	96.8	3,097
16.9	17,740	26.9	11,150	36.9	8,125	46.9	6,393	56.9	5,269	66.9	4,482	76.9	3,899	86.9	3,450	96.9	3,094
17.0	17,640	27.0	11,100	37.0	8,103	47.0	6,379	57.0	5,260	67.0	4,475	77.0	3,894	87.0	3,446	97.0	3,091
17.1	17,530	27.1	11,060	37.1	8,081	47.1	6,366	57.1	5,251	67.1	4,468	77.1	3,889	87.1	3,442	97.1	3,088
17.2	17,430	27.2	11,020	37.2	8,060	47.2	6,352	57.2	5,242	67.2	4,462	77.2	3,884	87.2	3,438	97.2	3,085
17.3	17,330	27.3	10,980	37.3	8,038	47.3	6,339	57.3	5,232	67.3	4,455	77.3	3,879	87.3	3,434	97.3	3,081
17.4	17,230	27.4	10,940	37.4	8,017	47.4	6,325	57.4	5,223	67.4	4,448	77.4	3,874	87.4	3,430	97.4	3,078
17.5	17,130	27.5	10,900	37.5	7,995	47.5	6,312	57.5	5,214	67.5	4,442	77.5	3,869	87.5	3,427	97.5	3,075
17.6	17,040	27.6	10,860	37.6	7,974	47.6	6,299	57.6	5,205	67.6	4,435	77.6	3,864	87.6	3,423	97.6	3,072
17.7	16,940	27.7	10,820	37.7	7,953	47.7	6,286	57.7	5,196	67.7	4,429	77.7	3,859	87.7	3,419	97.7	3,069
17.8	16,840	27.8	10,780	37.8	7,932	47.8	6,272	57.8	5,187	67.8	4,422	77.8	3,854	87.8	3,415	97.8	3,066
17.9	16,750	27.9	10,750	37.9	7,911	47.9	6,259	57.9	5,178	67.9	4,416	77.9	3,849	87.9	3,411	97.9	3,063
18.0	16,660	28.0	10,710	38.0	7,890	48.0	6,246	58.0	5,169	68.0	4,409	78.0	3,844	88.0	3,407	98.0	3,059
18.1	16,560	28.1	10,670	38.1	7,869	48.1	6,233	58.1	5,160	68.1	4,403	78.1	3,839	88.1	3,403	98.1	3,056
18.2	16,470	28.2	10,630	38.2	7,849	48.2	6,220	58.2	5,152	68.2	4,396	78.2	3,834	88.2	3,399	98.2	3,053
18.3	16,380	28.3	10,590	38.3	7,828	48.3	6,207	58.3	5,143	68.3	4,390	78.3	3,829	88.3	3,395	98.3	3,050
18.4	16,290	28.4	10,560	38.4	7,808	48.4	6,195	58.4	5,134	68.4	4,383	78.4	3,824	88.4	3,392	98.4	3,047
18.5	16,210	28.5	10,520	38.5	7,788	48.5	6,182	58.5	5,125	68.5	4,377	78.5	3,819	88.5	3,388	98.5	3,044
18.6	16,120	28.6	10,480	38.6	7,767	48.6	6,169	58.6	5,116	68.6	4,371	78.6	3,814	88.6	3,384	98.6	3,041
18.7	16,030	28.7	10,450	38.7	7,747	48.7	6,156	58.7	5,108	68.7	4,364	78.7	3,810	88.7	3,380	98.7	3,038
18.8	15,950	28.8	10,410	38.8	7,727	48.8	6,144	58.8	5,099	68.8	4,358	78.8	3,805	88.8	3,376	98.8	3,035
18.9	15,860	28.9	10,370	38.9	7,707	48.9	6,131	58.9	5,090	68.9	4,352	78.9	3,800	88.9	3,373	98.9	3,032
19.0	15,780	29.0	10,340	39.0	7,688	49.0	6,119	59.0	5,082	69.0	4,345	79.0	3,795	89.0	3,369	99.0	3,028
19.1	15,700	29.1	10,300	39.1	7,668	49.1	6,106	59.1	5,073	69.1	4,339	79.1	3,790	89.1	3,365	99.1	3,025
19.2	15,620	29.2	10,270	39.2	7,648	49.2	6,094	59.2	5,065	69.2	4,333	79.2	3,786	89.2	3,361	99.2	3,022
19.3	15,530	29.3	10,230	39.3	7,629	49.3	6,082	59.3	5,056	69.3	4,326	79.3	3,781	89.3	3,357	99.3	3,019
19.4	15,450	29.4	10,200	39.4	7,610	49.4	6,069	59.4	5,047	69.4	4,320	79.4	3,776	89.4	3,354	99.4	3,016
19.5	15,380	29.5	10,160	39.5	7,590	49.5	6,057	59.5	5,039	69.5	4,314	79.5	3,771	89.5	3,350	99.5	3,013
19.6	15,300	29.6	10,130	39.6	7,571	49.6	6,045	59.6	5,031	69.6	4,308	79.6	3,767	89.6	3,346	99.6	3,010
19.7	15,220	29.7	10,090	39.7	7,552	49.7	6,033	59.7	5,022	69.7	4,302	79.7	3,762	89.7	3,342	99.7	3,007
19.8	15,140	29.8	10,060	39.8	7,533	49.8	6,020	59.8	5,014	69.8	4,295	79.8	3,757	89.8	3,339	99.8	3,004
19.9	15,070	29.9	10,030	39.9	7,514	49.9	6,008	59.9	5,005	69.9	4,289	79.9	3,752	89.9	3,335	99.9	3,001
20.0	14,990	30.0	9,994	40.0	7,496	50.0	5,996	60.0	4,997	70.0	4,283	80.0	3,748	90.0	3,331	100.0	2,998

THE DECIBEL SYSTEM

The decibel (or "transmission unit") has been adopted as the practical unit by which the loudness of sounds may be compared. The computation of the unit is based on the Briggsian (base 10) logarithmic tables, and it has many other applications than that of loudness comparison. The chart shown below and the accompanying explanation will give a useful insight into the working and application of the system.

Energy. "Up"	Voltage "Up"	Number of Decibels	Energy. "Down"	Voltage "Down"
1.26	1.12	1	0.794	0.891
1.59	1.26	2	.631	.794
2.00	1.41	3	.501	.708
2.51	1.59	4	.398	.631
3.16	1.79	5	.316	.562
3.98	2.00	6	0.251	0.501
5.01	2.24	7	.1999	.447
6.31	2.51	8	.158	.398
7.94	2.82	9	.126	.355
10.00	3.16	10	.100	.316
12.59	3.55	11	.079	0.282
15.85	3.98	12	.063	.261
19.96	4.47	13	.050	.224
25.12	5.01	14	.040	.200
31.62	5.62	15	.032	.178
39.81	6.31	16	.025	0.158
50.12	7.08	17	.020	.141
63.10	7.94	18	.016	.126
79.43	8.91	19	.013	.112
100.00	10.00	20	.010	.100
125.9	11.22	21	.0079	.089
158.5	12.59	22	.0063	.079
199.6	14.13	23	.0050	.071
251.2	15.85	24	.0040	.063
316.2	17.78	25	.0032	.056
398.1	19.96	26	.0020	.050
501.2	22.39	27	.0025	.047
631.0	25.12	28	.0016	.040
794.3	28.18	29	.0013	.035
1,000.0	31.62	30	.0010	.032
1,259	35.48	31	.0008	.028
1,585	39.81	32	.0006	.025
1,996	44.67	33	.0005	.022
2,512	50.12	34	.0004	.020
3,162	56.23	35	.00032	.018
3,981	63.10	36	.00020	.016
5,012	70.80	37	.00025	.014
6,310	79.43	38	.00016	.013
7,943	89.13	39	.00013	.011
10,000	100.00	40	.00010	.010
12,590	112.2	41	.00008	.0089
15,850	125.9	42	.00006	.0079
19,960	141.3	43	.00005	.0071
25,120	158.5	44	.00004	.0063
31,620	177.8	45	.000032	.0056
39,810	199.6	46	.000025	.0050
50,120	223.9	47	.000020	.0045
63,100	251.2	48	.000016	.0040
79,430	282.0	49	.000013	.0036
100,000	316.0	50	.000010	.0032
1,000,000	1,000	60	.000001	.001
10,000,000	3,162	70	.0000001	.0003
100,000,000	10,000	80	.00000001	.0001
1,000,000,000	31,620	90	.000000001	.00001
10,000,000,000	100,000	100	.0000000001	.00003

The number of decibels Ndb corresponding to the ratio between two amounts of power P_1 and P_2 is

$$N\,db = 10 \log_{10} \frac{P_1}{P_2}$$

When two voltages E_1 and E_2 or two currents 1_1 and 1_2 operate in the same or equal impedances.

$$N\,db = 20 \log_{10} \frac{E_1}{E_2}$$

and

$$N\,db = 20 \log_{10} \frac{I_1}{I_2}$$

If E_1 and E_2 or I_1 and I_2 operate in unequal impedances,

$$N\,db = 20 \log_{10} \frac{E_1}{E_2} + 10 \log_{10} \frac{Z_2}{Z_1} + 10 \log_{10} \frac{k_2}{k_1}$$

and

$$N\,db = 20 \log_{10} \frac{I_1}{I_2} + 10 \log_{10} \frac{Z_1}{Z_2} + 10 \log_{10} \frac{k_1}{k_2}$$

where Z_1 and Z_2 are the absolute magnitudes of the corresponding impedances and k_1 and k_2 are the values of power factor for the impedances.

The accompanying table will enable the number of decibels corresponding to various energy and voltage ratios to be ascertained without calculation. Current ratios may be substituted for the voltage ratios given if desired.

Care should be taken not to confuse "Gain in db" with "Level in db." Each is commonly expressed in decibels although, strictly speaking, a level should be referred to as "db above zero level." Thus while the output level of a given amplifier is, say, 30 db, its gain may be only 20 db.

The threshold of audibility is much too low a level to be used as a reference intensity for relatively loud sounds such as those coming from a loud speaker, therefore "zero level" of 0 db = 6 milliwatts has been adopted from telephone transmission practice.

An idea of the intensity of sound at "zero level" may be had if it is remembered that speech from a telephone receiver held tightly against the ear is about zero level when it is just too loud to be comfortable. This represents a level roughly 50 db above the threshold of audibility.

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:

Overall gain = 23 — 10 + 23 + 14 = 50 db.

It should be noted that the decibel equivalents on left for voltage ratios "up" or "down" are only correct when the input and output impedances are the same. For dissimilar impedances, a calculation along the lines indicated in the text will be necessary.

The Decibel System (contd.)

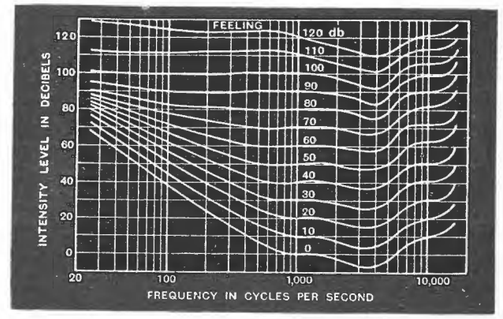
This is a much simpler and less unwieldly procedure than the older method of multiplying the gain factors together.

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 power index. In the examples above, $10 = 10^1$, $100 = 10^2$, and $1{,}000 = 10^3$, hence the levels are (10×1), $10 \times 2)$, and (10×3) decibels respectively. This should be of assistance to those unfamiliar with the use of logarithms.

SENSITIVITY OF THE EAR

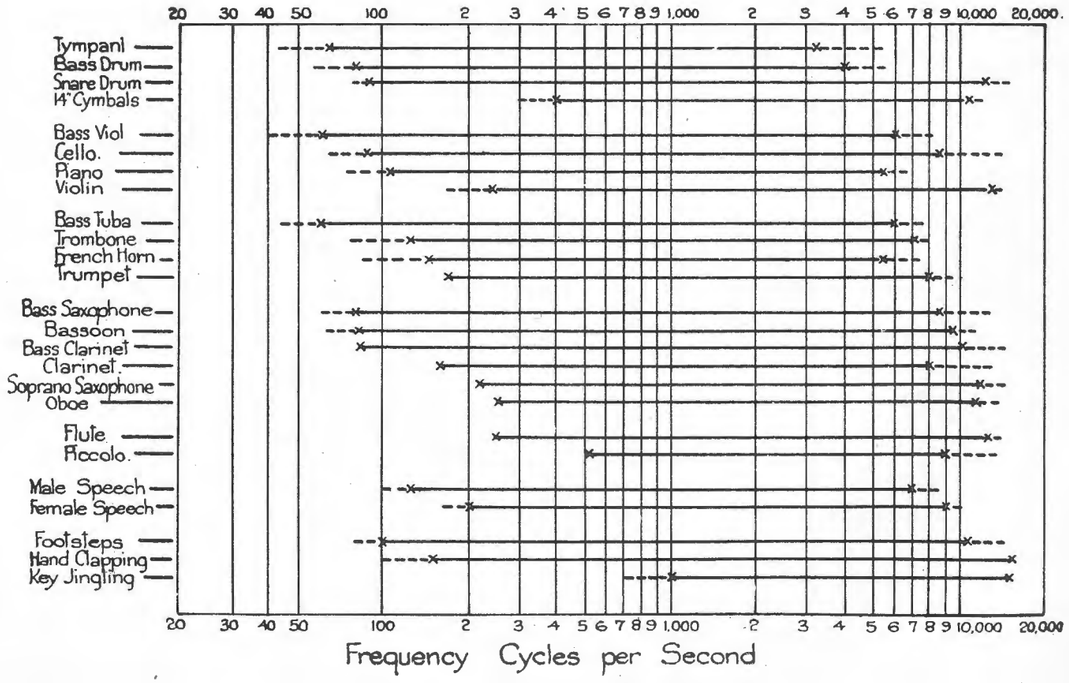
While the human ear is an extremely sensitive acoustic device it is also an extremely erratic one. No two ears are exactly the same when judged by "sensitivity" or frequency response curves. Each one is full of small peaks at differing frequencies. In addition the sensitivity of the ear will vary from day to day and considerably over a period of years. In general as age creeps on the ear becomes less sensitive to the higher frequencies in comparison to the lower.

A further factor to be considered is that the sensitivity of the ear varies considerably with the intensity of the sound being heard. The accompanying illustration gives an excellent indication of the manner in which the sensitivity of the "average" human ear varies over the audio frequency spectrum and also over a range of levels from "threshold" up to the point where a sound is "felt" instead of being "heard." This illustration, together with that showing the frequency spectra of various musical instruments, should be of value to all acoustic engineers.



The relationship between sound intensity (to the ear) and level at various frequencies.

Frequency Spectra of Musical Instruments



Short Wave Station Locations and Frequencies

Station	Call Sign	Freq.	λ	KW.
Cheribon (Dutch East Indies)	YDA6	2,870	104.53	0.025
Bandoeng (Dutch East Indies)	YDD2	2,910	103,.09	0.100
Batavia (Dutch East Indies)	YDA	3,040	98.68	10.000
Soerabaja (Dutch East Indies)	YDE4	3,150	95.24	0.150
Pekalongan (Dutch East Indies)	YDA7	3,270	91.74	0.015
Bombay (India)	VUB2	3,300	90.77	10.0
Amateurs		3,500—4,000 KC.	85.71—75 m.	
Delhi No. 2 (India)	VUD2	4,990	60.06	10.0
Bandoeng (Java)	PMY	5,150	58.30	1.0
Caracas (Venezuela)	YV5RC	5,800	51.72	1.0
Vatican City (Vatican State)	HVJ	5,976	50.26	15.0
Moscow (U.S.S.R.)	VZSPS	6,000	50.00	20.0
Mexico City (Mexico)	XEBT	6,000	50.00	1.0
Montreal (Canada)	CFCX	6,005	49.96	6.0
Pretoria (South Africa)	ZRH	6,006	49.94	5.0
Havana (Cuba)	COCO	6,010	49.92	0.3
Prague (Podebrady) (Czechoslovakia)	OLR2A	6,010	49.92	30.0
Sydney (Canada)	CJCX	6,010	49.92	1.0
Zeesen (Germany)	DJC	6,020	49.83	5-40
Prague (Podebrady) (Czechoslovakia)	OLR2B	6,030	49.75	30.0
Boston (U.S.A.)	W1XAL	6,040	49.67	20.0
Miami (U.S.A.)	W4XB	6,040	49.67	5.0
Daventry (Great Britain)	GSA	6,050	49.59	10-50
Philadelphia (U.S.A.)	W3XAU	6,060	49.50	10.0
Cincinnati (U.S.A.)	W8XAL	6,060	49.50	10.0
Motala (Sweden)	SBO	6,065	49.46	0.75
Georgetown (British Guiana)	VP3MR	6,070	49.42	0.2
Chicago (U.S.A.)	W9XAA	6,080	49.34	0.5
Nairobi (Kenya)	VQ7LO	6,082	49.33	0.5
Lima (Peru)	OAX4Z	6,082	49.33	15.0
Toronto (Canada)	CFRX	6,090	49.28	0.5
Hong Kong (China)	ZBW2	6,090	49.26	2.5
Cape Town (South Africa)	ZRK	6,100	49.20	5.0
Johannesburg (South Africa)	ZRJ	6,100	49.20	5.0
Chicago (U.S.A.)	W9XF	6,105	49.18	10.0
Bound Brook (U.S.A.)	W3XAL	6,105	49.18	15-35
Belgrade (Yugoslavia)	YUA	6,105	49.18	1.0
Daventry (Great Britain)	GSL	6,110	49.10	10-50
Calcutta (India)	VUC	6,110	49.10	0.5
Wayne (U.S.A.)	W2XE	6,120	49.02	10.0
Jeloy (Norway)	LKJ	6,120	49.02	1.0
Havana (Cuba)	COCD	6,130	48.92	1.0
Halifax (Canada)	CJHX	6,135	48.90	0.5
Pittsburgh (U.S.A.)	W8XK	6,140	48.83	30.0
Durban (South Africa)	ZRD	6,150	48.80	0.01
Winnipeg (Canada)	CJRO	6,155	48.78	2.0
San Jose (Costa Rica)	TIPG	6,410	46.80	1.0
Riobamba (Ecuador)	PRADO	6,610	45.31	2.0
Radio Nations (Switzerland)	HBQ	6,670	44.94	20.0
Amateurs		7,000—7,300 KC.,	42.85—41.09 m.	
Barcelona (Spain)	EAJI	7,030	42.70	—
Salamanca (Spain)	EAIBO	7,070	42.43	—
Tokio (Japan)	JVP	7,510	39.95	50.0
Moscow (U.S.S.R)	RKI	7,540	39.79	25.0
Radio Nations (Switzerland)	HBP	7,797	38.48	20.0
Budapest (Hungary)	HAT4	9,120	32.88	6.0
Havana (Cuba)	COCH	9,435	31.80	10.0
Madrid (Spain)	EAR	9,480	31.63	10.0
Rio de Janeiro (Brazil)	PRF5	9,500	31.58	12.0
Melbourne (Australia)	VK3ME	9,500	31.58	2.0
Bangkok (Siam)	HS8PJ	9,500	31.58	5.0
Daventry (Great Britain)	GSL	6,110	49.10	10-50
Skamleback (Denmark)	OZF	9,520	31.51	6.0
Pretoria (South Africa)	ZRH	9,522	31.50	5.0
Hong Kong (China)	ZBW3	9,525	31.49	2.5
Jeloy (Norway)	LKC	9,530	31.48	1.0
Schenectady (U.S.A.)	W2XAF	9,530	31.48	25.0
Suva (Fiji)	VPD2	9,535	31.47	0.4
Tokio (Japan)	JZI	9,540	31.46	50.0
Zeesen (Germany)	DJN	9,545	31.45	5-40
Prague (Podebrady) (Czechoslovakia)	OLR3A	9,550	31.41	30.0
Bombay (India)	VUB2	9,550	31.41	4.5
Schenectady (U.S.A.)	W2XAD	9,550	31.41	—
Soerabaja (Dutch East Indies)	Y2B	9,555	31.40	1.0
Zeesen (Germany)	DJA	9,560	31.38	5-40
Lima (Peru)	OAX4T	9,565	31.37	10.0
Millis (U.S.A.)	W1XK	9,570	31.35	10.0
Paris (Radio Mondial) (France)	TPB11	9,570	31.35	25.0
Manila (Philippine Islands)	KZRM	9,570	31.35	1.0
Lyndhurst (Australia)	VLR	9,580	31.32	1.0
Daventry (Great Britain)	GSC	9,580	31.32	10-50
Sydney (Australia)	VK2ME	9,590	31.28	20.0
Perth (Australia)	VK6ME	9,590	31.28	2.0
Delhi No. 2 (India)	VUD2	9.590	31.28	10.0
Huizen (Holland)	PCJ	9,590	31.28	60.0
Moscow (U.S.S.R.)	RW96	9,600	31.25	20.0
Cape Town (South Africa)	ZRK	9,605	31.23	5.0
Soerabaja (Dutch East Indies)	YDB	9,610	31.20	1.0
Rome (Italy)	I2RO3	9,635	31.12	25.0

Short-Wave Station Locations and Frequencies (contd.)

Station	Call Sign	Freq.	λ	KW.
Lisbon (Portugal)	CS2WA	9,650	31.09	2.0
Buenos Aires (Argentina)	LRX	9,660	31.06	10.0
Havana (Cuba)	COCQ	9,740	30.80	1.0
Madrid (Spain)	EAQ1	9.830	30.52	10.0
Havana (Cuba)	COCM	9.835	30.51	—
Lisbon (Portugal)	CSW	9,940	30.18	5.0
Marapicu (Brazil)	PSH	10.220	29.35	—
Bandoeng (Dutch East Indies)	PMN	10,260	29.24	1.5
Ruysselede (Belgium)	ORK	10,330	29.04	10.0
Buenos Aires (Argentina)	LSX	10,350	28.99	12.0
Bandoeng (Dutch East Indies)	PLP	11,000	27.17	1.5
Lisbon (Portugal)	CSW2	11,040	27.17	5.0
Radio Nations (Switzerland)	HBO	11,400	26.31	20.0
Havana (Cuba)	COCX	11,490	26.11	1.0
Warsaw (Poland)	SPD	11,530	26.01	20.0
Motala (Sweden)	SBP	11,705	25.65	0.75
Santiago (Chile)	CB1170	11,700	25.65	—
Paris (Radio Mondial) (France)	TPA4	11,720	25.60	12.0
Winnipeg (Canada)	CJRX	11,720	25.60	2.0
Huizen (Holland)	PHI	11.730	25.57	25.0
Boston (U.S.A.)	W1XAL	1,730	25.57	—
Daventry (Great Britain)	GSD	11,750	25.53	10-50
Zeesen (Germany)	DJD	11,770	25.49	5-40
Boston (U.S.A.)	W1XAL	11,790	25.45	20
Zeesen (Germany)	DJO	11,800	25.42	5-40
Vienna (Austria)	OER3	11,800	25.42	1.5
Tokio (Japan)	JZJ	11,800	25.42	50.0
Rome (Italy)	I2R04	11,810	25.40	25.0
Daventry (Great Britain)	GSN	11,820	25.38	10-50
Wayne (U.S.A.)	W2XE	11,830	25.36	10.0
Lisbon (Portugal)	CSW4	11,840	25.34	5.0
Zeesen (Germany)	DJP	11,855	25.31	5-40
Daventry (Great Britain)	GSE	11,860	25.29	10-50
Pittsburgh (U.S.A.)	W8XK	11,870	25.26	25.0
Paris (Radio Mondial) (France)	TPB7	11,885	25.24	25.0
Paris (Radio Mondial) (France)	TPA3	11,885	25.24	12.0
Reykjavik (Iceland)	TFJ	12,235	24.52	7.5
Moscow (U.S.S.R.)	VZSPS	12,000	25.00	20.0
Warsaw (Poland)	SPW	13,635	22.00	2.0
Amateurs		14,000—14,400 KC.	21.42—20.83 m.	
Barcelona (Spain)	EAJ1	14,060	21.35	—
Radio Nations (Switzerland)	HBJ	14,530	20.64	20.0
Sofia (Bulgaria)	LZA	14,920	20.11	1.5
Moscow (U.S.S.R.)	RW96	15,040	19.95	25.0
Zeesen (Germany)	DJL	15,110	19.85	5-40
Vatican City (Vatican State)	HVJ	15,120	19.84	25.0
Paris (Radio Mondial) (France)	TPB6	15,130	19.83	25.0
Boston (U.S.A.)	W1XAL	15,130	19.83	20.0
Daventry (Great Britain)	GSF	15,140	19.82	10-50
Bandoeng (Dutch East Indies)	YDC	15,150	19.80	1.5
Batavia (Dutch East Indies)	—	15,150	19.80	3.0
Daventry (Great Britain)	GSO	15,180	19.76	10-50
Hong Kong (China)	ZBW4	15,190	19.75	2.5
Zeesen (Germany)	DJB	15,200	19.74	5-40
Pittsburgh (U.S.A.)	W8XK	15,210	19.72	20.0
Huizen (Holland)	PCJ	15,220	19.71	60.0
Prague (Podebrady) (Czechoslovakia)	OLR5A	15,230	19.70	30.0
Paris (Radio Mondial) (France)	TPA2	15,240	19.69	12.0
Boston (U.S.A.)	W1XAL	15,250	19.67	20.0
Daventry (Great Britain)	GSI	15,260	19.66	10-50
Wayne (U.S.A.)	W2XE	15,270	19.65	10.0
Zeesen (Germany)	DJQ	15,280	19.63	5-40
Buenos Aires (Argentina)	LRU	15,290	19.62	7.0
Daventry (Great Britain)	GSP	15,310	19.60	10-50
Prague (Podebrady) (Czechoslovakia)	OLR5B	15,320	19.58	30.0
Schenectady (U.S.A.)	W2XAD	15,330	19.57	20.0
Zeesen (Germany)	DJR	15,340	19.56	5-40
Budapest (Hungary)	HAS3	15,370	19.52	6.0
Hicksville (U.S.A.)	W2XGB	17,310	17.33	5.0
Hong Kong (China)	ZBW5	17,750	16.90	2.5
Zeesen (Germany)	DJE	17,760	16.89	5-40
Wayne (U.S.A.)	W2XE	17,760	16.89	10.0
Paris (Radio Mondial) (France)	TPB3	17,765	16.88	25.0
Huizen (Holland)	PHI	17,765	16.88	25.0
Bound Brook (U.S.A.	W3XAL	17,780	16.87	15-35
Daventry (Great Britain)	GSG	17,790	16.86	10-50
Buenos Aires (Argentina)	LSY3	18,110	16.56	5.0
Radio Nations (Switzerland)	HBH	18,480	16.25	20.0
Bangkok (Siam)	HS8PJ	19,020	15.77	5.0
Zeesen (Germany)	DJS	21,450	13.99	5-40
Daventry (Great Britain)	GSH	21,470	13.97	10-50
Schenectady (U.S.A.)	W2XAD	21,500	13.95	—
Wayne (U.S.A.)	W2XE	21,520	13.94	10.0
Daventry (Great Britain)	GSJ	21,530	13.93	10-50
Pittsburgh (U.S.A.)	W8XK	21,530	13.93	6.0
Daventry (Great Britain)	GST	21,550	13.92	10-50

NOTE: This list is comprised of stations and frequencies actually in use on May 31, 1938, when it was compiled.

Australian Short Wave Experimental Transmission Schedules

VK2ME (SYDNEY). Sundays only, 31.28 Metres, 9,590 K/Cs.

Month of Session	Sydney Time	G.M.T.	E.S.T. (America)
1938			
July			
1st	3.0 p.m.— 5.0 p.m.	0500 — 0700	Mdt. — 2.0 a.m.
2nd & 3rd	7.30 p.m.—11.30 p.m.	0930 — 1330	4.30 a.m.— 8.30 a.m.
4th	2.30 a.m.— 4.30 a.m.	1630 — 1830	11.30 a.m.— 1.30 p.m.
August			
1st	3.0 p.m.— 5.0 p.m.	0500 — 0700	Mdt. — 2.0 a.m.
2nd & 3rd	7.30 p.m.—11.30 p.m.	0930 — 1330	4.30 a.m.— 8.30 a.m.
4th	1.30 a.m.— 3.30 a.m.	1530 — 1730	10.30 a.m.—12.30 p.m.
September			
1st	3.30 p.m.— 5.30 p.m.	0530 — 0730	12.30 a.m.— 2.30 a.m.
2nd & 3rd	7.30 p.m.—11.30 p.m.	0930 — 1330	4.30 a.m.— 8.30 a.m.
4th	12.30 a.m.— 2.30 a.m.	1430 — 1630	9.30 a.m.—11.30 a.m.
October			
1st	3.30 p.m.— 5.30 p.m.	0530 — 0730	12.30 a.m.— 2.30 a.m.
2nd & 3rd	7.30 p.m.—11.30 p.m.	0930 — 1330	4.30 a.m.— 8.30 a.m.
4th	12.30 a.m.— 2.30 a.m.	1430 — 1630	9.30 a.m.—11.30 a.m.
November			
1st	4.0 p.m.— 6.0 p.m.	0600 — 0800	1.0 a.m.— 3.0 a.m.
2nd & 3rd	7.30 p.m.—11.30 p.m.	0930 — 1330	4.30 a.m.— 8.30 a.m.
4th	Mdt. — 2.0 a.m.	1400 — 1600	9.0 a.m.—11.0 a.m.
December			
1st	4.0 p.m.— 6.0 p.m.	0600 — 0800	1.0 a.m.— 3.0 a.m.
2nd & 3rd	8.0 p.m.—Mdt.	1000 — 1400	5.0 a.m.— 9.0 a.m.
4th	Mdt. — 2.0 a.m.	1400 — 1600	9.0 a.m.—11.0 a.m.
1939			
January			
1st	4.0 p.m.— 6.0 p.m.	0600 — 0800	1.0 a.m.— 3.0 a.m.
2nd & 3rd	8.0 p.m.—Mdt.	1000 — 1400	5.0 a.m.— 9.0 a.m.
4th	Mdt. — 2.0 a.m.	1400 — 1600	9.0 a.m.—11.0 a.m.
February			
1st	4.0 p.m.— 6.0 p.m.	0600 — 0800	1.0 a.m.— 3.0 a.m.
2nd & 3rd	8.0 p.m.—Mdt.	1000 — 1400	5.0 a.m.— 9.0 a.m.
4th	Mdt. — 2.0 a.m.	1400 — 1600	9.0 a.m.—11.0 a.m.
March			
1st	4.0 p.m.— 6.0 p.m.	0600 — 0800	1.0 a.m.— 3.0 a.m.
2nd & 3rd	8.0 p.m.—Mdt.	1000 — 1400	5.0 a.m.— 9.0 a.m.
4th	12.30 a.m.— 2.30 a.m.	1430 — 1630	9.30 a.m.—11.30 a.m.
April			
1st	4.0 p.m.— 6.0 p.m.	0600 — 0800	1.0 a.m.— 3.0 a.m.
2nd & 3rd	8.0 p.m.—Mdt.	1000 — 1400	5.0 a.m.— 9.0 a.m.
4th	12.30 a.m.— 2.30 a.m.	1430 — 1630	9.30 a.m.—11.30 a.m.
May			
1st	4.0 p.m.— 6.0 p.m.	0600 — 0800	1.0 a.m.— 3.0 a.m.
2nd & 3rd	8.0 p.m.—Mdt.	1000 — 1400	5.0 a.m.— 9.0 a.m.
4th	1.30 a.m.— 3.30 a.m.	1530 — 1730	10.30 a.m.—12.30 p.m.
June			
1st	3.0 p.m.— 5.0 p.m.	0500 — 0700	Mdt. — 2.0 a.m.
2nd & 3rd	8.0 p.m.—Mdt.	1000 — 1400	5.0 a.m.— 9.0 a.m.
4th	2.30 a.m.— 4.30 a.m.	1630 — 1830	11.30 a.m.— 1.30 p.m.

VK3ME (MELBOURNE). 31.5 Metres (9,510 K/Cs.

	Melbourne Time	G.M.T.	E.S.T. (America)
Nightly, Monday to Saturday (inclusive)	7.0 p.m.—10.0 p.m.	0900 — 1200	4.0 a.m.—7.0 a.m.

VK6ME (PERTH). 31.28 Metres (9,590 K/Cs.)

	Perth Time	G.M.T.	E.S.T. (America)
Nightly, Monday to Saturday (inclusive)	7.0 p.m.— 9.0 p.m.	1100 — 1300	4.0 a.m.—6.0 a.m.

VPD2 (SUVA). (9,540 K/Cs.)

	Suva Time	G.M.T.	E.S.T. (America)
Nightly, Monday to Saturday (inclusive)	10.30 p.m.— Mdt.	1030 — 1200	5.30 a.m.— 7.0 a.m.

Experimental World-Wide Short Wave Broadcasting Station VK2ME Sydney

THE most powerful broadcasting station operating in Australia is VK2ME, the short wave long distance station of Amalgamated Wireless, located at Pennant Hills, fourteen miles from Sydney.

VK2ME is known as "The Voice of Australia," and has been heard in every country of the world where radio is known.

The studio is situated in Sydney, and the programmes cover the whole range of music, with the exception of jazz, interspersed with talks dealing mainly with the characteristic industries and life of Australia.

The transmissions of VK2ME are divided into four sections. The first covers Australia, the western portions of North and South America, and England. The second is intended for the southern and eastern portions of Australia, Tasmania, New Zealand, Papua, New Guinea, Fiji, New Caledonia, the New Hebrides, and other Pacific Islands. The third provides for Western Australia, China, Japan, the Philippine Islands, the Straits Settlements, U.S.A., and most of India, South Africa, and Rhodesia. The fourth transmission is received best in Great Britain, Western Europe, and India.

Perhaps the feature of VK2ME which has made it best known in overseas listening circles, is the laugh of Australia's national bird, the kookaburra, or laughing jackass, with which each programme starts and ends.

Considerable interest has been created in outside countries by talks on the Australian merino wool industry, agriculture, wheat, meat, dairying, and timber enterprises, and, particularly, by talks on Australia's tourist resorts. Tasmania has become more popular on the part of oversea visitors partly, it is known, through talks from VK2ME. Jenolan Caves, Mount Kosciusko and the surf beaches, for which Australia is famous, have become known abroad in a way that is very gratifying in official circles.

Amalgamated Wireless (A/sia) Ltd. is carrying out a National service in bringing before residents of oversea countries the advantages of Australia as a tourist resort, and keeping them informed of our resources and National development.

Some idea of the publicity value to Australia of a high-powered long-distance broadcasting station may be gathered from the fact that during two and a half years Amalgamated Wireless received 15,103 letters reporting on reception of VK2ME. The number of letters received averaged 116 a week.

The transmitter of VK2ME was designed and manufactured by Amalgamated Wireless. It has a power of 20 kilowatts in the aerial and operates on a carrier frequency of 9,590 kilocycles (31.28 metres), which is generated by a high precision valve oscillator and amplified through a series of valve magnifiers. The transmitter utilises 22 oil and air-cooled valves mounted in seven separate units.

Australians are becoming more and more interested in international affairs, a fact accounted for partly by reason of Australia being a member of the League of Nations, and partly on account of the large number of movements in Europe having a reaction upon Australia's financial and economical position. Just as we can listen in Australia to transmission in English from Germany and Holland, A.W.A. has made it possible for European residents to hear broadcast announcements from VK2ME in French, German, Dutch, Spanish, and Italian as well as English. It is believed that this will still further enhance the station's popularity and usefulness abroad, especially in European countries.

Experimental S.W. Broadcasting Station VK3ME.

VK3ME is the Victorian short wave overseas experimental station of Amalgamated Wireless (A/sia) Ltd. The transmitter is housed at the A.W.A. Transmitting Centre, Braybrook, six miles west of Melbourne on the Ballarat Road.

VK3ME commenced experimental world-wide broadcasts in 1927. The services have been gradually extended and the station now operates from Monday to Saturday, from 7 to 10 p.m., Eastern Australian Standard time (0900 to 1200 G.M.T.).

Every overseas mail contains appreciatory letters of the reception of the station's programmes. The items broadcast comprise entertainment interspersed with interesting and informative lectures and talks on Australian affairs.

The studio is located at the offices of Amalgamated Wireless (A/sia) Ltd., "Wireless House," 167 Queen Street, Melbourne, and is equipped for A.C. working throughout with the usual facilities for relaying and for duplex telephony.

The transmitter was designed and manufactured at the Radio-Electric Works of Amalgamated Wireless. It operates on 9,510 kilocycles and has an aerial power of 1.5 KW. It consists of four units and two high tension double wave three phase rectifiers. The high power method of modulation is used.

The aerial is of the half-wave vertical type arranged for low angle uniform radiation, and is remotely fed by a conventional high frequency feeder line about 250 feet long.

VK6ME, Perth.

On March 22, 1937, Amalgamated Wireless (A/sia) Ltd. inaugurated a short wave experimental broadcasting service of world range at Perth, Western Australia.

The station, known as VK6ME, operates on a frequency of 9,590 kilocycles with a power of 200 watts unmodulated in the aerial.

Reports on the reception of VK6ME have been received by A.W.A. from all parts of the world.

Commercial Station VPD2, Suva, Fiji.

Amalgamated Wireless (A/sia) Ltd., also operates the short wave broadcasting station VPD2 at Suva, Fiji. This station has a frequency of 9,540 kilocycles, with a power of 500 watts. It is expected that this power will be increased to 10 KW. before the end of 1938.

VPD2 is the only commercial short wave station in the Southern Hemisphere. Confirmatory letters of the station's reception have been received from all parts of the world.

PROMINENT ADVERTISERS IN AUSTRALIAN BROADCASTING

Analysed by Products Advertised

All the particulars included in this section are derived from information supplied by commercial broadcasting stations throughout Australia, and relate to broadcast advertising accounts on the respective stations during 1937.

Of the 90 commercial stations operating at the beginning of 1938 when a questionnaire was circulated a total of 81 stations returned the questionnaires completed in part or fully. Of these stations 51 supplied lists of accounts broadcast over their respective stations during 1937 and from those lists the following compilation was made. It must be borne in mind that at least one leading station in Melbourne, three in Sydney and one in Brisbane did not supply lists of their 1937 accounts. However, as only those accounts using substantial air time over one station or spreading their allocation over a number of stations have been extracted for publication in this list, a fairly comprehensive picture of broadcast advertising during 1937 has resulted.

One purpose of this section is to indicate at a glance from what industries and what sections of commerce broadcast advertising business flows. The station call-signs after each listed advertiser and product show at least some of the stations used, according to information supplied by those stations.

The 1937 account listings of these 51 stations represent in the aggregate a substantial number. The total of national accounts entered over the 51 stations reached 2,173, and accounts under the heading of "local expending £100 or more," reach 1,745.

Automobiles, Accessories, etc.

Bennett and Wood Pty., Ltd.: Accessories, 2WL.
Brico Pty., Ltd., Camperdown: Piston rings, 2GZ, 2NZ, 3SR, 3UL, 4AY, 4BC, 4GR, 5KA, 6AM, 6PM.
Colman-Keen Ltd., Redfern: Car polish, 2GZ.
Dalgety and Co., Sydney: Cars, 2GZ.
Dunlop Pedriau Rubber Co., Sydney: Tyres and rubber goods, 2GZ, 2HD, 2KO, 2LM, 3KZ, 4BC, 5DN, 6IX, 6WB, 7LA.
Ford Co. (Aust.) Ltd., Homebush: Cars, 3AW, 6ML.
General Motors-Holdens Ltd.: Cars. 2GZ, 3SR.
Hardie Trading Co., Sydney: Car polish, 4TO.
Reckitts (Oversea) Ltd., Redfern: Karpol, 2HD, 4AY, 6ML.
Smith Sons and Rees Pty., Ltd., Sydney: Spark plugs, 2CA.
Stack and Co., Sydney: Pontiac cars, 2WL, 6IX, 6WB.
Studebaker Cars, Sydney: Cars, 6IX, 6ML.
Robert Ushers and Sons, Sydney: Adson car polish, 2GZ.

Batteries, etc.

Chandler, J.B. and Co.: Diamond batteries, 4ZR.
Clyde Engineering Co., Sydney: Batteries, 4GR, 4TO, 4BU.
Ever Ready Battery Co., Rosebery: Batteries, 2AD, 2BH, 2GZ, 2LM, 2NZ, 2WL, 3SR, 4AY, 4BU, 4GR, 4MB, 4RO, 6AM, 6IX, 6ML, 6WB, 7BU, 7HO, 7LA, 7OT.
Exide Batteries (Aust.) Ltd., Sydney: Batteries, 2AD, 2GZ, 2KO, 2LM, 2NZ, 3SR, 7LA, 7UV.
Impex Ltd., Abfd., Melbourne: Batteries, 3SR.
Masse Batteries Ltd., Sydney: Batteries, 2GF, 2HD, 2WL, 3KZ, 4GR, 4MB, 4RO, 6AM, 6IX, 7LA.
Sutherland, A.P.: Exide batteries, 3UL.
Vesta Batteries, Leichhardt: Batteries, 4AY.
Widdis Diamond Dry Cells, Melbourne: Batteries, 2BH, 2GF, 2GZ, 2TM, 2WL, 3SR, 3UL, 4GR, 4MB, 4RO, 4TO, 5DN, 6IX, 6ML, 6WB, 7BU, 7LA.
Willard Batteries, Sydney: Batteries, 2AD, 2WL.

Bicycles.

Elliott Bros., Melbourne: Cycles, 2BH.
Healing, A. G. Ltd., Sydney: Cycles, 2CH.
Small, Bruce Pty., Ltd., Chippendale: Malvern Star cycles, 2BE, 2BS, 2CH, 2GZ, 2LM, 3AW, 4BU, 4MB, 6IX, 6ML, 6WB.

Cleaners and Dyers.

Brown's, Melbourne: Dry cleaning, 3SR.
De Luxe Dry Cleaning: Dry cleaning, 3SR.
Mayne, Mark Pty., Ltd., Crow's Nest: Dry cleaning, 2TM.

Confectionery.

Ace Chewing Sweets, Melbourne: Chewing gum, 2CH, 3XY, 5DN, 5KA, 6IX, 6ML.
Allen, A. W. Ltd., Melbourne: Sweets, 2CH, 2HD.
Hoadleys (Aust.) Ltd., Melbourne: Sweets, 2TM, 3XY, 6ML.
Life Savers, Fitzroy, Melbourne: Sweets, 3AW, 3XY, 4BH, 4BU, 5KA, 6IX, 6ML, 7LA.
McNiven's Ice Cream, Camperdown: Ice Cream, 2KY.
MacRobertsons, Melbourne: Sweets, 3AW, 3KZ, 3XY, 6IX, 6ML.
N.S.W. Fresh Food & Ice Co., Sydney: Ice Cream, 2GZ.
Nestle and Anglo-Swiss Condensed Milk Co., Sydney: Confectionery, 2BH, 2GF, 2GZ, 2HD, 2KO, 2NZ, 2TM, 2WL, 3GL, 3KZ, 4IP, 4MB, 4PM, 4TO, 5DN, 6AM, 6ML, 6WB, 7BU, 7HO, 7HT, 7LA.
Peters American Delicacy Co., Sydney: Ice Cream, 2CH, 2HD, 2KO, 3XY, 6ML, 6PM, 6WB, 7BU, 7HO, 7LA.
Small and Co., Stanmore: Sweets, 2HD.
Sydney Confectionery Ltd., Newtown: Sweets, 2GZ.
Wrigleys Ltd., Rosebery: Chewing Gum, 2BH, 2CH, 2GZ, 2KO, 2LM, 2TM, 2WL, 3KZ, 4IP, 4RO, 6AM, 6IX, 6WB, 7HT, 7LA.

Cosmetics, etc.

Amalgamated Drug and Cosmetic Co., Pyrmont: Cosmetics, 4BC.
Bourjois Et Cie (Aust.) Ltd., Sydney: Cosmetics, etc., 2HD, 5DN.
Bush, W. J., and Co., Sydney: Cosmetics, etc., 4BC, 6IX, 6ML, 6WB.
Blogg Bros., Sydney: Perfumes, 2TM.
Continental Drug Co., Sydney: Cosmetics, 2CH.
Dearborn Aust. Ltd., Sydney: Beauty products, 2AD, 2GZ, 2SM.

Prominent Advertisers in Australian Broadcasting

(Continued.)

Faulding, F. H., Redfern: Perfumery, 4BC.
Femalure Co. (R. B. Walton): Beauty products, 2CA, 2NZ.
James and Anderson, Sydney: Max Factor Cosmetics, 3KZ.
Potter and Moore, Sydney: Perfumes, 2KO, 3AW, 6IX, 6WB, 6ML.
Ponds Extract Co., International Ltd., Cosmetics, 2CH, 6IX, 6WB.
Woods, W.E., Ltd., Sydney: Nivea Face Cream, 2AD, 2CH, 2LM.

Electrical and Household Appliances.

A.G.E., Sydney: Electrical goods, 4BC.
Aladdin Industries Pty., Ltd., Sydney: Lamps, 2LM, 6WB.
B. G. E., Sydney: Electrical products, 2BE, 2CH, 2GZ.
Coleman Quick-Lite Co., Sydney: Lamps, irons, 2GZ, 2LM, 2TM.
Everyday Products Ltd., Sydney: Electrical goods, 2GZ.
Hallstroms Pty. Ltd., Willoughby: Refrigerators, 2TM.
Healing, A. G., Ltd., Sydney: Refrigerators, 2CH.
Moffatt-Virtue, Sydney: Electrolux refrigerators, 2LM, 2NZ.
Philips Lamps (Aust.) Pty. Ltd., Sydney: Lamps, 2CA, 2GZ, 2KO, 2MW, 3AW, 6IX, 6ML.
Pyrox Pty., Ltd., Sydney: Hot water systems, head light inserts, 2CH.
Sachs, E. and Co.: Stoves, 2LM, 4IP, 4MB, 4RO.
Standard Telephones and Cables, Sydney: Electrical appliances, 2MW.
Wilks, E. F., and Co. Ltd., Sydney: Electrical goods, 2GZ, 2KO.

Farm, Station, Gardening Equipment, etc.

Alfa Laval Separator Co., Sydney: Separators, 2GF.
A.R.C. Engineering Co., Sydney: Machinery, 2GZ.
Australian Fertilizers, Sydney: Fertilizer, 2TM.
Australian Reinforced Concrete Eng. Co., Sydney: Fencing, 2TM.
Buzzacott and Co. Ltd., Sydney: Station supplies, 2GZ.
Cyclone Fence Co., Abfd., Melbourne: Fences, 3SR, 3UL.
Dangar, Gedye and Malloch Ltd., Sydney: Machinery, 2GZ, 2NZ, 2TM.
Elder Smith and Co., Sydney: Shearing plants, 6AM.
Farmers and Graziers, Sydney: 2TM.
Goldsborough Mort, Sydney: Woolpresses, 2MO.
Grazcos, Sydney: Machinery, 2GZ.
Hardie Rubber Co. Ltd., Sydney: Garden hose, etc., 2GZ, 2HD, 3SR, 4BC, 5KA, 6AM, 6IX.
Howard Auto Cult., Northmead: Machinery, 2GZ.
International Harvester Co., Camperdown: Machinery, 2BE, 2BS.
Kelly and Lewis, Melbourne: Farm implements, 3UL.
Moffatt-Virtue Ltd., Sydney: Machinery, 2GF, 2GZ.
McGrath, John, Sydney: Tractors, 2DU.
Nitrogen Fertilisers, Sydney: Fertilisers, 3SR, 6WB.
Qualcast Pty., Ltd., Melbourne: Lawn Mowers, 2CH, 4BU, 4TO, 6IX, 6ML.
Ronaldson Bros. and Tippett, Sydney: Farm machinery, 3UL.
Sachs, E., and Co.: Saxon cream cans, 4ZR.
Shearer, David, Pyrmont: Machinery. 2MO, 2TM.
Waugh and Josephson, St. Peters: Tractors, 2MO.
Wolseley Machinery Co. Ltd., Sydney: Machinery, 2GZ, 2NZ.

Finance and Banking.

Amalgamated Cash Orders, Sydney: Cash loans, orders, 3GL.
Australian Fixed Trust Pty., Ltd., Sydney: Finance, 2KO, 2UE, 2WL.
Australian Mutual Provident Soc., Sydney: Insurance, 2BE.
Commercial Discounters Pty., Ltd., Sydney: 5KA.
Commonwealth Bank, Sydney: Loans, 2TM, 3KZ, 4MB, 6AM, 6PM.
Commonwealth Bank of Australia, Sydney: Banking service, 6WB.
Commonwealth Loan: Finance, 2DU.
Mutual Life and Citizens Assoc., Sydney: Assurance, 6AM, 6PM.
M.L.C., Sydney: Insurance, 2GZ.
N.S.W. Mont de Piete, Sydney: Loans, 3GL.
N.S.W. Mont de Piete Co., Sydney: Finance, 2HD.
Rural Bank of N.S.W., Sydney: Banking service, 2GZ, 2LM, 2NZ, 2TM.
State Insurance, Sydney: Insurance, 4GR, 4TO.
T. and G. Insurance Co. Ltd., Sydney: Insurance, 2HD, 6ML, 7HO.
Temperance and General Mutual Life Soc., Sydney: Assurance, 2CH.

Food and Groceries.

Adams, G. E., Ltd., Sydney: Cakes, 4TO.
Anderson, A. W., Sydney: Sausages, 2MO.
Angliss, W. M., Sydney: Foodstuffs. 2BH, 2CH, 2KO, 3AK, 4BC, 5DN, 6AM, 6IX, 6ML, 6WB, 7BU, 7LA, 7QT.
Apple and Pear Board: Fruit, 2CH, 4BC.
Arnott, William, Homebush: Biscuits, 2CA, 2GZ, 2TM, 7BU, 7HO.
Barnes, J., Sydney: Globex, 2KO, 4BU, 6IX, 6ML.
Barnes Bacon Co. Ltd., Sydney: Bacon, 2WL.
Bengal Chutney Co.: Chutney, 2CH, 4AY, 4MB, 4RO.
Berry, Henry and Co., Sydney: Tea and groceries, 2CA, 3AW, 3GL, 3KZ, 3SR, 3UL, 7HT, 7QT, 7UV.
Bickford, A. M., and Son, Sydney: Coffee, 5DN.
Bovril (Aust.) Ltd.: Bovril, 2GZ.
Brockhoffs (N.S.W.) Ltd., Glebe: Flour, 2HD, 2KO.
Brockhoff, Melbourne: Biscuits, 3AW, 3GZ, 3KZ, 3SR, 3UL, 7BU, 7LA.
Bushells Ltd., Sydney: Tea and coffee, 2AD, 2BH, 2CA, 2CH, 2DU, 2GF, 2GZ, 2HD, 2KO, 2LM, 2NZ, 2PK, 2RG, 2TM, 3AW, 3BA, 3GL, 3KZ, 3XY, 4AY, 4BC, 4TO, 4ZR, 5DN, 5KA, 6IX, 6WB, 7BU, 7HO, 7LA.
Celta Pty., Ltd., Sydney: Celta salt, 2CH, 2HD.
Cereal Foods Ltd., Sydney: Crispies, 2CH, 2GF, 2HD, 2LM, 2NZ, 2TM, 3SR, 3UL, 4AY, 4MB.
Cereal Foods (W.A.) Ltd., Fremantle: Weeties, 6IX, 6ML.
Cerebos Ltd., Sydney: Bisto, 3AW, 7BU, 7HT, 7LA.
Coleman-Keen (Aust.) Ltd., Redfern: Mustard, 2BH, 2LM, 4BH, 4MB, 4RO, 4TO, 6ML, 7LA.
Connell, John and Co., Sydney: Tea, 2CA, 2GF, 2GZ, 2NZ, 2TM.
Defiance Milling Co.: Flour, 4BU.
Douglass, W. C. Pty., Ltd., Sydney: Flour and groceries, 2GZ, 2HD, 2KO, 2LM, 2TM, 2WL, 4BC.
Eck's Aerated Waters, Croydon: Cordials, 3AW.
Farmer, Geo. Ltd., Melbourne: Hams, 6IX, 6ML.
Fielder, Geo. and Co., Sydney: Flour, 2TM.
Fleming and Co., Melbourne: Creamota, 2CH, 3KZ, 7BU, 7UV.
Foggitt Jones Pty., Ltd., Sydney: Rex products, 2CH, 2GZ, 2KO, 6IX, 6ML, 6WB.
Foley Bros., Sydney: Butter, 2GZ.
Fowler, D. and J., Perth: Groceries, 5KA, 6AM, 6IX, 6PM, 6WB.
Guest, T. B. and Co., Melbourne: Biscuits, 3AK.
Groves McVitty and Co., Melbourne: Custard powder, 3SR.
Gartrell White Ltd., Sydney: Cakes, 2WL.
Grocery Distributors Pty., Ltd., Melbourne: Groceries, 6ML.
Gibson, J. A. D. and Co., Sydney: Tea, 2HD, 2UW, 2WL, 7LA.
Hansens: Junket tablets, 4BU, 6MI.
Highfield Tea Co., Brisbane: Tea, 4RO.
Honey Board: Honey, 2CH, 2KO, 4BC, 6IX, 6WB, 7UV.
Hughes, E. Griffith: Salt, 4AY.
Hutton, J. C. Pty., Ltd., Sydney: Sauce, 3UL.
Hodgson and Co. Ltd., Sydney: Ally salmon, 2HD, 2KO, 5KA.
Ireland, J. and Co.: Groceries, 2LM, 2TM.
Inglis Ltd., Sydney: Tea, 2GZ, 2HD, 6IX, 6ML.
Joyce Biscuits, Sydney: Biscuits, 2GZ, 2TM.
Kellogg (Aust.) Ltd., Sydney: Cornflakes, etc., 2CH, 2GZ, 2HD, 2KO, 2LM, 2TM, 2WL, 3AW, 3KZ, 3SR, 4RO, 4TO, 5KA, 6IX, 6ML, 7BU, 7HO, 7LA.

Prominent Advertisers in Australian Broadcasting

(Continued from Page 157.)

Kraft Walker Cheese Co., Sydney: Cheese, 5DN, 6IX, 6WB, 7BU, 7HA, 7HO, 7LA.
Lea and Perrins Ltd., Sydney: Sauce, 2CH, 2GZ, 2HD, 3SR, 5DN, 6AM.
Lipton's, Melbourne: Tea: 3AW, 6IX, 6ML, 6WB.
Lockett Bros., Ltd.: Sauces, 2GZ, 2KA.
Clifford Love and Co.: Rolled oats, cornflour, starch, etc., 4BU, 6IX, 7HO, 7QT, 7UV.
Love, J. R. and Co., Sydney: Flour, tea, etc., 2GZ, 2HD, 2KO, 2WL.
Mary Gold, Sydney: Essences, 2KO.
Maxam Cheese Products Pty., Sydney: Cheese, 2BH, 4ZR, 5DN.
Meyers, N. E., Sydney: Mynor products, 2GZ, 4BC.
The Milk Board, Sydney: Milk, 2HD.
Moran and Cato, Sydney: Grocers, 2SM, 3KZ.
Mums Products, Sydney: Jellies, etc., 2GZ, 2KY.
Maize Products Pty., Ltd., Sydney: Starch and cornflour, 2CH, 2HD, 2KO, 2KY, 3AW, 7LA.
McLintock's Jelly Crystals, Melbourne: Jelly crystals, 3AW.
Nestle and Anglo-Swiss Cond. Milk Co., Sydney: Foodstuffs, 2BH, 2GF, 2GZ, 2HD, 2KO, 2NZ, 2TM, 2WL, 3GL, 3KZ, 4IP, 4MP, 4PM, 4TO, 5DN, 6AM, 6ML, 6WB, 7BU, 7HO, 7HT, 7LA.
Nut Foods Pty., Ltd., Sydney: Eta products, 2LM, 3SR.
O.T. LTD., Sydney: Cordials, 2CA, 2GZ, 2LM, 2NZ, 2TM, 4RO, 4TO.
Paget Manufacturing Co., Sydney: Jellies, etc., 3AW, 3KZ, 7BU.
Parsons Bros., Sydney: Groceries, 2KO, 3KZ, 4ZR.
Peek Frean Ltd., Sydney: Biscuits, 2KO.
Phoenix Biscuit Co., Melbourne: Biscuits, 3AW, 7BU, 7LA.
P.M.U. Condiment Co., Sydney: Condiments, 2CH, 2GZ, 2HD, 2LM, 2TM, 3AW, 4BC, 4RO, 6AM, 6PM.
Pie Bruce and Co., Sydney: Tinned fish, 4BU, 4SR.
Potato Marketing Board of Tasmania: Tasmanian potatoes, 2HD.
Premiums Ltd., Brisbane: Groceries, 4AY, 4BU, 4TO.
Procera, Sydney: Bread, 2DU.
Purina Grain Foods, Sydney: Cerials, 2CH, 4GR, 4MB, 4RD, 5DN, 6AM, 6PM, 7QT.
Robur Tea, Sydney: Tea and coffee, 2CA, 6AM, 6IX, 6ML, 6PM, 6WB, 7HT, 7QT, 7UV.
Rosella Preserving Co., Sydney: Rosella products, 2KO, 2LM, 2NZ, 3AW, 3XY.
Sanitarium Health Food Co., Sydney: Cereals, etc., 2CH, 2GZ, 2KO, 2LM, 2TM, 3SR, 3UL, 4AY, 4BC, 4GR, 4MB, 4TO, 5DN, 6AM, 6ML, 7BU.
Saunder's Malt Extract, Sydney: Malt extract, 2CH, 2GZ, 2KY, 3AW, 3XY, 5DN, 7LA.
Schweppes Ltd., Melbourne: Cordials, 2GZ, 3XY.
Sunshine Biscuit Co. Pty., Ltd., Melbourne: Biscuits, 3GL, 3SR, 3UL, 7HO.
Swallow and Ariell Ltd., Melbourne: Biscuits, cakes, 3AW, 3GL, 3KZ, 3SR, 3UL, 4AY, 4BH, 4BU, 4TO, 4ZR, 6AM, 6ML, 7BU, 7LA, 7QT.
Taylor, Samuel Pty., Ltd., Sydney: Essences, 2CH.
Tillock and Co., Sydney: Baking powder, flour, etc., 2BE, 2GF.
Traders Ltd., Newtown: Aeroplane jellies, 2HD, 2UW.
Wander, A. Ltd.: Ovaltine, 61X, 6WB.

Footwear.

Fostars Shoes Ltd., Sydney: Footwear, 2HD, 2KY, 4BH, 4BU, 4TO.
Hunter, John and Son, Redfern: Shoes, 2LM, 2NZ, 2TM, 4BU, 4GR.
Waldas Shoes Ltd.: Shoes, 5DN.
Marshall Shoe Co., Sydney: Shoes, 6IX, 6WB.
Williams The Shoemen, Melbourne: Shoes, etc., 3GL, 3SR, 3UL.

Furniture, Furnishings, etc.

Auslo Dis. Pty., Ltd.: Mirrors: 2LM, 2TM, 2WL.
Bebarfald's Ltd., Sydney: Sewing machines, 4TO.
Edments Ltd., Melbourne: Crystal china, etc., 7HT.
Harrison Smith, Melbourne: Sewing machines, 3UL.
Macrow and Sons, Melbourne: Furniture, 2HD.
Maples, Melbourne: Furniture, 3SR.
Morrison, C., Sydney: Wallpaper, 2TM.
Nettleton and Son, Sydney: Mattresses, 2KO, 2KY, 2LM, 2TM.
Pattersons Pty., Ltd.: Furniture, 3SR.
Pears Furnishing Co., Melbourne: Furniture, 3UL.
Tritton, F. Pty., Ltd., Brisbane. Furniture, etc., 4IP.

Furriers.

Biber Furs Ltd., Sydney: Furs, 2GZ, 2HD, 2KY, 2UW.

Hats, Millinery.

Henderson, R. C., Sydney: Hats, 2GZ, 2KO, 7BU, 7HO, 7LA.
United Felt Hats Pty., Ltd., Sydney: Hats, 5DN.

Hosiery, Lingeries, etc.

Aust. Knitting Mills, Sydney: "Golden Ray" hosiery, 2GZ, 7QT.
Beau Monde Ltd., Melbourne: Hosiery, 3XY, 4TO, 6IX, 6WB.
Belworth Hosiery, Coburg, Melbourne: Hosiery, 4BC.
Bond Industries, Sydney: Hosiery and underwear, 2BH, 2CH, 2TM, 3KZ.
Holeproof Co., Sydney: Hosiery, 5DN, 7BU, 7HO, 7HT.
Kayser, Julius, Melbourne: Hosiery, etc., 2BH, 2CA, 2CH, 2DU, 2GF, 2GZ, 2HD, 2KO, 2LM, 2MO, 2NZ, 2TM, 2WL, 3GL, 3SR, 3UL, 7BU, 7HT, 7LA, 7QT, 7UV.
Lustre Co., Sydney: Hosiery, etc., 2AD, 2BH, 2GZ, 2HD, 2LM, 2NZ, 2TM, 3GL, 3KZ, 4IP, 4MB, 4TO, 5DN, 6AM, 6IX, 6ML, 7LA.
Mignon, Sydney: Hosiery, 2CH, 2KO, 3KZ, 6IX, 6ML, 7HT, 7LA.
Mimosa Manufacturing Co., Redfern: Lingerie, 2HD.
Prestige Ltd., Sydney: Hosiery, etc., 2BH, 2CA, 2GF, 2GZ, 2LM, 2WL, 3AW, 3KZ, 4GR, 4MB, 4TO, 5DN, 6AM, 6IX, 6ML, 6WB, 7HT, 7LA, 7UV.
Southern Textiles Pty., Ltd., Sydney: Hosiery, 2CH, 2HD.

Household Utilities, etc.

Alexander, J. R. and Sons, Melbourne: Boot polish, 5KA.
Andrews, H. T., Brisbane: Cleaners, 4MB.
Armstrong, R. H. and Co., Sydney: Cleaners and polishes, 2GZ, 2LM, 2TM, 7BU, 7QT.
Ausoline Co.: Insecticide, 4MB.
Birmacley Polish, Melbourne: Polish, 3AW.
Brent Windeyer and Co., Sydney: "Will-Kill," 2GZ.
Bryant and May, Melbourne: Matches, 3AW, 3BA, 3KZ, 3SR, 3UL, 4AY, 4BC, 4RO, 5DN.
Cahill, John, Sydney: Soap, 2KO.
Dad's Washing Tablets, Sydney: 2KO.
Farley (Aust.) Ltd., Camperdown: Vermex, 2BH, 2CH, 2GZ, 2LM, 2NZ, 4BU.
Fassett and Johnson, Sydney: Fly-tox, 2CA, 2GZ, 2KO, 2LM, 2NZ, 6IX, 6WB.
Fisher, W., Melbourne: Polish, 3KZ, 7HT, 7LA, 7UV.
Fowler's Vacola Ltd., Sydney: Bottling outfits, 2GZ, 2NZ, 3AW, 4BH, 6ML, 6WB, 7HO.
Grocery Dist. Pty., Ltd., Melbourne: Kepeg, 2GZ, 2HD, 2KO, 3SR.
Hanslick Products, Sydney: Soaps, etc., 2TM.
Heath, T. W. Pty., Ltd., Melbourne: Tarzan grip, 3UL.
Kitchen and Sons Pty., Ltd., Sydney: Soaps and cleaners, 2GZ.
Kiwi Polish, Melbourne: 4AY, 4BH, 4BU, 4GR, 4MB, 4RO, 4TO, 4ZR, 7HT.
Kleeners Ltd., Sydney: Cleaners, etc., 2CH, 2HD, 2TM, 3AW, 3KZ, 4BH, 5DN, 6IX, 6ML, 6WB.
Matthews Thompson and Co., Ltd., Sydney: Polishes, 2GZ, 2LM.
Mays Products Pty., Ltd.: Dandy starch, 4BC.
McGregor Wheelgrip and Eng. Co., Melbourne: "Killamite," 3SR, 6IX, 6WB.

Prominent Advertisers in Australian Broadcasting

(Continued.)

National Merchandisers, Sydney: Insect spray, 2TM.
Nuggett Polish Co., Melbourne: Polish, 2GZ, 3AW, 3KZ, 5KA, 6ML, 7BU.
Preservene Pty., Ltd., Melbourne: Soap, 2CH, 3AW, 3KZ, 3SR, 3UL, 7BU, 7HT, 7UV.
Reckitts (Oversea) Ltd., Sydney: Blac-it, etc., 2HD, 4AY, 6ML.
Rex Research Corp.: "Flytox," 6AM.
Rocke Tompsit, Melbourne: Insectibane, 2CH, 4TO, 6IX, 6ML, 6WB.
Taylor Samuel Pty., Ltd., Sydney: Mortein, 2CH, 2GZ, 2HD, 2KO, 2LM, 2TM, 4BC, 5DN, 6ML, 7LA.
Veall's Agencies Pty., Ltd., Sydney: Hi-Mark shoe cleaner, 6IX, 6WB.
Verm-X., Ltd., Camperdown: Spray, 2KO.
Whiteloid, Rosebery: Shu-milk, 2GZ, 2KY, 3KZ, 4GR, 4MB, 4RO, 4TO.
Zebra Stove Polish: 2BH, 2CA, 3UL, 7HO.

Jewellers, Jewellery, etc.

Dunklings Ltd., Perth: Jewellers, 6AM, 6PM.
Lands, Sam., Sydney: Jewellery, 2KY, 2MO.
Nissen, F. W., Brisbane: 4MB.
Singer, B. and Co., Sydney: Omega watches, 2BS, 2HD, 2LM, 4RO.

Liquor.

Brown, Thos.: Black and White whisky, 4ZR.
Carlton and United Breweries, Carlton: Beer, 7BU.
Cranbrook: Whisky, 6IX, 6ML.
Commonwealth Wool and Produce, Sydney. Whisky, 2MO.
Doyle, L. Ltd., Perth: Tolley's gin, 6PM.
Distillers Agency Ltd., Sydney: Whisky—King Geo. IV., 6ML.
Gilbey, W. and A. Ltd., Sydney: Gin, 2BH, 2GZ, 2HD, 2LM, 3AW, 4BH, 4TO, 6AM, 6IX, 6ML, 6PM, 7BU, 7HO, 7UV.
Gibbs Bright and Co., Sydney: Bells whisky, 2GZ.
Gramp, G. and Sons, Sydney: Orlando wines, 2GZ, 2HD, 2KY, 2TM, 5DN, 5KA, 6IX, 6ML, 6WB.
Hardy Thomas and Sons, Sydney: Wines, 2TM.
Tucker and Co. Ltd., Sydney: Brandy —Chateau Tanunda, 2DU, 2GF, 2GZ, 2HD, 2KO, 2LM, 2MO, 2TM.
Lanoma Gin: Gin, 3XY.
McWilliams Wines Ltd., Sydney: Wines, 2BS, 2CA, 2LM, 2MO, 2PK, 4BU, 4RO, 4TO.
Noonan, J. Ltd., Perth: Bell's whisky, 6IX, 6ML, 6WB.
Parbury Henty and Co., Sydney: Gin—J.D.K.Z., 7BU, 7UV.
Penfold's Wines and Spirits: Wines, 7QT.
Holmes, Richard Ltd., Perth: Windsor whisky, 6AM.
Richmond Brewing Co. Ltd., Sydney: Beer, 2HD, 3AW, 3XY, 6ML, 6PM.
Seward, J. M., Ltd., Perth: Vat, 69, 6PM.
Smith and Sons, Samuel Ltd., Perth: Wines, whisky (White Horse), 5DN, 6AM.
Seppelt and Sons, Sydney: Wines, 2AD, 2GF, 2GZ, 2KO, 3AW, 5DN, 6AM, 6PM.
Tolley, Scott and Tolley: Gin, 2HD.
Tooheys, Sydney: Oatmeal stout, 2HD.

Medicines, Medical, etc.

Amal. Drug and Cosmetic Co., Melbourne: Medical products, 2CH, 3SR.
Amalg. Drug Co., Pyrmont: Medicinal, 2KO.
Amalg. Drug and Cosmetic Co., Pyrmont, Salda seltzer, 2GZ, 3KZ.
Andrew's Liver Salts: 6IX, 6ML, 6WB.
Associated Sales, Sydney: Schumann's salts, 2BH, 2KO, 2KY, 3AW, 3KZ, 4BC, 4GR, 4RO, 4TO, 5DN, 6AM, 6PM.
Atkin's Tonic, Melbourne: Tonic, 3AW.
Australian Broadcasting Health Soc., Sydney: Junipah mineral spring salts, etc., 2AD, 2CA, 2DU, 2GF, 2LM, 2MO, 2NZ, 2TM, 4BU, 4GR, 4IP, 4MB, 4TO.
Australian Chemists' Alliance: Chemical lines, 2GZ, 2HD, 2TM.
B.C. and E. Chemicals, Sydney: Bartz salts, 2LM, 2NZ, 2TM, 2WL.
Beckers Ltd., Sydney: A.P.C. powders, 2CA, 2GZ, 2KO, 2TM, 4AY, 4BC, 4BU, 4IP, 4MB, 4RO, 4TO, 5DN, 5KA, 6IX, 6ML.
Beecham's Pills Ltd., Carlton, Melbourne: Pills, 2CH, 2HD, 3KZ, 4BH, 6IX, 6ML, 6WB.
Best and Gee Ltd., Sydney: Lantigen, 2BS, 2KO, 2LM.
Bickford, A. M., Sydney: Sal Vital, 4TO, 2BH.
Blackney, S., Melbourne: Chiropractic, 3SR.
Bonnington's, Sydney: Cough cure, 2CH, 2KO, 4TO, 6AM, 6ML.
British Australian Drug Co.: Druggists, 4BH.
British Colonial and Eastern Chemicals, Ltd., Sydney: Mineral spring salts, 2GZ.
British H. F. Titchie and Co. Ltd., Sydney: Medicine, 2CH.
Clements, Rozelle: Clement's Tonic, 2CH, 2GZ, 2KO, 2KY, 2LM, 3AW, 3KZ, 3SR, 4AY, 4BC, 4BH, 5DN, 5KA, 6IX, 6ML, 6WB.
Commonwealth & Dominion Agencies Ltd., Sydney: Medicine, 2CH.
De Witt and Co., St. Kilda: Antacid powder, 3SR.
Douglas Drug Co., Sydney: Bidomak, 2AD, 2BH, 2CA, 2CH, 2GF, 2GZ, 2HD, 2KO, 2LM, 2MO, 2NZ, 2RG, 2TM, 2WL, 3BA, 3GL, 3KZ, 3SR, 3UL, 3XY, 4AY, 4BC, 4BH, 4BU, 4GR, 4IP, 4MB, 4RO, 4TO, 5DN, 5KA, 6AM, 6IX, 6ML, 6PM, 6WB, 7BU, 7HO, 7LA, 7UV.
Edinburgh Labs., Sydney: Lantigen, 2TM.
Eichorn's Remedies Pty., Ltd., Sydney: Eichorn's remedy, 2GZ.
Elliotts, Sydney: Medicinal, 2CH, 2KO.
Emerson Drug Co.: Medicine, 2CH.
Eno's Fruit Salts, Melbourne: Fruit salts, 2CA, 2GF, 2GZ, 2KO, 2LM, 2NZ, 2RG, 2WL, 5DN, 5KA.
Fassett and Johnson, Sydney: Carter's Little Liver Pills, 2BH, 2BS, 2CA, 2CH, 2GF, 2GZ, 2HD, 2KO, 2KY, 2LM, 2NZ, 2TM, 2WL, 3GL, 3KZ, 4BC, 4BH, 4BU, 4GR, 4IP, 4RO, 4TO, 5DN, 5KA, 6AM, 6IX, 6ML, 6PM, 6WB, 7HT, 7LA, 7UV.
Faulding, F. H. and Co., Melbourne: Chemists, 5DN.
Faulding and Co., Sydney: Medicinal, 2KO, 6IX, 6ML, 6PM, 6WB.
Felton Grimwade and Bickford, Perth: Sal Vital, 6IX, 6ML, 6WB.
Fisher and Co., Sydney: Fisher's phospherine, 2CA, 2CH, 2KO, 2LM, 2MO, 2WL, 3KZ, 4BC, 4GR, 4MB, 4RO, 4TO, 5DN, 5KA, 6AM, 6IX, 6ML, 7LA.
Gilseal Products: 6IX, 6ML, 6WB.
Gollin and Co., Sydney: Aspro, 3KZ.
Good Health Club of Australia, Sydney: Diet, 3GL.
Grosvenor Laboratories, Sydney: Medicines, 2CA, 2TM, 4TO.
Hall's Black Jack (A. W. and E. M. Hall), Caulfield: Cough mixture, 3SR.
Hardy, R. M. and Co., Sydney: Medicinal, 2GZ, 2KO, 3AW, 4BC, 4BH, 4GR, 4RO.
Hean's Essence Pty., Ltd., Sydney: Heenzo, 2GZ, 2HD, 3AW, 4BH, 5DN.
Hepburn Spa, Melbourne: 6IX, 6ML, 6WB.
Hutuwai Distributing Co., Sydney: Hutuwai, 2CH, 2GZ, 2HD, 2KY, 3AW, 7UV.
Karna Vita Co. Pty., Ltd., Sydney: Medicine, 2CH.
Knox Co., Sydney: Cystex, 3AW, 3KZ, 4BC, 4RO, 4TO, 5DN.
Laxette Manufacturing Co., Melbourne: Laxettes, 2GZ.
Marne and Co., Newtown: A.P.C. powders, 4TO.
Nicholas Pty., Ltd., 10 City Road, Prince's Bridge, Melbourne: Aspro, 2BH, 2CH, 2GZ, 2HD, 2LM, 2NZ, 4BU, 4IP, 4PM, 4TO, 5DN, 5KA, 6IX, 6ML.
Parson's Bros., Sydney: Fruit saline, 2LM, 2TM.
Potter and Birke, Sydney: Druggists and junipah, 2BH, 2GZ, 2KY, 2WL, 3BA, 3GL, 3XY, 4AY, 4BC, 4BU, 4MB, 4RO, 5KA, 6AM, 7BU, 7UV.
Pruno and Herbos Pill Manufacturing Co.: Pills, etc., 2NZ.
Rhu Pills: Medicinal, 2GZ, 2KO, 3BA, 7HO, 7HT, 7LA.
Sayers Allport Pty., Ltd., Sydney: A.P.C. powders, 2HD.
Sayers Allport, Sydney: Wholesale druggists, 2GZ.

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Sheldon Drug Co., Sydney: Eucalyptus, A.P.C.'s, etc., 2DU, 2GZ, 2KO, 2PK, 2SM, 2TM, 4BH, 7BU.
Stearn's, Fred and Co., Glebe; Nyal products, 2GZ, 2KO, 2KY, 2LM, 2TM, 2WL, 3AW, 3BA, 3KZ, 3SR, 4BC, 4BU, 4MB, 4RO, 4TO, 6IX, 6WB, 7HO, 7LA.
Taylors and Elliotts, Brisbane: Druggists, 4BH, 4RO, 4TO.
Tiger Salve Pty., Ltd., Sydney: Tiger salve, 2GZ.
Twin Soda Laboratories, Balmain: Twin soda, 2BS, 2CA, 2GZ, 2HD, 2LM, 2MO, 2NZ, 2PK, 2TM, 2WL.
Vermex, Camperdown: 6IX, 6ML, 6WB.
Vicks Chemical Co.: Vatronol, vaporub, 6IX, 6WB.
Vincent's Chemical Co., Sydney: A.P.C. powders, 2BH, 2CA, 2CH, 2DU, 2GF, 2GZ, 2HD, 2KO, 2KY, 2NZ, 2RG, 2TM, 4AY, 4BC, 4GR, 4MB, 4RO, 4TO, 5KA, 7BU, 7HO.
Wawns, Sydney: Wawn's wonder wool, 2KO, 6AM, 6IX, 6ML, 6WB.
Wicks: Chemicals, 7HO.
Woods, W. E., Ltd., Sydney: Peppermint cure, 2AD, 2CH, 2GF, 2KO, 2LM, 3SR, 4AY, 4BC, 4GR, 4RO, 6IX, 6ML, 6WB.

Opticians.

Aird, W. J., Melbourne: Optician, 3UL.
Australian Optical Co., Sydney: Opticians, 2CH, 2GZ, 2HD, 5KA, 6ML.
Gibb and Beeman Ltd., Sydney: Opticians, 2CA, 2LM, 2MO.
Paxton's, Sydney: Opticians, 2DU.
Webster, Jack and McDonald, Sydney: Opticians, 2MW.

Paints, Lacquers, Builders' Materials.

Abbott, L. G.: Paints, 2BH .
Australian Paint and Composition Co., Concord: Majora paints, 2TM.
Berger, Lewis, Sydney: Paints, 2GZ, 2KO, 2LM, 3KZ, 4AY, 4BC, 4BU, 4IP, 4MB, 4RO, 4TO, 6IX, 6WB, 7LA, 7QT.
Blundell Spence and Co. Ltd., Waterloo: Linseed oil, 2TM.
Blundell and Spence Co. Ltd., Waterloo: Paints, 2BE.
British Australian Lead Manufacfacturers, Cabarita: Paints, 2BE, 2CH, 2GF, 2GZ, 2KO, 2LM, 2NZ, 2TM, 3BA, 3GL, 3KZ, 3SR, 3XY, 4BC, 4BU, 4GR, 4MB, 4PM, 4RO, 4TO, 5DN, 6AM, 6IX, 6WB, 7BU, 7HO, 7HT, 7LA.
Hardie, James and Co., Sydney: Fibrolite, etc., 2AD.
Hardie Trading Co., Sydney: Spartan lacquer, 6IX, 6WB.
Heath and Co.: Dan Dee paint, 2WL.
Major Bros. Ltd., Concord: Paint, 2GZ, 2NZ, 3SR, 3UL, 7LA.
Mates Ltd., Albury: Timber, 2DU.
Meggitt Ltd., Sydney: Linseed oil paint, 2BH, 2CA, 2CH, 2KO, 2LM, 2NZ, 2WL, 3SR, 3UL, 4BC, 4BU, 4GR, 4TO.
Morrison, Jas. and Co. Pty., Ltd., Sydney: Paints and oil, 2GZ.
Sherwin Williams Co. (Aust.) Pty., Ltd., Sydney: Paint, 2KO, 4BU, 4IP, 6AM, 6ML, 7LA.
Sterling Varnish Co., Sydney: Varnish, etc., 2HD.
Taubmans Ltd., Sydney: Paints and varnishes, 2CH, 3AW.
Taylor's Paints Pty., Ltd., Sydney: Paints, 2HD.

Petrol, Oils, etc.

Alba Petroleum Co., Melbourne: Petroleum, 3AK, 3KZ, 3UL.
Australian Motorists Petrol Co. Ltd., Sydney: Petrol, 2CH.
Commonwealth Oil Refineries, The, Ltd., Sydney: C.O.R. petrol and oil, 3AW, 3KZ, 4BC, 4GR, 4IP, 5DN.
Independent Oil Industries Ltd., Sydney: Oil, 2CH, 4BH.
Kendall Refining Co., Sydney: Oils, 2KO.
Lowe, W.: Ausoline, 4TO.
Neptune Oil Co. Pty., Ltd., Sydney: Petrol and oils, 2BE, 2GZ, 2KO, 2PK, 2TM, 3KZ, 3SR, 3UL, 4BC, 4MB, 6AM, 6IX, 6ML, 6PM, 6WB, 7BU, 7HO, 7LA.
Pennsylvanian Oils (A/sia) Ltd., Sydney: Oils, 2BE, 2CH, 2GZ, 2LM, 2NZ, 2TM.
Shell Co. of Australia, The, Ltd., Sydney: Petrol and oils: 2AD, 2BE, 2BH, 2CH, 2DU, 2GF, 2GZ, 2HD, 2KO, 2KY, 2LM, 2NZ, 2MO, 2PK, 2RG, 2TM, 3AW, 3BA, 3GL, 3KZ, 3SR, 3XY, 4BC, 4BH, 4BU, 4GR, 4IP, 4RO, 4TO, 5DN, 5KA, 6AM, 6IX, 6ML, 6PM, 6WB, 7BU, 7HO, 7HT, 7LA, 7QT, 7UV.
Sleigh, H. C., Sydney: Firezone petrol, 2KO.
Texas Co., The (A/sia), Ltd., Sydney: Oils and petrol, 2LM, 4MB, 7BU, 7LA.
Vacuum Oil Co. Pty., Ltd., Sydney: Oil and petrol, 2AD, 2BE, 2CA, 2DU, 2GF, 2GZ, 2HD, 2KO, 2LM, 2MO, 2NZ, 2RG, 2TM, 3AK, 3GL, 3KZ, 3SR, 3UL, 3XY, 4AY, 4BH, 4BU, 4GR, 4IP, 4MB, 4RO, 4TO, 4ZR, 5DN, 5KA, 6AM, 6IX, 6ML, 6WB, 7BU, 7HO, 7LA, 7UV.
Valvoline Oil Co., Sydney: Valvoline, 2HD.
Wakefield, C. C. and Co. Ltd., Sydney: Oils, 2CH, 2GZ, 2KO, 2LM, 2TM, 4BH, 4GR, 4IP, 4ZR, 6AM, 6IX, 6ML, 6PM, 6WB.
Wolverine Lubricants Distributors (Aust.): Motor oil, 2CH,

Public Utilities.

National Gas Association of Aust., Sydney: Gas, 3AW, 3KZ.

Publications.

"Age" Newspaper Service, Melbourne: Newspaper, 3AK, 3BA, 3GL.
Alexander, W. D., Sydney: "Greyhound Recorder," 2WL.
Argus and A/sian Ltd., Melbourne: Newspaper, 3BA, 3GL.
Associated Nepspapers Ltd., Sydney: News, 2GZ, 2LM.
"Australian Women's Weekly," Melbourne: 3KZ, 3XY.
Farmers and Settlers' Newspaper Pty., Ltd.: 2MO.
Fitchett Bros.' Pty., Ltd., Melbourne: Magazine, 2HD.
"Marvel Racing Final," Sydney: Racing service, 2TM.
"2UE Newsletter Form Guide," Sydney: Racing, 2CA, 2WL.
Shipping Newspapers Ltd., Sydney: 6AM.
"Truth and Sportsman," Sydney: News, 2HD, 2NZ.
Truth Newspaper Co., Sydney: News, 2AD.
"Turf Review," Sydney: Racing, 2HD.
United Press: 7LA.

Radio, Music, etc.

Australian General Electric Ltd., Sydney: Radio—Bandmaster, 2GF.
Airzone (W.A.) Ltd., Perth: Radios, 6IX, 6ML, 6PM, 6WB.
Allan and Co., Melbourne: Musical instruments, 3UL.
Amalgamated Wireless (A/sia) Pty., Ltd., Sydney: Radiola, 2CH, 2GF, 2GZ, 2LM, 3AW, 3UL, 4PM, 4TO, 7BU, 7HO.
Amalgamated Wireless Valve Co. Pty., Ltd., Sydney: Radiotron valves, 2AD, 2BH, 2CH, 2DU, 2GF, 2GZ, 2KO, 2MO, 2TM, 4PM, 4RO, 7BU, 7HO, 7LA, 7UV.
British General Electric Co. Pty., Ltd., Sydney: Radios, 2GF, 2LM, 2MO.
Beale and Co. Ltd., Sydney: Pianos, 2GZ, 2TM.
Breville Radio Pty., Ltd., Sydney: Radio and washing machines, 2TM.
E.T.C. Industries Ltd., Sydney: Ken-Rad valves, 2HD.
Electricity Meter and Allied Industries Ltd., Sydney: Philco radio, 2CH, 2GZ.
General Motors-Holden's Ltd., Sydney: Car radio, 5DN.
Healing, A. G. Ltd., Melbourne: Radio, 2CH, 3GL, 3SR, 3UL, 7BU.
Heiron and Smith (Salanola) Pty., Ltd., Sydney: Radio, 2MO.
Gramophone Co. Ltd., Sydney: Radios, 2BE.
Howard Ltd., Richmond, Vic.: Radio, 2LM, 7HT.

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Kelvinator Aust. Ltd., Adelaide: Refrigerators, 5DN.
Kriesler (A/sia) Pty., Ltd., Sydney: Radios, 2KO, 6AM, 6IX, 6ML, 6PM, 6WB.
Lekmek, Radio Laboratories: 7QT.
Levensons, Sydney: Radio, 2LM.
New System Telephones Pty., Ltd., Melbourne: Philco radio, 3SR, 3UL.
Paling, W. H. and Co. Ltd., Sydney: Musical instruments, 2BE.
Philips' Lamps (A/sia) Pty., Ltd., Sydney: Radioplayers (radio), 2BE, 2LM, 2TM, 6IX, 6ML, 6WB.
Philips' Lamps (A/sia) Pty., Ltd., Sydney: Valves, 6IX, 6ML, 6WB.
Shefte College of Music, Sydney: 5KA.
Standard Telephones and Cables Pty., Ltd., Alexandria: Radios, 2MW, 2PK.
Stromberg-Carlson (A/sia) Pty., Ltd., Alexandria: Radio, 2LM, 7BU, 7HO.
Sutton's Pty., Ltd., Sydney: Pianos and radios, 2AD.
Thom and Smith Ltd., Mascot: Tasma radio, 2KY, 2LM.

Sport Requisites.

Alexander Tennis Racquet Co., Adelaide: Tennis racquets, 2CH.
Slazengers (Aust.) Pty., Ltd., Sydney: Tennis racquets, 3AW.
Sykes Bats: Bats, 5DN.
Waddells Ltd., Sydney: Sporting goods, 2NZ.

Stationery Supplies.

Brooks, William, Brisbane: School books, 4RO.
Chartres Ltd., Sydney: Office material, 2TM, 4BC, 6IX, 6WB.
Collins Bros. and Co. Ltd., Rosebery: Publishers and manufacturing stationers, 5DN.
Conklin Pen Co., The, Sydney: Pens, 4BC, 5KA, 7LA, 7UV.
Eversharp, Sydney: Pencils, 2KO.
Gordon and Gotch (A/sia) Ltd., Sydney: Stationery, 4BC, 4BH.
Sydney Pincombe Pty., Ltd., Sydney: Typewriters, 2HD.
Stott and Underwood Pty., Ltd., Sydney: Typewriters, 2DU, 2GZ.

Stores.

Finney Isles and Co., Brisbane: Department store, 2LM.
Marcus Clark and Co., Sydney: Department store, 3UL, 3SR.
Penneys Ltd., Brisbane: Department store, 2LM, 4BH.
Snow Sydney Ltd., Sydney: Department store, 2CA, 2LM.
Snow Sydney Pty., Ltd., Sydney: Bell's products, 2GZ.
Wallace, Buck and Goodes Pty., Ltd., Melbourne: Departmental store, 3XY.
Woolworths Ltd., Sydney: Department store, 2LM.

Tailors, Wearing Apparel, etc.

Adelaide Tailoring Co. Ltd., Sydney: Suits, 2HD.
Berlei Pty., Ltd., Sydney: Corsets, 2BH, 2CH, 3AW, 6ML.
Coo-ee Clothing Ltd., Sydney: Clothing, 2KY.
Cox Bros. Ltd., Melbourne: Clothing, etc., 5KA, 6AM, 6PM, 7HT, 7LA.
Fosseys Pty. Ltd., Sydney: Clothing, 2BS, 2MO.
Foy and Gibson Pty., Ltd., Melbourne: Drapers, 3KZ.
Foy and Gibson Pty., Ltd., Sydney: Eagley underwear, 2GZ, 2KO, 2TM, 7LA.
Gilbert and Stokes Pty., Ltd.: Pyjamas, 2CH.
King Gee Clothing Co. Ltd., Sydney: Clothing, 4GR, 4IP, 5KA.
La Mode Corsets Pty., Ltd., Sydney: Corsets, 3AW.
Lady Ruth Corsets: 3BA.
Lucas, E. and Co. Pty., Ltd., Sydney: Duroloc frocks, 4BC.
Macrae, K. M. Pty., Ltd., Melbourne: Swim suits, 2CH.
Morley's, Sydney: Underwear, 5DN.
Murray, D. and W. Ltd., Sydney: Materials, etc., 2DU, 2GF, 2NZ, 2TM, 3KZ, 4BH, 4RO, 4TO, 7BU.
Murray, D. and W. Ltd., Sydney: "Gripu" trousers, 2MO, 4BU, 4RO, 4ZR, 7BU.
P. and R. Gowns, Sydney: Frocks, 2DU.
Pelaco Ltd., Sydney: Shirts, 2CA, 2CH, 2GZ, 2HD, 2KO, 2LM, 2NZ, 3GL, 3SR, 3UL.
Pike Bros., Brisbane: Tailoring, 4TO.
Reid, Robt. and Co. Ltd., Sydney: Elasta-strap trousers, 4RO.
Rockman's Showrooms Pty., Ltd., Sydney: Frocks, 3BA.
Rothwell's Ltd., Brisbane: Men's wear, 4TO.
Sargood Gardiner Ltd.: "Top Dog," 4ZR.

Textiles.

Felt and Textiles of Australia Ltd., Sydney: Feltext floor covering and merino slippers, 2AD, 2CH, 2GZ, 2HD, 2KY, 2MW, 2TM, 3AW, 3SR, 5DN, 6ML, 7UV.
Foy and Gibson, Melbourne: Blankets, 5KA, 7BU, 7HO.
Hughes, F. W. Pty., Ltd., Sydney: "Sunbeam" wool, 2GZ, 2TM.
Isherwood and Bartleet Pty., Ltd., Sydney: Fabrics, 2KO.
Josephson and Son: Clothing: 2LM, 4RO.
Kelsall and Kemp Ltd. (Tas.): Blankets and flannels, 2CH, 3KZ.
Laycock Son and Co., Melbourne: Laconia blankets, 2AD, 2BH, 2CA, 2CH, 2GZ, 2HD, 2KO, 2NZ, 2TM, 3GL, 3KZ, 3SR, 4RO, 4TO, 5DN, 6AM, 6ML, 6WB.
Patons and Baldwins, Sydney: Woollens, 5DN, 6AM, 6ML.
People's Stores: Drapers, 2BH.
Walton, F. S. and Co. Ltd., Sydney: Dress material, 2GZ, 2NZ, 5DN, 7UV.
Walton, F. S. and Co. Ltd., Sydney: O.B. sheets, 3KZ, 7UV.
Warren and Strang Pty., Ltd., Sydney: Floor covering, 4BC.

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Winns Pty., Ltd., Sydney: Drapery, 2DU.

Tobacco, Cigarettes, etc.

Bafra Cig. Papers: Cigarette papers, 5DN.

Du Maurier Products: Cigarettes, etc., 3AK.

Gollin and Co. Pty., Ltd., Sydney: Cigarette papers, 3KZ, 5KA.

Michelides Ltd., Perth: Tobacco, cigarettes, 6IX, 6ML, 6WB.

Newcastle Tobacco Co.: Tobacco, 2MO.

Perfection Tobacco: Tobacco, 3XY.

Phillips, Godfrey, Melbourne: Cigarettes, 2CH, 2GZ, 2KO, 3BA, 3KZ, 5DN, 6AM, 6ML, 7BU, 7HT.

Wills, W. D. and H. O. (Aust.), Ltd., Sydney: Cigarettes, tobacco, etc., 2AD, 2BH, 2CH, 2GF, 2GZ, 2HD, 2KO, 2KY, 2LM, 2MO, 2NZ, 2TM, 3AW, 3GL, 3KZ, 3SR, 3XY, 4AY, 4BC, 4BH, 4RO, 4TO, 5DN, 5KA, 6AM, 6ML, 7HO, 7LA.

Toilet Requisites, etc.

Bush, W. J. and Co. Ltd., Sydney: Toilet goods, 2CH.

Colgate-Palmolive, Peet Co. Ltd., Sydney: Palmolive soap, etc., 2CH, 2GZ, 2KY, 3KZ, 4BC, 4BH, 4TO, 6IX, 6ML, 7LA, 7UV.

European Laboratories Co., Sydney: Todd's toothpaste, 2HD, 2MO.

Hoffnung and Co., S. Ltd., Sydney: Gem razors, 7HT.

Joubert and Joubert Pty., Ltd., Sydney: Razor blades, 5DN.

Kolynos Incorporated, Sydney: Toothpaste, 2BH, 2CH, 2GZ, 2KO, 2TM, 3AW, 3KZ, 4BH, 6ML, 6PM, 7HT.

Lambert Pharmacal Co., Sydney: Toothpaste—Listerine, 2GZ, 3KZ, 6AM, 6IX, 6ML, 7BU, 7LA, 7UV.

Lever Bros. Pty., Ltd., Sydney: Soaps, 2BH.

National Brush Co. (Aust.) Ltd., Sydney: Tooth brushes, 2CH.

Nettlefold, A. J. and Sons, Sydney: Canberra razor blades, 6IX, 6ML.

Parke Davis and Co.: Shaving cream, 2CH.

Pepsodent Co. (Aust.) Pty., Ltd., Sydney: Tooth paste, 2CH, 2HD, 3KZ, 5DN.

Phipson and Co. Pty., Ltd., Sydney: Gillette razor blades, 2CH, 6IX, 6WB.

Russell, June: Hairdressing, 2SM, 2LM.

Valdemar Petersen, Sydney: Pyrex tooth powder, 4BH, 4BU, 4TO.

Toys.

Cyclops Toys Pty., Ltd., Sydney: 3KZ.

Meccano Dept, Sydney: 2CH, 2KO, 2LM, 4BC, 4GR, 4TO, 5DN, 6AM, 6ML, 7LA.

Travel Tours, Hotels, etc.

Airlines of Australia Ltd., Sydney: Air travel service, 2CH, 4BC.

Commonwealth Government Railways: Transport, 6IX.

Coolangatta Council: Tourist service, 2TM, 2CH.

Ford Sherington Ltd., Sydney: Travel goods, 2CH, 6IX.

Federal Hotel, Melbourne: Accommodation, 7BU, 7LA.

Interstate Steamship Owners' Federation Ltd., Sydney: Shipping services, 2CH.

McDonald Hamilton and Co., Sydney: Cruises, 3KZ, 4BC.

New Zealand Govt. Tourist Bureau, Melbourne: Tours, 3SR, 3UL.

Orient Steam Navigation Co. Ltd., Sydney: Travel, 2AD, 2BS, 2CA, 2CH, 2GF, 2GZ, 2HD, 2KO, 2MO, 3GL, 4AY, 4BC, 4GR, 4RO, 6AM, 6IX, 6ML, 6WB, 7BU, 7HO.

Pioneer Tourist Service, Sydney: Transport, 2CH, 3AW, 3KZ.

Randwick Municipal Council: Tourist report, 2TM.

Victoria Palace Ltd., Melbourne: Accommodation, 2CA, 3SR, 5DN, 7BU, 7HO, 7LA.

Victorian Railways: Travel, 2CH, 3AW, 3GL, 4BC, 5DN.

Veterinary, Animal Foods, etc.

Animal Health Products Pty., Ltd.: Sheep food, 2MO.

Clubb, A. M. and Co. Pty., Ltd., Sydney: Spratt's dog foods, 5DN.

Flint Laboratories, Melbourne: Vet. med., 3SR.

Griffiths Hughes Ltd.: Karswood poultry spice, 2GZ.

Goldsbrough Mort and Co. Ltd., Sydney: Edwards sheep dip, etc., 2GZ, 2MO.

Kitchen and Sons Pty., Ltd., Sydney: Stock licks, 2NZ.

Meggitt Harold Ltd., Gladesville: Halmeg oil, nuts, 2GZ.

Paton's Products Ltd., 44 Campbell Street, Newtown: Sheep foods, 2CA, 2DU, 2GZ, 2MO, 2PK.

Miscellaneous.

150th Anniversary Celebrations: Celebrations, 2BH, 2BS, 2CA, 2CH, 2DU, 2GZ, 2KO, 2KY, 2TM, 3SR, 3UL, 4GR, 4TO, 6IX, 6ML, 6WB, 7LA.

Anti-Poverty Campaign Council: 6AM, 6PM.

Ausoline Co.: Ausoline, 4RO.

Australian Labour Party (N.S.W.): Political, 2MO, 2PK, 6PM.

Australian National Party, Perth: Political, 6PM.

Beam Wireless, Sydney: Beam wireless, 2CH, 6ML.

Best Bets, Sydney (Tom Ellis): Racing, 2CA, 2BS, 2TM, 3UL.

British Israel World Federation, Sydney, 2GZ, 6PM.

Catholic Taxpayers' Association, Sydney: Taxes, 2CA, 2DU, 2GZ, 2KO, 2NZ, 2TM, 3GL, 3SR, 4RO, 4TO, 5DN, 6AM, 6PM, 7BU, 7HO, 7QT.

Chamber of Manufacturers: Australian industry, 2CH.

Colman Keen (A/sia) Ltd., Redfern: Vulcanol, 5DN.

Constitutional Association of N.S.W.: Politics, 2CH.

Cooper, Jack: Racing, 3SR, 7HT.

Douglas Credit Movement, Melbourne: Political, 3AW.

Federal Labour Party: Political, 2CA, 2CH, 2KO, 2MO, 2TM, 3SR, 6IX, 6ML, 6WB.

Federal Referendum Publicity Campaign: Political, 2AD, 2BH, 2CA, 2DU.

Francis, George, Sydney: Race talks, 2BS, 2CA, 2KY, 2NZ, 3SR, 7BU, 7UV.

Golden Casket, Brisbane: Lotteries, 4MB, 4RO, 4TO.

Goldsbrough Mort Co., Ltd., Sydney: Ru-Mos, 6AM, 6PM.

Hardie, Jas. Trading Co. Pty., Ltd., Sydney: Tilux, 2HD.

International Bible Society: Religious, 4MB.

Johnson, S. C. and Sons Pty., Ltd., Sydney: Glo-coat, 6AM, 6PM.

London Baby Carriage Manufacturers, Melbourne: Baby carriages, 3AW.

Morrison, James and Co. Pty., Ltd., Sydney: Tar, oil, etc., 2NZ.

M.U.I.O.O.F., Sydney: Fellowship, 2GZ

Naylor, Rufe, Sydney: Racing, 2PK.

N.E.N.C.O.: Woolbrokers, 2NZ.

N.R.M.A., Sydney: 2LM.

Newcastle District Abattoir Board: 2NZ.

Punters' Pie, Sydney: Racing, 2DU, 2TM.

R.A.S. Vic., Melbourne: Show, 3UL.

Royal Agricultural Society, Perth: Shows, 6PM.

R.U.R. Pty., Ltd., Sydney: "R.U.R.", 2GZ.

Taxation Department, Sydney: 2CH, 2TM.

U.A.P., Melbourne: Political, 3SR.

U.A.P., Sydney: Election propaganda, 2BS, 2CA, 2CH, 2KO, 2MO, 4TO.

U.C.P.; Political, 2BH, 2DU, 2LM, 2MO, 2PK, 2TM.

Vockler, B., Melbourne: Racing, 3SR, 3UL.

RADIO LISTENER CLUBS

The following list of radio listener clubs, in alphabetical order, is compiled from information supplied by the respective stations, and while it does not aspire to show all such clubs in operation throughout Australia, it nevertheless contains what are apparently the leading radio listener clubs. Further details relating to these clubs will be found in the section devoted to broadcasting station general particulars.

A1 Junior Radio Club 5KA
Amazon Club (children) 3MA
Australian Women's League . . 2CH
Bluebirds (children) 3BA
Bobby Bear Club 3UZ
Breakfast Club 3UL
Bridge Club 4BH
Call to Youth Club 2UE
Chatterbox Corner 3AW
Cheerio Club (adults) 6GE
Cheerio Club (children) 3UL
Children's Club 2LM
Children's Club 7HO
Children's Glee Club 2WG
Children's Session Club 7EX
"Chums" 3AW
Country Service Club (women's) 2GZ
Country Women's Service Club . . 2NZ
Friendly Circle (women) 3UL
Friendship Circle (women) . . . 3BA
Friendship Club 3SR
Good Companions 2LM
Good Companions 3XY
Grub Club 3UZ
Gumnut Children's Club 2KM
Happiness Club 2GB
Happiness Club 3KZ
Happy Hour Club 6AM
Housewives' Association 7HO
Joybells Club 4AY
Joy Club (children) 6GE
Joy Club (juniors) 2HD
Joyster Club (adults) 2HD
Junior Country Service Club . . 2GZ
Junior Tennis Association . . . 3AW
Juvenile Club 7LA
Kipling Boys' Club 5DN
Koala Club for Children 2NZ
Koala Club 7UV
Kookaburra Club (children) . . 4BH
Listeners' League 2BE
Listeners' League 3AK
Look Up and Laugh Club 3UZ
Melbourne Boys' Club 3AK
Merrymakers' Club 3SH
Merrymakers' Club (adults) . . . 5KA
Mickey Mouse Club 4BC
Mothercraft Club 7LA
Old King Cole's Court 3GL
Pals Club 4BC
Peter Pals Club 3XY
Peter's Sunshine Club 7QT
Possum Club 2TM
Radio Club 2BS
2KA Radio Service Club 2KA
Radio Sunday School 4BU
Round Table Club 4BC
Smile Away Club 3DB
Smile Club 2GF
Smile Club 2MW
Smilers' Club 2MO
Smiles Club 4IP
Smilin' Thru Club 2KY
Sunny Radio Club 3SR
Sunpolishers' Club 7BU
Sunraysia Boys' Club 3MA
Swing Club 2AD
Tailwaggers' Club 2UE
Theatre Club 2LM
Willie Weeties Club 6AM
Women's Association 3AW
Women's Club 2KY
Women's Club 3SH
Women's Club 7BU
Women's Radio Club 2TM
Women's Service Club 2WG
Women's Session Club 7EX
Woollies Appeal Club 3DB
Youth Association 3AW

THE ALPHABET

Following is a list of initials which have come into popular use in reference to the respective organisations or companies listed below:—

A.A.A.
Announcers' Association of Australia. Headquarters: 128 Pitt Street, Sydney.

A.B.C.
Australian Broadcasting Commission. Headquarters: Broadcast House, Pitt Street, Sydney.

A.F.C.B.S.
Australian Federation of Commercial Broadcasting Stations. Headquarters: 271 Collins Street, Melbourne, Vic.

A.P.R.A.
Australasian Performing Rights Association Ltd., 66 King Street, Sydney.

A.R.P.
Australian Radio Publications Pty., Ltd. Offices: 30 Carrington Street, Sydney.

A.W.A.
Amalgamated Wireless (A/sia) Ltd. Headquarters: 47 York Street, Sydney.

B.A P.
Broadcast Advertising Pty., Ltd., Hunter Street, Sydney.

B.S.A.
Broadcasting Service Association Ltd., 29 Bligh Street, Sydney.

C.B.N.
Commonwealth Broadcasting Network. Headquarters: 48 Market Street, Sydney.

E.R.D.A.
Electrical and Radio Development Association. Assembly Hall, Margaret Street, Sydney.

I.R.E.
Institution of Radio Engineers (Aust.). Headquarters: 30 Carrington Street, Sydney.

M.U.A.
Musicians' Union of Australia. Federal office: 188 Little Collins Street, Melbourne, Vic.

N.C.B.S.
National Commercial Broadcasting Service of New Zealand. Box 1934, Auckland, N.Z.

N.C.A.A.A.
National Council of Accredited Advertising Agents.

P.R.E.I.A.
Professional Radio Employees' Institute of Australia. Headquarters: 60 King Street, Sydney.

R.I.F.
Radio Industries Functions Club. Hon. secretary's office: 30 Carrington Street, Sydney. Victoria, Hon. secretary's office, 239 Collins Street, Melbourne.

T.E.P.I.
Transmission Equipment Pty., Ltd., 390 Spencer Street, Melbourne.

FOREIGN.

B.B.C.
British Broadcasting Corporation.

C.B.C.
Canadian Broadcasting Corporation, Canada.

F.C.C.
Federal Communications Commission. (American governmental body controlling broadcasting in the United States of America).

F.T.C.
Federal Trades Commission. (American governmental body controlling internal trade and commerce in the United States.)

I.B.C.
International Broadcasting Co. Ltd., London.

N.A.B.
National Association of Broadcasters. (American counterpart of the Australian A.F.C.B.S.).

INDEX TO

Manufacturers and Suppliers of Broadcasting Station Equipment

TRANSMITTING EQUIPMENT

AMALGAMATED WIRELESS (A/SIA) LTD., 47 York Street, Sydney, N.S.W. 'Phone, BW2211; 167 Queen Street, Melbourne, 'Phone M4161. (Complete, and components).

AUSTRALIAN ENGINEERING EQUIPMENT CO. PTY., LTD., 415-19 Bourke Street, Melbourne, Vic. 'Phone MU2315. (Condensers).

COLVILLE WIRELESS EQUIPMENT CO. PTY., LTD., 8 Smail Street, Broadway, Sydney, N.S.W. 'Phone MA3172. (Complete, and components).

DUCON CONDENSER PTY., LTD., Bourke Street, Waterloo, N.S.W. 'Phone MA6104. (Condensers).

HILCO TRANSFORMER PTY., LTD., 97-111 Berkley Street, Carlton, Vic., N.3. 'Phone F1661. (Transformers).

LEKMEK AUSTRALASIA LIMITED, 75 William Street, Sydney, N.S.W. 'Phone FL2626. (Complete, and components).

McLELLAN, WM., J. & CO., 55 York Street, Sydney. 'Phone BW2385.

PHILIPS LAMPS (A/SIA) LTD., Philips House, Clarence Street, Sydney, N.S.W. 'Phone BW2121; and 590 Bourke Street, Melbourne, 'Phone MU6091. (Complete, and components).

STANDARD TELEPHONES AND CABLES (A/SIA) LTD., Botany Road, Alexandria, N.S.W. 'Phone MX1161. (Complete, and components).

TRANSMISSION EQUIPMENT PTY., LTD., 390 Spencer Street, Melbourne. 'Phone F4495. (Complete, and components).

W. G. WATSON AND CO. PTY., LTD., 279 Clarence Street, Sydney. 'Phone M4331.

STUDIO EQUIPMENT

AMALGAMATED WIRELESS (A/SIA) LTD., 47 York Street, Sydney, 'Phone BW2211; 167 Queen Street, Melbourne, 'Phone M4161.

CLUBB, A. M. & CO., 76 Clarence Street, Sydney. 'Phone B3908. (Pick-ups and microphones).

COLVILLE WIRELESS EQUIPMENT CO. PTY., LTD., 8 Smail Street, Broadway, Sydney. 'Phone MA3172.

E.T.C. INDUSTRIES LTD., 470 Elizabeth Street, Sydney. 'Phone MX1121. (Microphones and pick-ups).

INTERNATIONAL RADIO CO. PTY., LTD., 254 Castlereagh Street, Sydney. 'Phone M4896. (Microphones and pick-ups).

LEKMEK AUSTRALASIA LIMITED, 75 William Street, Sydney. 'Phone FL2626.

McLELLAN, WM. J. & CO., 55 York Street, Sydney. 'Phone BW2385.

PHILIPS LAMPS (A/SIA) PTY., LTD., Philips House, 69-73 Clarence Street, Sydney, 'Phone BW2121; 590 Bourke Street, Melbourne, 'Phone MU6091.

STANDARD TELEPHONES AND CABLES PTY., LTD., 258-274 Botany Road, Alexandria, Sydney. 'Phone MX1161.

TRANSMISSION EQUIPMENT PTY., LTD., 390 Spencer Street, Melbourne. 'Phone F4495.

INSTRUMENTS AND MEASURING EQUIPMENT

AMALGAMATED WIRELESS (A/SIA) LTD., 47 York Street, Sydney. 'Phone BW2211; and 167 Queen Street, Melbourne, 'Phone M4161.

GENERAL RADIO (Hayward C. Parish), 251a Pitt Street.. 'Phone M3531.

PATON ELECTRICAL INSTRUMENT CO., The, 90 Victoria Street, Ashfield, Sydney. 'Phone UA1960.

PHILIPS LAMPS (A/SIA) PTY., LTD., Philips House, 69-73 Clarence Street, Sydney. 'Phone BW2121. 590 Bourke Street, Melbourne. 'Phone MU6091.

SIEMENS (AUST.) PTY., LTD., 131 York Street, Sydney. 'Phone M4161.

SLADES RADIO, 61a Lang Street, Croydon, Sydney. 'Phone UJ5381.

STANDARD TELEPHONES AND CABLES PTY., LTD., 258-274 Botany Road, Alexandria, Sydney. 'Phone MX1161.

WARBURTON FRANKI LTD., 307 Kent Street, Sydney. 'Phone BW1251.

RECORDING AND REPRODUCING EQUIPMENT

AMALGAMATED WIRELESS (A/SIA) LTD., 47 York Street, Sydney, 'Phone BW2211; 167 Queen Street, Melbourne, 'Phone M4161.

CLUBB, A. M. & CO., 76 Clarence Street, Sydney. 'Phone B3908. (Agent for Presto Corporation of America, recorders and discs).

DIAMONDPOINT SERVICES PTY., LTD., 83 Pitt Street, Sydney. 'Phone BW7490. (Agents for Fairchild recorders).

E.T.C. INDUSTRIES LTD., 470 Elizabeth Street, Sydney. 'Phone MX1121.

INTERNATIONAL RADIO CO. PTY., LTD., 254 Castlereagh Street, Sydney. 'Phone M4896.

PHILIPS LAMPS (A/SIA) PTY., LTD., Philips House, 69-73 Clarence Street, Sydney, 'Phone BW2121; 590 Bourke Street, Melbourne, 'Phone MU6091.

RAYCOPHONE PTY., LTD., 62 Booth Street, Annandale, Sydney. 'Phone MW1834.

RATE CARD UNIFORMITY

Federation Secures Station Co-operation on "Base-Rate"

At a meeting of Sydney broadcast station advertising executives held under the auspices of the Australian Federation of Commercial Broadcasting Stations on January 28, 1938, the adoption of a system to bring about uniformity in station rate cards was carried unanimously. It was agreed that in the compilation of rate cards the principle be established that the base rate shall be the minimum rate at which a station is prepared to accept advertising. Throughout Australia many stations have already adopted the Federation's recommendations as set out below.

Mr. G. H. Anderson, country vice-president of the A.F.C.B.S. occupied the chair, and others present at the meeting were Messrs. C. A. Fletcher, D. R. Armstrong (2GB); S. E. Baume, J. Armitage (2UE); F. E. Levy (2UW); L. P. Quirk (2SM) and J. E. Ridley (2GZ). Apology was received from Mr. King on behalf of Mr. Beaver (2KY).

The chairman stated that at a meeting of the Sydney executive held on December 6, 1937, consideration was given to a proposal of the New South Wales Country Stations for the adoption of some uniform system in the preparation of rate cards, and that the matter had been referred to the various station advertising executives for suggestions.

The chairman stated that the proposal had also been considered by the Melbourne executive.

Consideration was then given to the Sydney and Melbourne proposals and suggestions, and also to the method of computation suggested for Canadian stations also to the method adopted by the I.O.W.A. and Colonial Networks in the U.S.A.

The following recommendations were adopted unanimously:—

(1(That in the compilation of rate cards, the principle be established that the base rate shall be the minimum rate at which a station is prepared to accept advertising.

(2) That the base rate shall be the 100-word rate for 312 times.

(3) That the base rate for both announcements and sessions shall be loaded by the following percentages:—

312 and over, base rate	(Index Fig.	100)
208-311 base rate plus 5%	(„ „	105)
156-207 „ „ „ 10%	(„ „	110)
104-155 „ „ „ 15%	(„ „	115)
78-103 „ „ „ 17½%	(„ „	117½)
52- 77 „ „ „ 20%	(„ „	120)
39- 51 „ „ „ 22½%	(„ „	122½)
26- 38 „ „ „ 25%	(„ „	125)
13- 25 „ „ „ 27½%	(„ „	127½)
1- 12 „ „ „ 40%	(„ „	140)

(4) That the rate for:

25 word announcements, be half base rate	(Index Fig.	50)
50 word announcements, be three-quarters base rate	(„ „	75)
100 word announcements, be the base rate	(„ „	100)
5-minute sessions be half the 15-min. rate	(„ „	175)
7½-minute session be two-thirds 15-min. rate	(„ „	233.3)
10 minute sessions be three-quarters 15-minute rate	(„ „	262.5)
15-minute sessions be 3½ times the base rate	(„ „	350)
30-minute sessions be the sum of the 10-minute and the 15-minute rate	(„ „	612.5)

(5) That in the preparation of the rate card, rates be calculated to the nearest 1d., 3d., or 6d. at the discretion of each individual station.

(6) That the rates for "solus" 25- and 50-word announcements (i.e., announcements which are to be given exclusiveness between items of entertainment), and "preferred" 100-word announcements (i.e., announcements which are to be broadcast at a specified time) be subject to a loading to be determined by each individual station.

(7) That the computation of rates in respect of contracts for different types of advertising (i.e., announcements and sessions, or different types of announcements, or different types of sessions) be

(Continued on foot of next page.)

AUSTRALIAN FEDERATION OF COMMERCIAL STATIONS

Head Office: 371 Collins Street, Melbourne. Phone M5532.
Sydney Office: Assembly Hall, 44 Margaret Street. Phone B7503.

OFFICE BEARERS FOR 1937-38.

President: D. W. Worrall, Esq. (3DB-LK).
Vice-Presidents: Senior, C. F. Marden, Esq. (C.B.N.); Country V.P., G. H. Anderson, Esq. (Macquarie Broadcasting Services); and Victorian V.P., S. Morgan, Esq. (3KZ).
Secretary: R. Dooley, Esq.
N.S.W. Secretary: A. F. O. Brown, Esq.
Federal Council comprises representatives of City Commercial Stations and two country commercial stations in New South Wales and Victoria.
Executive Council comprises representatives of Melbourne and Sydney stations and two country station representatives in Victoria and in New South Wales.

HISTORY.

The Federation started from small beginnings about 1928, when three of the Sydney stations then operating decided that common action was necessary on certain matters, such as copyright. Since the first interstate convention was held in 1930, the Federation has continued to grow in strength and in membership until now it has 70 commercial stations as members. Side by side with the expansion of the organisation so has the scope of its operations and interests increased also. To-day the Fedetion is a substantial stabilising influence upon almost every phase of broadcasting development in the commercial sphere, and a close watch is maintained on all governmental matters affecting broadcasting.

Note: Although it was proposed at the Southport (Q.) 1937 Convention to reform the constitution of the Federation, this had not taken place up to the time this YEAR BOOK went to press, and the subject will probably be dealt with at the 1938 Federation Convention later in the year.

Call Slogans Used by Some Australian Commercial Stations

The adoption of a station call slogan has become popular practice among Commercial Broadcasting Stations in Australia, and the following is a list of 68 stations which have familiarised their listeners with their respective "slogans."

2AD: "The Voice of New England."
2BE: "The Voice of the Far South Coast."
2BH: "The Barrier Miner" Broadcasting Station.
2BS: "Carillon City Broadcasting Station."
2CA: "From the Heart of the Nation."
2CH: "Entertains the Whole Family."
2DU: "The Western Station."
2GB: "The Nation's Station."
2GZ: "Country Service."
2HD: "The Voice of Friendship."
2HR: "The Voice of the Hunter."
2KA: "The Voice of the Mountains."
2KO: "The Voice of Industry."
2KM: "The Macleay Station."
2KY: "The Brightest Station on the Air."
2LM: "The Voice of the Northern Rivers."
2MO: "The Pioneer Station—The Voice of the North West."
2NZ: "2NZ Broadcasting to Northern New South Wales and Southern Queensland."
2PK: "The Voice of the Golden West."
2RG: "The Voice of the Murrumbidgee."
2SM: "The Modern Station."
2TM: "2TM Northern New South Wales."
2UW: "From the Top of the State."
2WG: "The Voice of the Riverina."
2WL: "The South Coast Station."
2XL: "The Sheep Station."
3AK: "The Voice of the Night—The Sporting Station."
3AW: "The Feature Station."
3BA: "The Courier Station—The Voice of the Garden City."
3BO: "The Friendly Voice of the North."
3DB-LK: "They Cover Victoria."
3GL: "The Voice of Victoria's Oldest Morning Journal."
3HA: "'The Age' Station"—"Radio Western."
3KZ: "The Brighter Broadcasting Service."
3MA: "The Sunraysia Station."
3CV: "The Station that is Different."
3SH: "Radio Northern 3SH—The Border Feature Station."
3SR: "Service and Results."
3TR: "The Gippsland Station."
3UL: "'The Argus' Station."
3UZ: "Voice of Victoria."
3XY: "The Quality Station."
3YB: "The Best of the West."
4AY: "The Brightest Broadcasting Service of North Queensland."
4BC: "The Radio Voice of Queensland."
4BK-AK: "The Courier-Mail Stations."
4BU: "Voice of the Burnett."
4CA: "At the Top of Australia."
4GR: "The Voice of the Downs."
4IP: "In the Heart of Ipswich."
4LG: "In the Midst of the Golden Fleece."
4MB: "Wynne's Station."
4VL: "The Voice of the Far West."
4WK: "The Listener's Companion."
5AD: "5AD The Premier Station in the State."
5DN: "First Station in the State."
5KA: "The Voice of South Australia."
6AM: "The Happy Station."
6GE: "The Featured Station."
6PM: "The Cheerful Station."
6PR: "The Centre of the Dial, the Centre of Attraction."
7BU: "The Station with a Smile."
7EX: "On Top in Tasmania."
7HO: "The Voice of Tasmania."
7HT: "The Voice of the Island."
7LA: "The Voice of the North."
7QT: "The Voice of the Wealthy West."
7UV: "The Voice of the Island State."

Rate Card Uniformity—

(Continued from Page 165.)

based on the monetary value of the contract. (For example, the rates for the announcements and the sessions in a contract for 104 × 100-word announcements and 26 × 15-minute sessions would be calculated as follows:—

1 × 15-minute session = 3½ × 100-word announcements. Therefore, 26 × 15-minute session = 91 × 100-word announcements.

104 announcements plus 91 announcements = 195 announcements, therefore, the 104 announcements would be charged for at the 156—207 rate.

3½ × 100-word announcements = 1 × 15-minute session. Therefore, 104 × 100-word announcements = 30 × 15minute session.

26 sessions plus 30 sessions = 56 sessions, therefore, the 26 sessions would be charged for at the 52—77 rate.

DIFFERENT SCALES.

Although the stations charge different scale rates for different times of the day and night, the base rate in each scale bears a definite relationship to every other scale, and the foregoing method of computation can be applied.

For instance, a station receives a contract as above in which the announcements are scheduled for broadcast during the day and the sessions at night. The day rates are two-thirds of the night rate, The sessions are equivalent to 91 announcements at the night rate, which are equivalent to 121 announcements at the day rate, and the scale rate to be charged for the announcements would accordingly be the 208—311 rate (104 + 121 = 225). Similarly 104 announcements equal 30 sessions at the day rate which is equivalent to 20 sessions at the night rate, and the scale rate to be charged for the sessions would accordingly be the 39—51 rate (26 + 20 = 46).

Commercial Broadcasting in NEW ZEALAND

Following are particulars relating to the four National Commercial Broadcasting Service Stations operated in New Zealand by the Dominion Government. Australian representatives: Radiovision Pty., Ltd., Blashki Buildings, Hunter Street, Sydney.

Commercial radio in New Zealand is operated and controlled solely by the New Zealand Government. There are four commercial stations, namely—1ZB Auckland, 2ZB Wellington, 3ZB Christchurch, and 4ZB Dunedin.

Each of the fourstations now operating has a separate rate-card, computed on the coverage of each station. National time bands (time available only to those advertisers who take such time over each of the four stations) are as follows:—

Morning: 6.30—6.45 a.m.; 7.15—7.30 a.m.; 8.15—8.30 a.m.; 8.45—9.22½ a.m.; 9.45—10 a.m.; 11—11.15 a.m.

Afternoon: 12—12.30 p.m.; 3—315 p.m.; 3.30—3.45 p.m.; 5—6 p.m. (Mondays, Wednesdays and Fridays only).

Evening: 7—45 p.m.; 8—8.30 p.m.; 9—9.30 p.m.; 9.45—10 p.m.; 10.45—11 p.m.

Advertisers who take National time over the four stations are charged approximately 20% less than the local rate on each station.

The head office of the service is situated at Hope Gibbon's Buildings, 7-13 Dixon Street, Wellington

National executives for 1937 were as follows:—Controller, Mr. C. G. Scrimgeour; National advertising manager, Mr. B. T. Sheil; secretary, Mr. H. Bell; business manager, Mr. W. J. Crowther.

1ZB AUCKLAND.

Operator: The New Zealand Government, National Commercial Broadcasting Service, 7/13 Dixon Street, Wellington. **Studios:** Queen's Arcade, Queen Street, Auckland. **Transmitter:** Waterview, Auckland. Licensed power, 1,000 watts; operating power, 1,000 watts.

Commenced operations: October 29, 1936.

Network affiliation: N.C.B.S. (1ZB, 2ZB, 3ZB, 4ZB)

Station director: W. E. Elliot. **Executive staff:** J. W. Griffiths (advt. manager), J. R. Brown (prog. organiser), J. N. Gordon (production supervisor). **Production and announcing staff:** A. B. Collyns, G. Vryer, M. D. Laurenson, A. D. Bathurst, F. L. Frost, C. G. C. Moore, M. J. S. Hutt, U. Paora, J. N. Thomson, H. D. Lock, R. G. W. Nixon. **Technical staff:** W. Illingworth (station engineer), S. L. Cotton, C. N. Edwards, W. B. Fitzwilliam, W. A. Williams, R. A. Patchett, E. W. Stringer, J. D. Llewellyn, W. E. Hunter, F. W. Kennedy, H. L. Martin, S. J. Murray. **Sales staff:** J. W. Griffiths (sales manager), D. G. S. Sheard, A. H. Hanlon. Total staff: 63.

Daily transmission hours: 6 a.m.-midnight.

Transmitter: Collins Radio, Type 20c.

Studio equipment: Collins Radio.

Aerial system: Quarter-wave vertical radiators, shunt fed.

2ZB WELLINGTON.

Operator: The New Zealand Government. National Commercial Broadcasting Service, 7/13 Dixon Street, Wellington. **Studio:** Hope Gibbon's Buildings, Dixon Street, Wellington. **Transmitter:** Mt. Victoria, Wellington. Licensed and operating power, 1,000 watts.

Commenced operations: April 28, 1937.

Station director: K. W. Kilpatrick. **Executive staff:** S. J. Duff (sales manager), L. E. Strachan (prog. organiser), K. S. Waterhouse (production supervisor). **Production and announcing staff:** C. T. Agassiz, R. P. Whitchurch, L. E. Aldridge, F. W. Bennett, I. P. Folong, O. T. Haddon, W. H. Harris, J. McNamara, B. R. O'Brien, A. P. H. Shone, K. T. A. G. Tahiwi, Miss M. J. Mullins, Mrs. D. Basham. **Technical staff:** M. S. King, H. A. Berry, J. D. Fraser, E. E. Gittings, P. R. Hoare, O. W. Martin, E. A. McPhee, E. C. Petherick, D. L. Rushworth, G. W. D. Ryrie, B. J. N. Petrie. **Sales staff:** A. C. Towsey, A. Scott. Total staff: 60.

Daily transmission hours: 6 a.m.-midnight.

Transmitter: Collins Radio, type 20c.

Studio equipment: Collins Radio.

Aerial system: Quarter-wave vertical, shunt fed.

3ZB CHRISTCHURCH.

Operator: New Zealand Government. National Commercial Broadcasting Service, 7/13 Dixon Street, Wellington. **Studios:** Colombo Street, Christchurch. **Transmitter:** New Brighton, Christchurch. Licensed and operating power, 1,000 watts.

Commenced operations: September 28, 1937.

Station director: F. W. Simpson. **Executive staff:** M. S. Bullivant (sales manager), L. E. Hunter (programme organiser). **Production and announcing staff:** R. B. Speirs, J. A. Bremner, E. E. Chivers, D. Combridge, A. A. Grundy, I. K. Mackay, L. B. McGoverne, R. A. C. Pollard, T. A. Pitama, J. L. Bickerdike, Miss G. W. Green, Mrs. M. G. Jennings. **Technical staff:** W. A. Penton (station engineer), D. S. Bell, H. L. Coughlan, L. A. Elliott, R. G. Holmes, E. D. Nicholl, V. E. Robinson, B. Sword, J. R. Tabley, B. J. Will, J. Younger, S. A. G. McKnight. **Sales staff:** P. G. Parker, K. W. Staples. Total staff: 60.

Daily transmission hours: 6 a.m.-midnight.

Recording facilities: At station.

Transmitter: Collins Radio, type 20c.

Studio equipment: Collins Radio.

Aerial system: Quarter-wave vertical, shunt fed.

(Continued overleaf.)

Commercial Broadcasting in New Zealand (continued)

N.Z. Agencies Handling Radio Accounts

DORMER BECK ADVERTISING LTD., Horne's Building, Vulcan Lane, Auckland, N.Z.

Executives: R. C. Dormer, L. M. Beck, R. Trenchard Smith (directors).

Radio Account Executives: R. C. Dormer, R. Trenchard Smith.

Recording Facilities Used: Stannage Radio Ltd.

Radio Accounts: Hugh Wright Ltd. (men's wear), Lusteroid Pty. Ltd. (Shu-milk, etc.), Jas. Pascoe (jewellery), Jewel Casket (jewellery), National Brush Co. (Aust.) Ltd. (tooth brushes), Sutton and Sutton Ltd. (live stock), Consolidated Tobacco Co. Ltd. (tobacco and cigarettes), Bradstreet's Ltd. (drapers), Banno Bros. (cycles), R. Jaffe (men's wear), Auckland Meat Co. (butchers, bacon curers, etc.), Vacuum Power Corporation Ltd. (refrigerators), J. M. Hyams Ltd. (cigarette papers), Quality Packers Ltd. (Teaspoon tea), Dresswell (frocks), Blue and White Stores (groceries), W. J. Stevens (lingerie), Hansell Laboratories (essences), David Teed Ltd. (Rhusal salts), Bridgers Dentists Co. (dentists), Paul Pty. Ltd. (Asthona), Timaru Milling Co. (Otis and Oatlets), Whitcombe and Toms (booksellers), Social Services (rest rooms), Brown Barrett Ltd. (coffee, sauce, etc.), Hallenstein Bros. (clothiers), Rendell's Ltd. (drapers), N.Z. Dry Cleaning Co. Ltd. (dry cleaners), Salas Beauty Salon (beauty salon), Silknit (N.Z.) Ltd. (May Belle lingerie), N.Z. Wallboards Ltd. (builders' supplies), H. F. Stevens Ltd. ("Whip-It"), Meltzer Bros. (clothiers), Warnock Bros. (Kia-Ora soap), Removals Ltd. (carriers), Clipper Polish Co. (metal polish), Victoria Cafe (restaurant), Fred. Forde Ltd. (Firestone tyres), J. Collinson Ltd. (tailors), L. G. Grey (chemist), Barry and Beale (opticians), Miss Harrison (millinery), W. M. Pitcher and Son (used cars), Kealy's Ltd. (booksellers), Chesney Ltd. (smallgoods), A. C. Pine (dermatologist), O. V. Garland (milk bar), F. T. F. Evans (farm machinery), Nikau Bacon Co. (Nikau bacon), Wilton Collieries (briquettes), Thorpe's Motors (used cars), Australasian Waste Products (parcel delivery), A. C. Trousdale (land agent), Anderson Electrical Co. (electricians), Stormont's Ltd. (tinned puddings, bakers), Geo. Walker Ltd. (furniture), Peter Jackson (Overseas) Ltd. (Peter Jackson No. 3 Cigarettes), N.Z. Refrigerating Co. (C.M.C. tongues), T. Clark (shoes), Pams Products Ltd. (Pams baking powder), Bond and Bond Ltd. (refrigerators, radios, etc.).

FITCHETT, W. B. LTD., "Evening Post" Building, Wellington, New Zealand.

Executive: W. B. Fitchett (managing director).

GOLDBERG ADVERTISING AGENCY, THE, A.M.P. Buildings, Custom House Quay, Wellington, New Zealand.

Executives: H. B. Riggs (general manager for New Zealand), L. D. Webster (manager for Wellington), G. T. Wiggs (asst. manager).

Radio Account Executive: Robert J. Wardlaw.

Recording Facilities Used: Local studios for announcement recordings, American and Australian recorded features.

Radio Accounts: Bond's Hosiery Mills (N.Z.) Ltd. (hosiery), C.O. Products (Waxshine floor polish and other cleaners), Eudahy and Co. (Old Dutch), Life Savers (N.Z.) Ltd. (chewing sweets, etc.), Goodrich Tyre Co. (tyres), Godfrey Phillips (N.Z.) Ltd. (De Reszke cigarettes), Kolynos Incorporated (Kolynos toothpaste), Sylk-Save (Sylk-Save—hosiery saver), Nestle's Anglo-Swiss Condensed Milk Co. (A/sia) Ltd. (Nestle's products), Wyeth Chemical Co. (Bismag).

GOLDBERG ADVERTISING AGENCY LTD., THE, T. and G. Buildings, Hereford Street, Christchurch, New Zealand.

Executives: S. J. Wearn (manager), J. Patterson (accounts executive).

Radio Accounts: Francis Curtis (jewellery), Cook and Ross Ltd. (cosmetics), Mason Struthers (hardware), Royds Bros. and Kirk Ltd. (foodstuffs).

GOLDBERG ADVERTISING AGENCY LTD., THE, Royal Exchange Buildings, O'Connell Street, Auckland, New Zealand.

Executive: J. T. Mills (director).

Radio Accounts: George Court and Sons Ltd., Neil Stewart and Co. (Hutuwai), Nestle and Anglo-Swiss Condensed Milk Co. Ltd. (cream, Highlander milk, Milo food). MacAlister Bros. Ltd. (Nuro films), Alfred Bevage Ltd. (men's goods).

GORDON AND GOTCH (N.Z.) ADVERTISING LTD., Waring Taylor Street, Wellington, New Zealand.

Executives: K. Alexander (manager), I. A. Mackay (chief executive).

Radio Accounts: Coffee and Spice Co. (preserved ginger, cherries, coffee, etc.), Cranbux Ltd. (Odol and Odol oxygen tooth pastes), Weldon's Journal, Modern Woman.

RADIO FEATURES LTD., Colonial Mutual Building, Custom House Quay, Wellington, N.Z.

Executives: Sinclair Carruthers (managing director), Elliott Lloyd (ganeral manager) branch managers—G. C. Laird (Auckland), D. Grist (Wellington), D. Du Maurier (Christchurch), J. Stanley (Dunedin).

Recording Facilities Used: Audition equipment all cen-

(Continued on Page 170.)

N.Z. Commercial Stations

(Continued from Page 167.)

4ZB DUNEDIN.

Operator : New Zealand Government. National Commercial Broadcasting Service, 7-13 Dixon Street, Wellington. **Studios:** C.P.O. Building, Dunedin. **Transmitter:** Highcliff, Dunedin. Licensed and operating power, 1,000 watts.

Commenced operations: October 12, 1937.

Station director: L. J. Greenberg. **Executive staff:** S. C. Asquith (sales manager), M. L. A. Tozer (programme organiser), R. G. A. Oak (production supervisor). **Production and announcing staff:** L. R. Sceats, L. C. Bates, W. P. Dawson, J. Y. Dixon, K. W. Donaldson, P. L. Fowler, B. V. McCawe, J. B. McConnell, C. A. McDowell, R. S. Johnson. **Technical staff:** A. E. Foster (station engineer), M. V. Macauley, J. L. Anderson, F. W. A. Barnett, S. W. Cayzer, J. Dine, L. Gibb, C. J. McCarthy, H. E. Phillips, W. T. Smith, H. F. Tattersfield, H. T. Pearse. **Sales staff:** W. R. M. Shaw, E. T. Thomson. Total staff, 58.

Daily transmission hours: 6 a.m.—midnight.

Recording facilities : At station.

Transmitter: Collins Radio Type 20c.

Studio equipment : Collins Radio.

Type of aerial: Quarter wave vertical, shunt fed.

Commercial Broadcasting in New Zealand (continued)

AGENCIES HANDLING RADIO ACCOUNTS

RADIO FEATURES LTD. (Continued on Page 168).

tres—recording equipment at Wellington, Auckland, Christchurch.

Radio Accounts: S. F. Aburn Ltd. (hardware), Ascot Ltd. (mercers), Adams Bruce Ltd. (cakes), Auckland Trotting Club (races), Balling's Ltd. (cordials), Barker and Pollock (dress materials), Arthur Barnett Ltd. (drapery), Barnett, Barnett (furniture), Baxter Trading Co. (polish—floor), Beatty Bros. (washing machines), Berger Lewis and Son (paints), Bettol Manufacturing Co. (manufacturing chemists), W. B. Beveridge (cycle dealer), Alfred Bishop Ltd. (Junipah mineral salts), Bjelland and Co. (sar dines), Miss E. M. Black (florist), B.A.L.M. (Dulux), Brown Ewing and Co. (drapers), Horace Bull Ltd. (tailors), John Bulleid and Co. (departmental store), Cadbury Fry Hudson (Bourne Vita), D. and A. Campbell (shoes), Cathie and Sons Ltd. (suits), Cereal Foods Ltd. (cereals), Chemists Supplies (chemists), Christchurch Cinemas (talkies), A. R. Christian Ltd. (motor accessories), City Dye Works (cleaners), Clarkes (cycles), H. M. Conway (plumbers), J. and Mrs. Craig (chiropractors), Allan Crighton (motor cycles), Dann Bros. (plumbers), De Luxe Shoes (shoes), Direct Silk and Frock Co. (materials), D.C.Y. Co. Ltd. (grocers), Dominion Rental Cars Ltd. (car hire), Don Tailors (tailors), Dora Portrait Studios (photographers), D.I.C. Ltd. (drapers), Dreighton Jones (hardware), Drewery's Auction Room (auctioneers), George Dyer and Co. (plumbers), Arthur Ellis and Co. (mattresses), Empire Furriers (furs), W. Escott (Moresuds), A. C. Falconer (hats), H. Famillton (decorators), Fashion House (frocks), Firestone Tyres (tyres), Fletcher Humphries (tea), Floriana Floral Studios (floral), Forster's Toilet Rooms (hairdressing), F. O. H. Milk Bars (milk shakes), Fowne's Ltd. (drapers), Fruit Lax (medicine), Gardiner's Gown Salon (gowns), Goldband Taxis (taxis), M. Gould and Co. (tailor), T. H. Green and Co. (bacon curers), S. L. R. Halliwell (dentist), Hansell's Laboratories (Milko), A. R. Harris and Co. (engineers), Harrod's Ltd. (tailors), Hays Ltd. (drapers), W. M. Haycroft and Co. (jewellers), Herbert Shoe Co. (shoes), M. Hollander (ladies' tailor), F. Hogg (jeweller), Hope Bros. Ltd. (mercers), Houghton and Burn (insecticides), Iles and Poole (hairdresser), C. L. Innes and Co. (cordials), International Harvester Co. (machinery), Ireland's Ltd. (estate agents), Iva Plaut Food Co. (manures), Jensen Bros. (butchers), Jolland's Ltd. (egg preserver), Joy Products Ltd. (hand cleanser), Kincaid's Ltd. (drapers), Klippel Bros. (tie manufacturers), W. Lambourne (furnishers), J. S. Land (bags), Lane's Ltd. (cordials), J. G. Laurenson and Sons (bakers), E. J. Lloyd (jeweller), I. R. Little Ltd. (radios), Adam Mackay Ltd. (grocers), Majestic Floor Polish Co. (floor polish), Maple Furnishing (furniture), Marie Louise Ltd. (gowns), F. N. R. Meadows Ltd. (manures), J. J. Melhuish and Co. (condiments), Milne and Choyce (drapers), Murdoch and Co. Ltd. (manufacturing chemists), David McRae Ltd. (mattresses), R. T. McLean (physical culture), L. D. Nathan (tea), The Neil Manufacturing Co. (manufacturing chemists), George Newby (bag and trunk manufacturer), N.Z. Express Co. (radios), N.Z. Surf Association (competitions), Otago Farmers' Co (merchants), Paget Manufacturing Co. (kitchen helps), Para Rubber Co. (rubber goods), Patterson Barr Ltd. (men's outfitters), Patterson Bros. (hardware), Pattison, Ede Co. (furriers), Philips' Lamps (lamps), Ponsford, Newman and Benson (Roamer watches), Pyne Gould and Guiness (stock and station agents), Quigley's Ltd. (furnishers), Radiation (N.Z.) (stoves—gas), Rattray and Son (tea), Regent Gowns (gowns), Reilley's Central Produce Market (auctioneers), Reilly's Parking Station (parking), Reliance Retread Co. Ltd. (retreading), Restar (South Island) Ltd. (disinfectant), A. I. Rhodes (lingerie), Ross and Glendinning (warehousemen), Plummer, Sadie (corsets), Sanitarium Health Foods (Marmite), Savoy Restaurant (suppers), Schneideman and Son (tailors), Scholl Manufacturing Co. (foot aids), Scoullar and Co. Ltd. (furnishers), Self-Help Co-op. (grocers), Selwyn Millinery (hats), Silver Radio Agency (radios), Smallbone Bros. (razor blades), Smith and Brown (furnishers), Eugene Spitz (ladies' tailor), Stannage Radio (radios), Star Stores (grocers), H. F. Stevens (druggists), Sunshine Milk Bars (refreshments), Swift and Co. (junket tablets), J. T. Taverner (chemist), W. F. Tucker and Son (soup and custard), Tucks Ltd. (grocers), Mrs. S. C. Turner (health drink), Turnbull and Jones (electricians), Undrill Bros. (clothiers), U.F.S. Dispensary (chemists), Vivian Vance (refrigerators), Van Grey Pty. Ltd. (hair restorer), The Vogue (hats), Waitemata Brewery (accommodation), Wardell's (Dun) Ltd. (grocers), Warnock's Ltd. (drapers), Watson's Ltd. (jewellers), Whitehead and Pears (drapers), White Star Taxis (taxis), Whittome Stevenson (jams, etc.), Ern. Williams (tailor), J. Williamson Ltd. (fountain pens), T. and W. Young (tea), Zimme's Ltd. (frocks), Zip Heaters (heaters), Berlei (corsets).

LEADING NATIONAL ADVERTISERS WHO USED THE N.C.B.S. DURING 1937

Ambler and Co. Ltd. (Shirts).
Aulsebrooks Ltd. (Biscuits).
B.A.L.M. (Paints).
Beatty Bros. (Washing Machines).
Begg, Chas. and Co. (various).
Bishop, Alfred (Juuipah Salts).
Bushells (Tea).
Cadbury-Fry-Hudson (Biscuits and Chocolates).
Cathie and Sons Ltd. (Suits).
Christian, A. R. (Brake Lining).
Clement's Tonic.
Corbon, A. A. and Son (Tonic Wine).
Douglas Drug Co. (Bidomak).
Firestone Tyre and Rubber (Tyres).
Hansell Laboratories (Essences).
Fletcher Humphreys (Tea).
Kolynos Ltd. (Toothpaste).
Knox Co. Ltd. (Cystex).
Lloyd, E. J. (Jewellery).
McDuffs Ltd. (various).
Nathan, L. D. Ltd. (Tea).
National Distributors (various).
National Electric and Engineering Co. Ltd. (Stoves, etc.).
National Magazines (Magazine).
Nestle's Anglo-Swiss Condensed Milk Co. (Confectionery and foodstuffs).
Ponsford Newman (Watches).
N.Z. Railways (Transport).
Orient Navigation Co. (Transport).
Paget Manufacturing Co. (No-Rub and Clever Mary).
Phillips, Godfrey (De Reszke Cigarettes).
Philips' Lamps (N.Z.) (Radios).
Pinchin and Johnson (Paints).
Sanitarium Health Food (Foods).
Self Help Stores (various).
Tucker, W. F. and Sons (various).
Vincent Chemical Co. (A.P.C.).
Waitemata Brewery Ltd. (Hotels).
Wander, A. Ltd. (Ovaltine).
Woolworth's (N.Z.) Ltd. (Stores).
Wrigleys Ltd. (Chewing Gum).
Wyeth Chemical Co. (Bismag).

A List of DIRECTORS OF BROADCASTING STATIONS

A

Aitken, J. B., Director, 3SR.
Albert, A. F., Director, 4GR, 4RO, 2UW, 4BC, 4MB.
Albert, F., Director, 4BC, 4RO, 4MB.
Albert, M. F., Director, 4GR, 2UW.
Aldermann, F. C., Director, 4SB.
Allan, A. J., Director, 2DU.
Allan, F., Director, 3AW.
Austin, R. B., Dr., Director, 2AD.

B

Baillie, R. G. L., Director, 2BS.
Balmain, W. H., Chairman of Directors, 2BE.
Barker, E. M., Director, 6PR.
Baxter, G. S., Director, 3MA.
Bean, L. P. R., Chairman of Directors, 7QT.
Bennett, O., Director, 2TM.
Body, E. I., Chairman of Directors, 2DU.
Bowly, Chas., Director, 4BC.
Brand, A. E., Director, 2LM.
Burston, H., Managing Director, 2BH.
Butters, Sir John, Director, 2UE.
Budd, A. A., Chairman of Directors, 2MW.

C

Callaghan, C. Y., Director, 2BS.
Chandler, Frank, Director, 4BH.
Chandler, J. B., Chairman of Directors, 4BH; Director, 4SB.
Christensen, A. J., Director, 4BU.
Clark, S. W. J., Director, 3BA.
Cottrell, E., Director, 3UZ.
Cook, Ramsay Burns, Director, 3GL.
Cromie, Chas. T., Director, 3UZ.
Curtis, R. G., Director, 4BU.

D

Daniell, Frederick, Director, 2GB, 2WL, 3AW, 2HR.
Darrow, F. G., Director, 4SB.
Davey, J. H., Director (Managing), 3BA.
Denison, Sir Hugh, Director, 2GB.
Denison, L. A., Director, 2GB.
Denison, R. E., Director, 2GB, 2CA, 2WL, 2HR, 2UE.
Dickson, A. H., Director, 6PR.
Downing, H. P., Chairman of Directors, 6PR.
Doyle, Stuart F., Chairman of Directors, 4BC, 4RO; Director, 4GR, 4SB, 4MB.
Drummond, D. H., Hon., Director, 2AD, 2NZ.
Duncan, Frederick de R., Director, 2WL.
Dunlop, C. H., Director, 2HR.
Dunstan, W., Director, 3DB-LK.

E

Edgar, V., Director, 3AK.
Elliot, R. D., Director, 3MA.
Ettelson, P. W., Director, 3XY.

F

Fagan, R., Director, 2SM.
Featonby, G. S., Director, 3HA.
Featonby, George A., Director, 3SH.
Findlay, A. P., Director, 7BU; Managing Director, 7DY.
Findlay, P. A., Director, 7BU.
Findlay, N. A., Managing Director, 7QT.
Findlay, Selwyn H., Managing Director, 7HO.
Fink, D., Director, 3DB-LK.
Fisk, Sir Ernest, Chairman of Directors, 2CH, 2GF.
Fisk, E. I., Director, 3HA.
Fitzhardinge, F. N. B., Director, 2DU.
Fleming, F. B., Director, 2GZ.

G

Garrott, A. E., Director, 7QT.
Gelle, Dr. Louis, Chairman of Directors, 6GE.
Gilligan, D. J., Director, 2GZ.
Goddard, T., Dr., Director, 2MO.
Gold, E. E., Managing Director, 4GR, 4ZR.
Gordon, E. J., Director, 2DU.
Greig, H., Director, 6IX, 6ML, 6WB.

H

Harrison, V. G. H., Chairman of Directors, 3XY.
Harrison, W. H., Director, 3AK.
Harvey, W. J., Chairman of Directors, 4BU.
Henderson, Kingsley A., Director, 3SR, 3UL.
Higginbotham, E., Chairman of Directors and Managing Director, 2TM.
Hodges, Mr., Director, 2MG.
Holloway, E. Director (Managing), 3CV.
Holmes, D. E., Director, 2DU.
Humphry, J. L., Director, 4AY.
Hunter, H., Director, 5KA.
Hurley, W., Director, 2SM.

J

Jackson, H. B., Director, 6IX, 6ML, 6WB.
Johnson, C., Director, 2PK.
Johnson, E. B., Director, 4IP.
Johnson, W. J., Director, 4IP.
Jones, L. M., Dr., Director (Managing), 2RG.
Joseph, A., Director, 2TM.

K

Kelly, G. Dalziel, Sir, Chairman of Directors, 3SR, 3UL.
Kingston, F. C., Director, 6IX, 6ML, 6WB.
Kitto, T. C., Director, 2HD, 7UV.
Knapton, H. T., Chairman of Directors, 2NZ.

L

Lansell, C. V., C.M.G., M.L.C., Director, 3CV.
Lanyon, C. D., Director, 3MA.
Lashmar, E., Director, 2SM.
L'Estrange, M., Director, 2SM.
Lincoln, R., Director, 5KA.
Low, R. D., Director, 4AY.

M

Manchee, A. F., Chairman of Directors, 2GZ; Director, 2NZ.
Marden, C. F., Director, 4GR, 4RO, 4BC.
Marsh, G. W., Director, 5DN.
Mather, Alex., Sen., Director, 2HR.
Matthews, A. J., Chairman of Directors, 2PK.
Mayne, W. G., Director, 4ZR.
McArthur, A. H., Director, 2AD.
McCann, B., Director, 7HT.
McCann, L., Director, 7HT.
McCauley, A. L., Director, 2KM, 2KA.
McCauley, G. E., Director, 2KA.
McGeoch, R. S., Director, 4ZR.
McIntosh, J. C., Jun., Director, 2LM.
McLean, Jack, Director, 2LM.
Meacham, F. J., Director, 4IP.
Meany, J. A., Managing Director, 2SM.
Middleton, J. H., Director, 2GZ, 2NZ.
Milton, E., Director, 2MG.
Milton, H., Director, 2MG.
Mitchell, M. G., Director, 2DU.
Mitchell, V. F., Director, 4BH.
Morgan, S., Managing Director, 3KZ.
Morgan, W. V., Director, 3KZ.
Morris, R., Director, 7HT.
Moses, F. H., Director, 2KM.
Moss, W., Director, 2HD.
Murdoch, Sir Keith, Director, 3DB-LK.
Murray, J. Stanley, Chairman of Directors, 2BH.
Murray, T. G., Director, 2SM.
Musgrove, M. D'O., Director, 6IX, 6ML, 6WB.
Muston, H. C., Director, 4SB.

N

Nettlefold, Len, Director, 7HO.
Nicholl, F. C., Director, 2MW.
Nicholson, R. M., Director, 4LG.
Nicholson, R. M., Mrs., Director, 4LG.
Nilsen, Oliver J., Director, 3UZ.
Nilsen, O. Victor, Director, 3UZ.

O

Ogilvy, C., Director, 2CA.
Oliver, L. M., Director, 2MO.
Oliver, M. J., Managing Director, 2MO.
O'Neill, J. P., Chairman of Directors, 2KM, 2KA.
O'Neill, M., Director, 2SM.
Opie, A. J., Dr., Director, 2LM.
O'Sullivan, Neil, Director, 4BH.

P

Pacini, H., Director, 3DB-LK.
Paddison, A. C., Director, 2KM, 2KA.
Parkinson, W. S., Director, 4IP.
Paton, J. L., Director, 6PR.
Perriam, A. W., Director, 2GB.
Pickering, R. B., Director, 2DU.
Pinkerton, H. R., Director, 5DN.
Pratt, A. C., Director, 2MW.
Price, J. C., Director, 2MW.

Q

Queale, Wm., Director, 5DN.

R

Raward, J. T., Director, 2MW.
Ricketson, Staniforth, Director, 3SR, 3UL.

(Continued foot of next page.)

Managers of Broadcasting Stations

Following is a list of managers of commercial broadcasting stations in Australia compiled from information supplied, as as July 20, 1938:—

A

Anderson, Val. J., Manager, 3MA.
Armitage, J. G., Assist. Manager, 2UE.
Armstrong, John C. F., Manager, 7QT.

B

Banney, J. P., Manager, 3BO.
Beaver, H. E., Manager, 2KY.
Bills-Thompson, G., Station Manager, 7HO.
Blake, R. L., Manager, 2AD.
Blee, Norman, Manager, 3SH.

C

Carson, C. R., Manager, 4BH.
Chamberlain, Frank S., Station Manager, 3TR.
Clay, S. A., Station Manager, 2MG.
Cox, H. E., Manager, 4TO.

D

Dahl, E. M. L., General Manager, 4AY.
Darke, Harold S., Service Manager, 2KA, 2KM.
Davey, J .H., Managing Director, 3BA.
Dower, John, Manager, 2AY.
Dyball, H. F., Manager, 2TM.

E

Ebrall, Herbert, Manager, 6GE.

F

Findlay, P. A., Managing Director, 7DY.
Findlay, S. H., Managing Director, 7HO.
Fitts, R. A., General Manager, 3HA, 3SH, 3TR.
Foley, Eileen (Miss), Station Manager, 9MI.
Fox, A. E. R., Manager, 2GF.
Frank, K., Manager, 4PM.

G

Gold, E. E., Managing Director, 4GR-4ZR.
Gough, J., Station Manager, 7LA.

H

Harrison, Eric, Manager, 2LM.
Hay, A. C. R., Manager, 2BH.
Higginbotham, E., Managing Director, 2TM.
Holt, Tom, General Manager, 3XY.
Holloway, E., Managing Director, 3CV.
Holtze, A. L., Manager, 5AD-MU-PI-SE
Horner, H. G., General Manager, 2GB.
Hutchinson, Val., Manager, 2KM.

J

Jameson, John, Manager, 2HD.
Jones, Dr. L. M., Managing Director, 2RG.

K

Kemp, S. J. A., Manager, 3YB.
Kemsley, A. N., General Manager, 3UZ.
Kennedy, T. St. John, Manager, 6PR.
Kirkland, J. R., Manager, 2BE.

L

Lambart, T., Manager, 4IP.
Lawrence, A. E., Manager, 4WK.
Lewis, E. J., Station Manager, 3UL.
Lewis, H. J., Manager, 2GN.
Lyons, N., Station Manager, 2UW.

M

Marden, C. F., General Manager, 2UW.
Marsh, Gordon W., General Manager, 5DN.
McCauley, Geo. E., Managing Director, 2KA.
McKenzie, J. R., Manager, 3GL.
Meany, Monsignor J., Manager, 2SM.
Miller, J. D., Manager, 2PK.
Mitchell, V. F., Manager, 4SB.
Morgan, S., Managing Director, 3KZ.

O

Oliver, L. M., Manager, 2MO.

P

Pearce, F. R., Manager, 4CA.
Parish, H. R., Manager, 7DY.

R

Radford, J. A., General Manager, 2HR.
Rheuben, E. J., General Manager, 4RO.
Ridley, J. E., General Manager, 2GZ.
Roberts, Russell F., Manager, 4BC.
Roberts, I. A., Manager, 2WG.
Robertson, Alec., General Manager, 4BK-AK.

S

Samuel, B., Manager, 6IX, 6ML, 6WB.
Searle, A. B., Manager, 4VL.
Sharp, Chris. S., General Manager, 2CA.
Sharpe, J. A., Manager, 2MW.
Sheppard, N. S., Superintending Manager, 3SR-3UL.
Spencer, T., Manager, 2CH.
Spicer, Hon. F. W., Managing Director, 2PK.
Stevenson, C. V., Managing Director, 2UE.
Storey, O. J., Manager, 2BS.
Strange, C. A., Manager, 3YB.
Syme, D. F., Managing Director, 3SH, 3TR.

T

Taylor, John T., General Manager, 3AW.
Thomas, R. C., Manager, 7HT.
Towner, Arthur D., General Manager, 7BU.

W

Walpole, Frank S., Manager, 2DU.
Ward, R., Manager, 7QT.
Whitford, F. R., Managing Director, 6AM, 6PM.
Wood, E. A., Manager, 7UV.
Woodland, C. V., Manager, 4BU.
Worrall, D. T., Manager, 3DB-LK.

Y

Yeldon, R. A., General Manager, 2WL.

DIRECTORS OF BROADCASTING STATIONS

(Continued from Page 171.)

Ridley, J. E., Director, 2NZ.
Riley, H. E., Director, 7DY.
Roberts, B., Director, 5DN.
Roberts, E. V., Director, 2BS, 2WG.
Roberts, N., Director, 2BS.
Roberts, I. A., Mrs., Director, 2WG.
Robertson, C. M., Chairman of Directors, 2LM.
Robertson, Geo., Director, 7HO.
Robinson, E., Director, 2HR.
Robinson, O., Director, 2HR.
Rock, A. P., Director, 6GE.
Rolph, G. B., Director, 7EX.
Rolph, W. R., Director, 7EX.
Ryan, A. J., Director, 2CA.
Ryan, C. A., Director, 2KM.

S

Schneider, W. K., Director, 5KA.
Scott, A. K. K., Director, 2DU.
Shaw, N. L., Director, 2UE.
Sheahan, J. P., Director, 2PK.
Sheffer, H. M., Director, 2TM.
Shepheard, Len, Director, 6GE.
Shepherd, L., Director, 3XY.
Simpson, E., Director, 2AD.
Sloman, M. G., Director, 3KZ.
Smith, C. P., Director, 6IX, 6ML, 6WB.
Smith, F. E., Director, 4ZR.
Sommerlad, E. C., Hon., Director, 2AD, 2NZ.
Sparkes, R. C., Director, 2HD.
Spicer, F. W., Hon., Managing Director, 2PK.
Spowers, Allan, Director, 3SR, 3UL.
Stephens, W. J., Director, 3CV.
Stevenson, C. V., Managing Director, 2UE.
Stodart, J. D., Director, 6PR.
Sutherland, G., Director, 3HA, 3AW.
Syme, David F., Director, 3HA; Managing Director, 3SH, 3TR.
Syme, G., Director, 3AW.
Syme, J. H., Chairman of Directors, 3AW.
Syme, M., Director, 5DN.
Syme, Maisie, A., Director, 3SH, 3TR.

T

Tait, F. S., Director, 3AW.
Tait, John H., Director, 3AW.
Tareha, C. A., Director, 5KA.
Taylor, C. P. A., Director, 3BA.
Taylor, K., Director, 3BA.
Taylor, G., Director, 3DB-LK.
Thompson, Mr., Director, 2MG.
Thring, Olive, Director, 3XY.
Towner, A. D., Director, 7BU, 7DY.

W

Walsh, O. J., Director, 7UV.
Whitcomb, T., Director, 2TM.
Whitford, A. A., Director, 6AM, 6PM.
Whitford, Archer P. H., Director, 6AM, 6PM.
Whittord, E. I., Director, 6AM, 6PM.
Whitford, F. R., Managing Director, 6AM, 6PM.
Whitham, H. B., Director, 2RG.
Whyte, A. S., Director, 3DB-LK.
Wood, E. A., Director, 2HD.
Wynne, A. P., Managing Director, 4MB.

Y

Yeldon, Russell A., Director, 2WL.
Young, R., Director, 7HT.

Broadcasting Station Personnel

The following list of names is taken from information supplied by the various commercial stations. Every endeavour has been made to keep the list up-to-date at the time of going to press, but staff changes at stations are occurring so frequently that the publishers cannot accept any responsibility for omissions or inaccuracies which might be brought about by such changes.

A

Abramowski, Olaf. Sales staff, 3UZ.
Abrahams, Max. Production and announcing staff, 2PK.
Adermann, C. F. Director, 4SB.
Aitken, J. B. Director, 3SR.
Aked, B. Technical staff, 2LM.
Albert, A. F. Director, 2UW, 4GR, 4RO.
Albert, F. Vice-chairman, 4BC, 4RO.
Albert, M. F. Director, 4GR, 2UW.
Allan, F. Director, 3AW.
Allen, Frank. Continuity manager, 3AW.
Allen, H. Technical staff, 2CH.
Anderson, A. Sporting editor, 2UW.
Anderson, Jim. Announcer, 4BC.
Anderson, G. H., Macquarie Network, Sales Manager.
Anderson, Val. J. Manager, 3MA.
Andrew, Alf. Announcer, 3AK.
Angles, C. Sporting commentator, 2UW.
Anthoney, R. Announcer, 5DN.
Archibald, L. Engineer, 3UZ.
Armistead, A. K. Technical staff, 2HD.
Armitage, J. G. Assistant manager, 2UE.
Armstrong, D. R. Assistant manager, 2GB.
Armstrong, Peter. Announcer, 7QT.
Arnold, C. J. Production, 2UW.
Ashton, M. Sales staff, 2GB.
Athelwood, Ron. Announcing staff, 3AW.
Atkinson, F. A. Announcer, 6IX.
Auchterlonie, A. Announcer, 5KA.
Austen, Janet. 2CH.
Austin, R. B., Dr. Director, 2AD.
Austwick, E. D. Technical staff, 2UW.
Ayling, R. Technical staff, 2DU.

B

Badger, F. D. Announcer and sales, 4TO.
Baeyertz, C. N. Sales staff, 2UE.
Bairnsfather, Captain. Announcer, 2KY.
Baker, M. Announcer, 2WG.
Balk, D., Miss. Production staff, 5DN.
Balmain, W. H. Chairman of directors, 2BE.
Balmer, W. Announcer, 3KZ.
Balmer, N. E. Programme manager, 3KZ.
Banney, J. P. Manager, 3BO.
Banks, A. Sales staff, 3KZ.
Banks, Norman. Chief announcer, 3KZ.
Barlee, Roly. Announcer, 3UZ.
Barlin, Geo. Technical staff, 2CA.
Barker, E. M. Director, 6PR.
Barnes, C. Sales staff, 2MO.
Barnes, John. Announcer, 3XY.
Barry, H. G. Production and announcing staff, 2KA.
Bartle, O. Engineer, 2NZ.
Barwick, W. Sales staff, 7HT.
Barwick, E. Technical staff, 3KZ.
Batty, N. Announcer, 2WG.
Baume, S. E. Advertising manager, 2UE.
Baverstock, W. Publicity manager, Macquarie Broadcasting Services, and 2GB.
Baxter, G. S. Director, 3MA.
Bayley, E. M. Secretary, 4BK-AK.
Bean, L. P. R. Chairman of directors, 7QT.
Beaney, W., Technical staff, 4BH.
Beattie, R. Announcer, 4GR.
Beaver, H. E. Manager, 2KY.
Beck, C. Announcer, 4RO.
Bell, Gordon. Chief announcer, 3SR.
Bennett, A. L. Studio manager, 2TM.
Bennett, J. Digby. Sales, 2SM.
Bennett, O. Director, 2TM.
Bennett, Bremner E. Announcer, 2CH.
Benson, E. Miss. Programme manager, 5AD-MU-PI-SE.
Bermingham, Raymond F. Studio manager, 2GZ.
Berryman, L. Miss. Announcer, 6ML.
Bessemer, Eric. Chief of staff, 4BC.
Biggins, J. Technical staff, 2LM.
Bills-Thompson, G. Station manager, 7HO.
Bini, Stephani. Publicity officer, 3UZ.
Binks, Colin. Chief announcer, 3TR.
Bird, C. 2CH.
Bishop, N. Chief engineer, 4GR.
Bischoff, C. Technical Staff, 2KA.
Blake, R. L., Manager, 2AD.
Blackney, L. Technical staff, 3GL.
Blackshaw, Geo. Announcer, 3XY.
Blakeney, K. Programme manager, 2GB.
Blandford, M. Announcer, 3DB-LK.
Bleazby, C. Announcer, 3XY.
Blee, Norman. Manager, 3SH.
Bleechmore, R. C. Sport announcer, 4AY.
Blight, Miss. Announcer, 2DU.
Bluett, F. Announcer, 2KY.
Blunt, Geo. Producer, 3XY.
Boast, H. Engineer, 3LK.
Body, E. I. Chairman of directors, 2DU.
Bolland, Geo. Announcer, 2HD.
Bonfield, Leisha. Announcer, 4BC.
Bonney, Ralph. Announcer, 7UV.
Bowie, W. Announcer and continuity, 3SH.
Bowly, Chas. Director, 4BC.
Bradshaw, C. V. Station manager, 3HA.
Brady, C. Announcer, 2MO.
Brain, Trevor. Announcing and sales staff, 7BU.
Brand, A. E. Director, 2LM.
Bray, G. A. Sales manager, 7UV.
Brebner, J. Technical staff, 3GL.
Brentnall, M. Announcer, 2WG.
Breed, C. Engineer, 2GZ.
Brewin, D. J. S. Sales staff, 3DB-LK.
Briggs, E. Technical staff, 4BC.
Briggs, Leicester O. Record department, 2GZ.
Broad, E. Announcer, 6AM, 6PM.
Broadbent, Jack. Announcer, 4BC.
Brosie, H. Technical staff, 2HR.
Brotchie, G. Sales staff, 2UE.
Brown, H. M. Technical staff, 2BH.
Brown, J. H. Chief engineer, 2KY.
Browne, R. Announcer, 5AD-MU-PI-SE.
Budd, H. Announcer, 2MW.
Budd, A. A. Chairman of directors, 2MW.
Bulcock, Mary. Announcer, 4BH.
Bull, Herbert. Technical staff, 4BU.
Burgess, Jack. Chief announcer, 5AD-MU-PI-SE.
Burrage, J. Engineer, 3SR.
Burrows, Richard. Chief announcer, 3HA.
Burston, H. Managing director, 2BH.
Butson, H. L. Accountant, 2WL.
Butterfield, G. Technical staff, 6IX.
Butters, Sir John. Director, 2UE.
Button, B. C. Announcer, sales, 2CH.
Buxton, H. Sales staff, 2GB.
Buzacott, H. Technical staff, 4GR.
Buzacott, N. Engineer, 3LK.
Byron, J. A. Secretary, 2WL.

C

Callard, M. Announcer, 3DB-LK.
Calley, W. H. Accountant, 2GB.
Callow, M. Technical staff, 2GB.
Callow, Russell. Announcer, 7HO.
Cameron, J. Announcer, 5AD-MU-PI-SE.
Cameron, R. Technician, 2UE.
Campbell, B. Sales staff, 3XY.
Campbell, K. M. Sales manager, 3XY.
Campbell, W. R. Secretary, 6GE.
Canavan, J. Technical staff, 6IX.
Cannon, R. Technical staff, 3CV.
Carlin, Arthur. Technical staff, 2KY.
Carmichael, Alan. Publicity, 3AW.
Carr, A. Programme supervisor, 2UE.
Carson, C. R. Manager, 4BH.
Carter, B. Announcer, 6IX.
Carter, C. Accountant, 2UW.

Station Personnel (contd.)

Carter, Goff. Announcer, 6AM, 6PM.
Carter, N. Announcer, 4GR.
Cartwright, V., Miss. Announcer, 3GL.
Carvosso, A. J. Secretary, 5DN.
Casos, Dean. Announcer, 4BC.
Cayley, Frank. Chief copywriter and announcer, 2GZ.
Chaloner, A. R. Secretary and accountant, 2NZ.
Chamberlain, Frank S. Station manager, 3TR.
Chamberlain, W. Technical staff, 3XY.
Chandler, Frank. Director, 4BH.
Chandler, J. B. Chairman of directors, 4BH.
Chaplin, Allen C. Announcer, engineer, 2PK.
Chapman, Maurice. Sales manager, 5AD-MU-PI-SE.
Chappell, V. Asst. engineer, 7DY.
Charlesworth, Gilbert. Announcer, 3UZ.
Chatfield, M. J. Technical staff, 2NZ.
Choats, R. Technical staff, 6PM.
Chrisholm, Graham. Production and announcing staff, 2KM.
Christensen, A. J. Director, 4BU.
Churchward, E. C. Advertising manager, 6IX, 6ML, 6WB.
Clark, S. W.J. Director, 3BA.
Clarke-Cottrell, F. Publicity manager, 2UW.
Clarke, H. B. Sales staff, 2GZ.
Clarke, S. O. Sales staff, 2CH.
Clay, S. A. Station manager, 2MG.
Clifford, R. R. Accountant, 4BC.
Clyne, E. Murray. Engineer, 3UL.
Coates, Eileen. Announcer, 2CA.
Cochrane, A. S. Senior announcer, 2CH.
Coe, K. Announcer, 7LA.
Coffey, Ida, Mrs. (Penelope). Announcer, 3UZ.
Coldwell-Smith, C. E. Announcer, 2CH.
Cole, G. Junior technical staff, 2UE.
Collibee, E. Announcer and salesman, 2UW.
Collings, Laurence C. Announcer, 2GZ
Colman, E. Chief announcer, 2CA.
Condon, Bert. Announcer, 2NZ.
Connolly, Gerry. Announcer, 4BC.
Connor, E. Executive staff, 4LG.
Cook, Barney. Announcer, 4BC.
Cook, Ramsay Burns. Director, 3GL.
Cookson, M. Technical staff, 3AW.
Coombs, T. G. Sales staff, 3HA-TR-SH.
Cooper, E. Engineer, 7HT.
Cortez, J. Announcer, 6AM, 6PM.
Cossins, Denis. Announcer, 7EX.
Cottrell, Eric. Director, 3UZ.
Cottrell, L. Technical staff, 3XY.
Cousens, C. H. Production and announcing staff, 2GB.
Cox, A. M. Technical staff, 3BA.
Cox, H. E. Manager, 4TO.
Crago, G. L. Announcer, 2BH.
Crago, James C. Chief announcer, 2MO.
Craig, N. Announcer, 4BC.
Crawcour, J. A. Announcer, 2UW.
Creighton, J. Announcer, 2MW.
Croke, T. L. Announcer, 2BS.
Cromie, Chas. T. Director, 3UZ.
Cross, C. J. Sales staff, 7HT.
Crossman, K. Announcer and production manager, 5DN.
Crouch, E. C. Chief engineer, 2GZ, 2NZ.
Cruickshank, Norman W. Technical staff, 4SB.
Cullen, M. Announcer, 2WL.
Cumston, L. Technical staff, 2GB.
Cunnington, Charles L. Copy and script writing, 2GZ.
Curdie, Margaret. Announcer, 3SH.
Currie, R. Technical staff, 2CH.
Curry, Mr. John. Electrical engineer on board "Kanimbla," 9MI.
Curtis, R. G. Director, 4BU.

D

Dahl, E. M. L. General manager, 4AY.
Dahlberg, L. Sales staff, 3BA.
Daley, Les. Announcer, 4BH.
Daniell, F. Director, 3AW, 2WL, 2HR, 2GB, and Executive Director, Macquarie Broadcasting Services.
Dargie, D. Technical staff, 2GB.
Darke, Harold S. Service manager, 2KA, 2KM.
Darkin, Miss K. Announcer, 2PK.
Darrow, F. G. Director, 4SB.
Dart, L. W. Publicity officer, 2CH.
Dash, Dorothy, Miss. Children's session, 4BC.
Davey, Jack. Production and announcing staff, 2GB.
Davey, J. H. Managing director, 3BA.
Davidson, R. Sales staff, 2TM.
Davies, R. R. Engineer, 5DN.
Davis, C. Announcer, 5AD-MU-PI-SE.
Davison, Thomas. Technical staff, 2KY.
Dawson, D. Technical staff, 2TM.
Day, Donald. Announcer, 3XY.
Deane, Miss L. Production and announcing staff, 2GB.
Dear, Alex. ("Terry"). Chief announcer, 3AW.
Dease, John. Production and announcing staff, 2GB.
Dearth, Harry. Production and announcing staff, 2GB.
Decent, L. S. Sales staff, 2WG.
Dempsey, Myra. 2KY.
Denby, W. F. Sales staff, 3DB-LK.
Denison, Sir Hugh. Director, 2GB.
Denison, L. A. Director, 2GB.
Denison, R. E. Director, 2GB, 2UE, 2CA, 2WL, 2HR.
Devereaux, R. Announcer, 2WG.
Devine, John. Executive staff, 7EX.
Dexter, J. Announcer, 3SR.
Diamond, William. Senior announcer, 4BU.
Dickson, A. H. Director, 6PR.
Dickson, F. P. Chief engineer, 2BE.
Dickson, I. Announcer, 3GL.
Dixon, A. L. Chief engineer, 4BK-AK.
Dixon, Neville. Sales manager, 3HA, 3SH, 3TR.
Dodds, J. Engineer, 7HO.
Donovan, R. Announcer, 2QN.
Douglass, R. Announcer, 2NZ.
Dower, John. Manager, 2AY.
Downie, Moira. Announcer, 2HR.
Downing, H. P. Chairman of directors, 6PR.
Doyle, Stuart F. Chairman of directors, 2UW, 4BC, 4RO, 4GR, 4SB.
Drake, H. V. Sales staff, 4BH.
Drew, B., Miss. Announcer, 2DU.
Drummond, D. H., Hon. director, 2AD, 2NZ.
Duff, David. Sales staff, 3AW.
Dukes, G. W. Senior technical staff, 2UE.
Duncan, Frederick de R. Director, 2WL.
Duncan, H. 7LA.
Dungan, Dorothy. Continuity, 3AW.
Dunlop, C. H. Director, 2HR.
Dunlop, K., Miss. Continuity, 3KZ.
Dunn, J. Sales staff, 2KY.
Dunne, John. Studio manager, 2SM.
Dunoon, K. Miss. Announcer, 3KZ.
Dunstan, D. Technical staff, 4BC.
Dunstan, W. Director, 3DB-LK.
Dyball, H. F. Manager and secretary, 2TM.

E

Earl, Harry. Continuity writer, 3AK.
Eaton, J. Asst. production supervisor, 2UE.
Ebrall, Herbert. Manager, 6GE.
Eden, K. Announcer, 3DB-LK.
Edgar, V. Director, 3AK.
Edwards, D. Miss. Announcer and commercial supervisor, 5AD-MU-PI-SE.
Edwards, George. Director of production, 2UW.
Edwards, H. E. Technical staff, 2KY.
Edwards, Stewart. Announcer, 7UV.
Egan, P. J. Secretary, 2SM.
Elliot, R. D. Director, 3MA.
Elliott, Douglas. Announcer, 3KZ.
Elliott, Frank. Technical staff, 4BC.
Elliott, Walter G. Announcer, 4BH.
Ellis, A. Technical staff, 2CA.
Enticknap, M. Technical staff, 4BC.
Ettelson, P. W. Director, 3XY.
Evans, E. Engineer, 3SH.
Everard, R. Announcer, 4BC.
Everett, Sydney. Announcer-producer, 4BH.
Eversen, W. D. Announcer, 4LG.
Ewart, W. Announcer, 2UE.

F

Fagan, R. Director, 2SM.
Fair, Richard. Announcer, 2SM.
Fairweather, Keith. Chief engineer, 4IP.
Falkenmier, June, Announcer, 4VL.
Fardell, F. W. Accountant, 3DB-LK.
Farrelly, Jack Announcer, 2KY.
Farris, E. C. Sales, 2SM.
Fawcett, Stanley. Sales staff, 3UZ.
Featonby, G. S. Director, 3HA.
Featonby, George A. Director, 3SH.
Feekings, W. Technical staff, 4BH.
Ferguson, J. Announcer, 2AD.
Filmer, Mrs. Announcer, 2UE.
Findlay, A. P. Managing director, 7DY, director 7BU.
Findlay, Mollie. Announcer, 7HO.
Findlay, M. F. ("Aunt Madge"). 7DY.
Findlay, N. A. Managing director, 7QT.
Findlay, Selwyn H. Managing director, 7HO; manager, Findlay's Pty., Ltd., Hobart, Tas.
Fink, T. Director, 3DB-LK.

Firth, W. Sales staff, 2GB.
Fisher, A. F. Engineer, 5DN.
Fisk, Ernest, Sir. Chairman of directors, A.W.A. (2CH).
Fitts, R. A. General manager, 3HA, 3SH, 3TR.
Fitzhardinge, F. N. B. Director, 2DU.
Fleming, F. B. Director, 2GZ.
Fletcher, C. A. Advertising manager and sales staff, 2GB.
Frank, K. Manager, 4PM.
Francis, Maurice. Author and dramatist George Edwards Productions, 2UW.
Freeman, C. A. Announcer and sales, 5DN.
Foley, Eileen M. Announcer-in-charge, 9MI (short-wave).
Folie, Max. Technical staff, 3MA.
Foott, Miss R. Service department, 2UW.
Foster, G. Announcer and sales, 2LM.
Foster, Miss M Announcer., 6GE.
Fox, A. E. R. Manager, 2GF.
Fox, John. Announcer, 2KY.
Forsyth, Terry. Announcer, 4IP.
Forsythe, G. Gordon. Sales staff, 4BH
Freeman, C. Announcer, 5KA.
Freeman, S. C. L. Sales, 2SM.
Fremlin, R. A. Advt. manager, 4BK-AK.
French, C. G. Production manager, 3XY.
Fuhrman, W. Sales staff, 6AM, 6PM.
Fuller, H. Engineer, 3SR.
Furley, P. Announcer, 2CA.

G

Gainford, R. Senior announcer, 2UE.
Garden, Ian. Announcer, 2KY.
Garden, M. M. Programme manager, 2KY.
Gardiner, A. Technical staff, 2NZ.
Gardner, D. Executive staff, 4LG.
Garrott, A. E. Director and secretary, 7QT.
Geeves, P. Announcer, 2CH.
Gelie, Dr. Louis. Chairman of directors, 6GE.
Gibbons, A. Technical staff, 2GB.
Gibbs, G. Technical staff, 4BH.
Gibson, Beth. Announcer, 4BU.
Gibson, L. Announcer, 5KA.
Gibson, Miss Grace. American Transcription Agencies.
Gibson, G., Miss. 2CH.
Gilder, C. Assistant sales manager, 2UW.
Gilligan, D. J. Director, 2GZ.
Gilmour, Wyn. Announcer, 2CA.
Giraud, C. Sales staff, 6IX, 6ML, 6WB.
Glancy, P. Announcer, 4RO.
Gledhill, R. Announcer, 6IX, 6WB.
Glew, Les. Chief engineer, 3UZ.
Goddard, T., Dr. Director, 2MO.
Goddard, W. G., Dr. 4BC.
Godfrey, K. Announcer, 2TM.
Gold, E. E. Managing director, 4GR, chairman 4ZR.
Gooding, D. Chief engineer, 5AD-MU-PI-SE.
Gordon, Laurie. Chief announcer, 2NZ.
Gordon, Peggy. Announcer, 2AD.
Gower, E. L. Sales staff, 6IX, 6ML, 6WB.
Grace, A. Chief technician, 3KZ.
Graham, R. M. Sales staff, 4BC.

Station Personnel (contd.)

Grant, W. T. Technical staff 2KM, 2KA.
Gray, A. Sales staff, 3KZ.
Gray, G. Asst. manager, 7UV.
Gray, J. Technical staff, 2WL.
Gray, W. Studio manager, 3GL.
Green, Max. Announcer, 7EX.
Greenham, Iris ("Pat"). Announcer, 3KZ.
Greer, N. C. Technical staff, 6WB.
Gregory, H. Salesman and announcer, 2UW.
Greig, H. Director 6IX, 6ML, 6WB.
Grey, Mrs. Announcer, 2KY.
Griffin, E. P. Secretary, 4BC.
Griffin, Jack. Technical staff, 4BC.
Grimstone, R. Announcer, 4GR.
Grist, S. W. Sales staff, 3DB-LK.
Grose, Frank. Production and announcing staff, 2GB.
Gurry, Jack. Sporting commentator, 3UZ.
Guthrie, D. Technical staff, 4RO.

H

Hahn, Arthur (Bimbo). Production and announcing staff, 2GB.
Haines, F. B. Sales staff, 2GZ.
Hall, E. Sales staff, 2HR.
Hallsworth, N. Announcer, 2HR.
Ham, G. Chief technician, 4BH.
Hammer, C. Technical staff, 2UW.
Hanna, F. Engineer, 2GZ.
Hannam, H. Engineer, 2GZ.
Hardman, G. Announcer, 4BH.
Hardy, W. Announcer and salesman, 2UW.
Harmer, Massey. Technical staff, 2KY.
Harnett, Dominic. Announcer, 2SM.
Harper, H. Studio manager, 4BK-AK.
Harper, John. Chief announcer, 2KY.
Harrington, G. R. Sales staff, 4GR.
Harris, L. Technical staff, 7QT.
Harris, Hector. Secretary, 3AW.
Harrison, Eric. Manager, 2LM.
Harrison, Mr. James G. Production and announcing staff, 2GB.
Harrison, V. G. H. Chairman of Directors, 3XY.
Harrison, W. Director, 3AK.
Hart, W. Engineer, 2GZ.
Hart, William. Production and announcing staff, 2GB.
Harte, B. Technical staff, 4BH.
Harty, F. S. 2KY.
Harvey, C. Announcer, 3DB-LK.
Harvey, Joan. Sales staff, 2KA.
Harvey, Norman. Announcer, 4BU.
Harvey, W. J. Chairman of directors, 4BU.
Hatherley, Frank Production, 4BH.
Hawthorne, Reg. Production manager, 2SM.
Hay, A. C. R. Director and manager, 2BH.
Hay, H. Announcer, 6AM, 6PM.
Haycroft, V. Announcer, 3YB.
Hayward, K. P. Sales staff, 6IX, 6ML, 6WB.
Healy, Ian. Announcer, 2HR.
Heimann, T. R. Advt. manager, 2MO.
Hemery, P. Announcer, 3SH.
Hender, R. Announcer, 6PR.
Hender, R. Sales staff, 6PR.
Henderson, Kingsley A. Director, 3UL, 3SR.
Henry, J. Announcer, 3GL.
Henwood, R. Engineer, 6AM.
Herring, W. G. Sales staff, 2WL.
Hibbert, C. Technical staff, 2GB.
Higginbotham, E. Managing director, 2TM.
Hill, F. T. Engineer, 5DN.
Hipwell, R. Technical staff, 2BH.
Hitch, A. V. Announcer and sales staff, 4AY.
Hoad, A. E. Programme production and engineer, 2GF.
Hodges, Mr., Director, 2MG.
Hodgman, Brian. Announcer, 7HO.
Holland, C. Announcer, 2UE.
Holloway, Ernest. Managing director, 3CV.
Holmes, D. E. Director and chief engineer, 2DU.
Holmes, Francis. Sales and announcing staff, 7BU.
Holt, Tom. General manager, 3XY.
Holtze, A. L. Manager, 5AD-MU-PI-SE.
Homfrey, L., Miss. Announcer, 3DB-LK.
Homfrey, Louise, Miss. ("Louise"). Announcer, 3UZ.
Hooper, M. Chief engineer, 3DB-LK.
Hopton, A. Technical staff, 3CV.
Horner, H. G. General manager, 2GB.
Howard, B. Announcer, 2KY.
Howard, Keith. Announcer, 4BC.
Howard, Ken. Announcer, 2KY.
Howe, Ray. Technical staff, 4BU.
Howie, C. R. Engineer, 5DN.
Hudson, Kenrick ("Dick"). Announcer and production manager, 3KZ.
Hudson, T. Announcer, 2UW.
Hugh, Errol. Announcer, 2NZ.
Hughes, Richard. Production, announcing and sales staff, 2GB.
Hugill, M. 2CH.
Hume, E. J. Chief engineer, 5DN.
Humfrey, F. J. Advertising manager, 2PK.
Humphrey, J. L. Director, 4AY.
Hunter, G., Miss. Announcer, 2RG.
Hunter, H. Director and sales, 5KA.
Hurndell, A. Announcer and technical staff, 4TO.
Hurley, W. Director, 2SM.
Hussey, C. Announcer, 2MO.
Hutchison, C. Engineer, 2WL.
Hutchinson, Val. Manager, 2KM.
Hutton, R. Announcer, 4BC.
Hutton, D. Announcer, 2HD.
Huxley, C. I. Accountant, 2TM.
Hyde, Loftus. Announcer, 4BH.

I

Ingleby, R. Production, 7HT.
Isaacson, A. Assistant manager, 3KZ.
Israel, M. Technical staff, 3AW.

J

Jack Bill. Technical staff, 4BC.
Jackson, B. Secretary, 3KZ.
Jackson, B. J. Melbourne manager, 2QN.
Jackson, G. Production and announcing staff, 2GB.

Station Personnel (contd.)

Jackson, H. B. Director, 6IX, 6ML, 6WB.
Jacques, V. A. Continuity, 5AD-MU-PI-SE.
James, C. Announcer, 2UW.
James, D. Programme department, 2GZ.
James, D., Mrs. Announcer, 6PR.
James, E. W. Chief announcer, 2BE.
James, R. P. Announcer, 2BH.
James, R. P., Mrs. Announcer, 2BH.
Jameson, John. Manager, 2HD.
Jamieson, M. Programme Department, 2GZ.
Jarvis, V. Technical staff, 2RG.
Jeffrey, L. Sales staff, 4BH.
Jenkin, Frank. Production and announcing staff, 2KA.
Jenkins, R. Announcer, 2WG.
Jermyn, J. Announcer, 3SR.
Jesson, R. A. Production and announcing staff, 2GB.
Johnson, C. J. Director, 2PK.
Johnson, E. B. Director, 4IP.
Johnson, W. J. Director, announcer, and sales staff, 4IP.
Johnston, M. Announcer, 2HD.
Johnston, Mr. Announcer, 2UE.
Johnston, Wm. W. Secretary, 2HD.
Jones, Colin. Production staff, 2KY.
Jones, Dr. L. M. Managing director, 2RG.
Jordon, Mrs. Dorothy. Production and announcing staff, 2GB.
Jordon, James. Engineer, 4BU.
Joseph, A. Director, 2TM.
Joyce, D. Announcer and continuity, 3KZ.
Judd, Noel. Chief announcer, 2WL.

K

Kahle, E. Production and announcing staff, 2KM.
Kauper, H. Consulting engineer, 3DB-LK.
Keating, P. Announcer, 7HO.
Keir, G. Announcer, 4RO.
Keiron, M. Announcer, 2WG.
Kelly, G. Dalziel, Sir. Chairman of directors, 3SR, 3UL.
Kelly, Reg. Announcing and sales, 2HR.
Kemp, Arthur. Technical staff, 4BH.
Kemp, S. J. A. Manager, 3YB.
Kemsley, A. N. General manager, 3UZ.
Kennedy, T. St. John. Manager, 6PR.
Kermond, L. Assist. engineer, 3YB.
Kerr, A. D. Engineer, 3BA.
King, R. A., M.L.C. Secretary, 2KY.
Kingdom, R. Technical staff, 2AD.
Kingsley, Helen. Announcer, 2NZ.
Kingston, F. C. Director, 6IX, 6ML, 6WB.
Kinley, R. Asst. Engineer, 7UV.
Kirkland, J. R. Advertising manager, 2BE.
Kitto, T. C. Director and chief engineer, 7UV. Director 2HD.
Knapton, H. T. Chairman of directors, 2NZ.
Knight, C. Technical staff, 2CA.
Knowles, F. Sales staff, 2CH.
Krimmer, A. Announcer, 4BC.
Kruger, S. Technician, 2UE.
Kurts, A. Announcer and sales, 6PR.

L

Lambart, T. Manager, 4IP.
Lammas, Miss G. Programme department, 2UW.
Lane, R. E. Sales staff, 2CH.
Langborne, Kitty, Miss. Announcer, 2GF.
Lansell, C. V. Director, 3CV.
Lanyon, C. D. Director and secretary, 3MA.
Larkin, J. S. Advertising manager, 3UZ.
Lashmor, E. Director, 2SM.
Lawrence, A. E. Manager, 4WK.
Lawrence, C. Sporting annotator, 2UW.
Lay, D. 7LA.
Layton, K. Announcer, 2CH.
Leach, G. Technical staff, 4BC.
Lebanon, B. Announcer, 4BC.
Leen, N., Miss. Announcer, 6GE.
Leigh-Cooper, J. Technical staff, 2BS.
Leiper, J. Sales staff. 2TM.
L'Estrange, M. Director, 2SM.
Levy, F. E. Sales manager, 2UW.
Levy, W. Announcer, 2QN.
Lewis, E. J. Station manager, 3UL.
Lewis, H. J. Manager, 2GN.
Lewis, L. Announcer, 6IX, 6WB.
Lilburne, G. Announcer, 3KZ.
Lincoln, R. Director, 5KA.
Lindgren, Kathleen ("Nancy Lee"). Announcer, 3AW.
Ling, T. J. Chief engineer, 2BE.
Lisle, V. Announcer, 2UW.
Littleton, E. Chief of continuity, 4BC.
Llewellyn, A. H. Senior technical staff, 2UE.
Lloyd, K. P. G. Sporting and sales, 3UL.
Longhurst, E. Announcer, 2BE.
Longmore, H. Engineer, 3LK.
Lord, Tasman. Technical staff, 7BU.
Louer, C. K. Technical staff, 2GB.
Lovegrove, E. A. Sales staff, 6PR.
Low, R. D. Director, 4AY.
Lumsdaine, Jack. Production and announcing staff, 2GB.
Lunn, L. 2KY.
Lyons, N. Station manager, 2UW.

M

Maguire, Derek. Announcer, 2CA.
Mair, C. Engineer, 3HA.
Manchee, A. F. Chairman of directors, 2GZ; director, 2NZ.
Manning, Pam. Announcer, 2LM.
Marcus, R. 2CH.
Marden, C. F. General manager 2UW, director 4BC, 4GR, 4RO.
Marple, C. Technical staff, 2HD.
Marsh, G. W. Director and general manager, 5DN.
Marshall, D. Technical staff, 2CH.
Mason, Oscar. Announcer, 3HA.
Mason-Wood, E. Production and announcing staff, 2GB.
Masters, John. Announcer, 3AW.
Mather, Alex., sen. Director, 2HR.
Mather, A. S. Chief engineer, 2HR.
Mather, W. D. Technical staff, 3BA.
Mathers, A. J. Advertising manager, 3AK.
Mathews, J. Technical staff, 3GL.
Matthews, A. J. Director, 2PK.
Matthews, Richard. Announcer, 4BC.
Maughan, F. Engineer, 3DB.
Mayne, W. G. Director, 4ZR.
Meacham, F. J. Director, 4IP.
Meakes, R. F. Technical staff, 2GB.
Meany, Monsignor J. A. Managing director, 2SM.
Meldon, M., Miss. Announcer, 4RO.
Meredith, Keith. Technical staff, 4BU.
Meredith, S. Announcer, 2UE.
Metaxa, K. Sales staff, 3AK.
Meton, H. Executive staff, 2MG.
Middleton, J. H. Director 2GZ, 2NZ.
Miles, G. Chief Engineer, 7HT.
Millard, H. Announcer, 4BC.
Millar, C. K. Secretary, 2GZ.
Miller, E., Miss. Secretary, 2RG, 2LF.
Miller, J. D. Manager, 2PK.
Miller, Mrs. E. H. ("Mary Ann"), 3SR.
Miller, Renn. Chief announcer, 3DB-LK.
Miller, Rosalind. Continuity, 3AW.
Millan, K. Announcer, 2WG.
Milton, E. Director, 2MG.
Milton, H. Director, 2MG.
Minto, J. Sales staff, 2CH.
Mitchell, M. G. Director, 2DU.
Mitchell, V. F. Director, 4BH.
Mitchell, V. F. Manager, 4SB.
Mogg, F. R. Secretary, 3XY.
Moginie, K. Announcer, 2TM.
Moller, Percival. Secretary, 4BU.
Moloney, C. J. Manager and chief announcer, 2PK.
Monoghan, V. Engineer, 3HA.
Moore, Donald. Announcer, 3TR.
Moore, M. Technical staff, 2DU.
Moran, C. Technical staff, 4BH.
Morgan, Reg. Production and announcing staff, 2GB.
Morgan, S. Director (managing), 3KZ.
Morgan, W. V. Director, 3KZ.
Morley, J. K. Announcer, 2KY.
Morris, J. Sales staff, 2KM, 2KA.
Morris, Leslie, Miss. Announcer, 3SR.
Morris, R. Director, 7HT.
Morrison, C. B. Technical staff, 6GE.
Morrissey, K. Announcer, 2HD.
Morrow, J. Technical staff, 2GB.
Morrow, Keith. Announcer, 3AK.
Morse, Hilda G. Announcer, 2UW.
Moses, F. H. Director, 2KM.
Moss, W. Director, 2HD.
Muhling, C. Announcer, 6AM-PM.
Munnings, B. Senior technical staff, 2UE.
Munro, Mabel. Sales staff, 7EX.
Murdoch, Sir Keith. Director, 3DB-LK.
Murphy, J. Engineer, 3HA.
Murphy, W. Technical staff, 3UZ.
Murray, A. J. Sales manager, 3KZ.
Murray, John. Sales manager, 2KA.
Murray, J. Stanley. Chairman of Directors 2BH.
Murray, T. G. Director, 2SM.
Musgrove, M. D'O. Director, 6IX, 6ML, 6WB.
Muston, H. C. Director and secretary 4SB.

Mc.

McArthur, A. H. Director, 2AD.
McArthur, Marion. Announcer, 2AD.

McCallum, Moncrieff. Production staff, 2KY.
McCann, B. Director, 7HT.
McCann, L. Director, 7HT.
McCartney, Sir Edward. Chairman of directors, 4BK-AK.
McCauley, A. L. Director, 2KM, 2KA.
McCauley, Geo. E. Managing director and station manager, 2KA.
McConnell, J., Salesman, 2UW.
McDonald, Mrs. Angus. Announcer, 3TR.
McDonald, J. Announcer, 2WG.
MacDonald, K. A. Announcer, 5AD-MU-PI-SE.
MacDonald, S. Announcer, 3HA.
Macdougal, Ann. Women's Club organiser, 2KA.
McGeoch, R. S. Director, 4ZR.
McGregor, R. Announcer, 6ML.
McGregor, R. R. Engineer, 3UL.
McGregor, Tom. Programme manager, 4BC.
MacGregor, Peter. Production and announcing staff, 2KA.
McGuinness, G. Sales staff, 2CH.
McIlwraith, McEacharn Ltd. Director of 9MI.
McIntosh, J. C., jun. Director, 2LM.
MacKay, Doreen. Announcer, 2SM.
McKay, J. Sales staff, 2UW.
McKee, Steve. Sporting editor, 5AD-MU-PI-SE.
McKee, Mrs. Announcer, 4GR.
McKenzie, J. Announcer, 4BC.
McKenzie, J. R. Manager, 3GL.
McKillop, G. Announcer, 2UE.
McKinnon, R. Salesman, 2UW.
McLean, Jack. Director, 2LM.
McLennan, Jessie. Announcer, 4BC.
McLeod, F. Sales staff, 6GE.
McMahon, J. Announcer, 3UZ.
McMahon, R. Salesman, 2UW.
McNeil, T. A. Chief engineer, 2UW.
McNeilly, L., Miss. Announcer, 3MA.
McRae, E. Sales staff, 3SR.
McShane, F. Sales staff, 2UE.
McSpearin, Meg. Announcer, 2CH.

N

Neill, Catherine. Announcer, 3XY.
Nettlefold, Len. Director, 7HO.
Newall, L. Announcer, 5DN.
Nicholas, W. Chief engineer, 7HO.
Nichols, Cliff. Announcer, 3AW.
Nicholl, F. E. Director, 2MW.
Nicholson, D. Studio director. 5DN.
Nicholson, R. M. Director, 4LG.
Nicholson, R. M., Mrs. Director, 4LG.
Nilsen, Oliver J. Director, 3UZ.
Nilsen, O. Victor. Director, 3UZ.
Nolte, G. Technical staff, 3TR.
Noonan, Molly. 2LM.
Norton, C. Announcer, 5AD-MU-PI-SE.
Nowlan, W. Announcer, 4IP.

O

Oakley, R. A. Technical staff, 5KA.
O'Brien, Basil. Announcer, 7BU.
O'Brien, J. Announcer, 2WG.
O'Brien, J. Announcer, 2HR.
O'Brien, Margaret. Announcer, 7EX.
O'Donnell, K., Miss. Announcer, 2RG.
Ogilvy, C. Macquarie Broadcasting Services, also Director 2CA.
O'Hagan, Jack. Sales staff, 3AW.
O'Halloran, M. Director and sales staff, 5KA.
O'Keefe, Arthur. Announcer, 2GZ.
Oliver, A. Technical staff, 2MO.
Oliver, J. Sales staff, 3AK.
Oliver, M. J. Managing director and chief engineer, 2MO.
Oliver, L. M. Director and manager 2MO.
O'Neill, M. Director 2SM.
O'Neill, J. P. Chairman of directors, 2KM; director, 2KA.
Opie, A. J., Dr. Director, 2LM.
Osbourne, E. Announcer, 4LG.
O'Sullivan, Neil. Director, 4BH.
O'Sullivan, Pat. Technical staff, 2LM.
O'Sullivan, S., Miss. Production staff, 5DN.
Otley, Ted. Musical director, 4BC.

P

Pacini, H. Director, 3DB-LK.
Paddison, A. C. Director, 2KM, 2KA.
Palmer, B. Advertising manager, 2HR.
Palmer, Joyce, Announcer, 3MW.
Parish, H. R. General manager, 7DY.
Parish, L. Assistant Manager, 7DY.
Parker, Ken. Technical staff, 3MA.
Parker, N. Technical staff, 6IX.
Parkinson, W. S. Director, 4IP.
Parrant, E. Announcer, 6PR.
Parris, J. Announcer, 2QN.
Paton, J. L. Director, 6PR.
Patton, J. P. Sales staff, 6AM, 6PM.
Pearce, F. R. Manager, 4CA.
Peaston, H. H. Announcer, Engineer, 2GF.
Pengilley, L. Technical staff, 2TM.
Penny, A. Mrs. Announcing staff, 2TM.
Perriam, A. W. Director, 2GB.
Peterson, W. Technical staff, 6PR.
Pettett, J. Junior technical staff, 2UE.
Phillips, J. Technical staff, 2UW.
Phillips, J. P. Technical staff, 2UW.
Phillips, P. O. Supervisor of sporting and outside broadcasts, 2UE.
Philips, R. Announcer, 2WL.
Phillips, Stan. Announcer, 4BC.
Philpott, A. Technical staff, 3GL.
Phipps, W. Technical staff, 6PM.
Pieremont, B. Senior technical staff, 2UE.
Pieremont, R. Senior technical staff, 2UE.
Pieremont, R., jun. Senior technical staff, 2UE.
Pieremont, W. Technician, 2UE.
Pile, Richard. Announcer, 4BH.
Pinkerton, H. R. Director, 5DN.
Pither, Grace. Announcer, 3HA.
Potter, A. Technical staff, 3DB.
Potter, F. Technical staff, 2TM.
Powell, Miss J. Announcer, 2BE.
Powell, J. P. Announcer, 2RG.
Powell, Moray J. Announcer, 6AM, 6PM.
Power, Maurice. Announcer, 2CA.
Pratt, A. C. Director, 2MW.
Prentice, J. M. Announcer, 2UW.
Price, J. C. Director, 2MW.
Price, Ellis. Production and announcing staff, 2GB.
Prince, Arthur L. Sales manager, 4BC.
Proctor, A. M. Sales staff, 2GZ.
Pullan, Jack. Technical staff, 2KY.
Pullman, E., Mrs. Announcer and sales, 5DN.
Pym, Walter. Production and studio manager, 3UZ.

Q

Queale, Wm. Director, 5DN.
Quirk, L. P. Advertising manager, 2SM.

R

Radford, J. A. General manager, 2HR.
Radford, T. Accounts, 2GZ.
Rangott, W. Technical staff, 2RG.
Ratcliffe, Gordon. Copy and script, 2GZ.
Raward, J. T. Director, 2MW.
Raymond, Betty. Announcer, 7BU.
Read, A. L. Engineer, 6AM.
Reeve, Miss Goodie. Production and announcing staff, 2GB.
Reilly, John. Studio manager, 2QN.
Rheuben, E. J. General manager, 4RO.
Riches, Sydney. Technical staff, 3UZ.
Ricketson, Stauiforth. Director 3UL, 3SR.
Riding, E. Mavis. Publicity officer, 4BC.
Ridley, Alan. Country rep. 2GZ.
Ridley, J. E. General manager, 2GZ. Director 2NZ.
Riley, H. Producer, 7DY.
Riley, H. E. Director, 7DY.
Ringland, H. Salesman, 2UW.
Roberts, B. Director, 5DN.
Roberts, E. V. Managing director, 2WG, and Director 2BS.
Roberts, I. A., Mrs. Director, 2WG.
Roberts, P. Technical staff, 2WG.
Roberts, Russell F. Manager, 4BC.
Robertson, Alec. General manager, 4BK-AK.
Robertson, C. M. Chairman of directors, 2LM.
Robertson, Geo. Director, 7HO.
Robertson, J., Miss. Announcer, 6IX.
Robertson, Wilfred. Production and announcing staff, 4ZR.
Robinson, A. Sales staff, 3XY.
Robinson, E. Director, 2HR.
Robinson, O. Director, 2HR.
Robinson, W. Assistant engineer, 2UE.
Robson, C. Technical staff, 6IX.
Robson, Keith. Technical and sales staff, 2AD.
Rock, A. P. Director, 6GE.
Rodda, W. Technical staff, 6PR.
Rolph, G. B. Director, 7EX.
Rolph, W. R. Director, 7EX.
Rose, C. Sales staff, 3KZ.
Rosman, E. H. Secretary, 6IX, 6ML, 6WB.
Rowe, E. W. Announcer, 2HD.
Rowland, W. Technical staff, 3XY.
Ruck, M. Announcer, 6AM, 6PM.
Rudd, H. Technical staff, 2WG.
Ruler, Frank. Announcer, 3SR.
Russell, Albert. Production and announcing staff, 2GB.
Russell, R. McC. Asst. manager, 3DB-LK.

Station Personnel (contd.)

Russell, Fred W. Sales staff, 3AW.
Rutherford, Ruth (Mrs. R. L. Reid). Announcer, 4BC.
Ryall, Miss. Production and announcing staff, 2PK.
Ryan, A. J., Director and chief engineer, 2CA.
Ryan, C. A. Director, 2KM.
Ryan, John. Announcer, 2KA.
Ryan, J. B. Advertising manager, 2BH.
Ryan, John W. Chief engineer, 3AW.
Rycroft, J. L. Sales staff, 7HO.
Rycroft, S. Advertising manager, 7HO.

S

Salmon, J. Announcer, 3UL.
Samuel, B. Manager, 6IX, 6ML, 6WB.
Sarch, D. Miss. Announcer, 3MA.
Saul, John. Production staff, 2KY.
Saunders, George. Production and announcing staff, 2GB.
Saunders, G. A. Sales staff, 2GB.
Saunders, Margaret. Announcer, 2GF.
Sautelle, C. B. Technical staff, 2WL.
Sayle, W. Secretary, 2UW.
Scarlett, J. Technical staff, 3AW.
Scetrine, B. Engineer, 3BA.
Schneider, W. K. Director. 5KA.
Schneider, W. K., Mrs. Announcer, 5KA.
Schofield. L. Sales staff. 3UZ.
Schultz, L. N. Chief engineer, 2GB.
Scott, A. K. K. Director, 2DU.
Scott, Dulcie. Announcer, 4BH.
Scott, E. Announcer, 2UW.
Scott, R. Engineer and announcer, 2GZ.
Scrivener, Phyllis. Accountant, 4IP.
Searle, A. B. Manager, 4VL.
Searle, Alan. Technical staff. 4BC.
Seaton, Mr. P. Junior Technical staff. 2UE.
Sellers, V. 2KY.
Semfel, E. Technical staff, 4RO.
Seymour, J. Announcer, 3CV.
Seymour, H. Announcer, 4BH.
Sharland, A. B. Technical staff. 2CH.
Sharland, W. Announcer, 3XY.
Sharp, Chris. S. General manager, 2CA.
Sharpe, J. Manager, 2MW.
Shaw, Miss. Announcer, 2UE.
Shaw, N. L. Director, 2UE.
Sheahan, J. P. Director and secretary 2PK.
Sheffer, H. M. Director, 2TM.
Shepheard, Len. Director, 6GE.
Shepherd, L. Director and chief engineer, 3XY.
Sheppard, R. Musical director, 4BC.
Sheppard, N. S. Superintending manager, 3UL-3SR-3YB.
Shew, R. L. Production and announcing staff. 2KA.
Shortell, R. Chief engineer, 3SR.
Simmons, H. T. Chief engineer, 6IX, 6ML, 6WB.
Simms, E. O. Announcer, 6ML.
Simonds, A. Engineer, 2MW.
Simons, A. J. Sales staff. 4BC.
Simpson, D. H. Advertising manager, 4AY.
Simpson, E. Director, 2AD.
Simpson, F. W. Sales staff, 2KA, 2KM.
Sirl, C. Technical staff, 6WB.
Skirrow, B. Programme department, 2GZ.
Sleath, Howard. Programme director, 4BH.
Sleep, M. Engineer, 3DB.
Sloman, M. G. Director, 3KZ.
Small, T. A. Announcer, Secretary and Chief Engineer, 2MW.
Smith, A. Technical staff, 3YB.
Smith, C. P. Director, 6IX, 6ML, 6WB.
Smith, F. E. Director, 4ZR.
Smith, K. Technical staff, 4GR.
Smith, Ronald. Engineer, 4IP.
Smith, Stuart. Technical staff, 4BC.
Smith, T. Technical staff, 2GB.
Smyth, P. A. Sales staff, 5DN.
Snell, Eric. Announcer, 3XY.
Sommerlad, Hon. E. C. Director 2AD, 2NZ.
Sorelle, Max. Production and announcing, 4BC.
Sowden, A. H. Announcer, 3YB.
Sparkes, R. C. Director, 2HD.
Speight, Peter. Manager and announcer, 2AD.
Spencer, Colt. Secretary, 7HT.
Spencer, J. Announcer, 7HT.
Spencer, Keith. Studio manager, 4AY.
Spencer, T. Manager, 2CH.
Spicer, Hon. F. W. Director (managing), 2PK.
Spinner, Leslie. Technical staff, 2KY.
Spooner, A. Technical staff, 6WB.
Spowers, Allan. Director, 3UL, 3SR.
Stallard, Herbert. Announcer, 4BC.
Stanley, Chas. Announcer, 2CH.
Stapleton, B. B. Assistant advertising manager and publicity, 2SM.
Steel, T. Production and announcing staff, 2KA.
Stelzer, Mrs. E. M. Production and announcing staff, 2GB.
Stelzer, W. J. Sales staff, 2GB.
Stephens, W. J. Director, 3CV.
Stephenson, B. Technical staff, 2UW.
Stevens, D. Production staff, 5DN.
Stevens, E. S. Technical staff, 2NZ.
Stevens, F. S. Technical staff, 2CH.
Stevenson, C. V. Managing director, 2UE.
Stevenson, N. M. Service supervisor, 2UE.
Stevenson, M. Chief engineer, 2UE.
Stewart, J. Technical staff, 2GB.
Stewart, R. Technical staff, 2CH.
Stewart, R. B. Sales staff, 2TM.
Steyne, Roy. Producer, 3XY.
Stirk, T. Technical staff, 2KA.
Stirling, Nell. George Edwards Productions, 2UW.
Stodart, J. D. Director, 6PR.
Stokes, G. Sales staff, 4BH.
Stone, N. Engineer, 7HT.
Storey, O. J. General manager, 2BS.
Storr, J. Announcer, 3XY.
Strange, Anthony. Manager, 3YB.
Stuart, J. Announcer, 3DB-LK.
Sullivan, L. Sales staff, 3CV.
Sullivan, R. Announcer, 5DN.
Sutherland, G. Director, 3AW, 3HA.
Sutherland, Jock. Technical staff, 4BC.
Swain, Norman ("Billy Bouncer"). Announcer, 3KZ.
Syme, David F. Director, 3HA, 3SH, 3TR.
Syme, G. Director, 3AW.
Syme, J. H. Chairman of directors, 3AW.
Syme, M. Director, 5DN.
Syme, Maisie A. Director, 3TR, 3SH.

T

Tait, F. S. Director, 3AW.
Tait, John H. Director, 3AW.
Tapper, J. R. Technical staff, 6ML.
Tareha, C. A. Director and engineer, 5KA.
Taylor, C. E. Programme director, 3DB-LK.
Taylor, C. P. A. Director, 3BA.
Taylor, H. V. Lindo. Chief engineer and sales, 2AD.
Taylor, John T. General manager, 3AW.
Taylor, Miss K. Announcer, 2BE.
Taylor, K. Director. 3BA.
Taylor, N. Production and announcing, 6ML.
Taylor, G. Director, 3DB-LK.
Temby, F. K. Technical staff, 3AK.
Thomas, D. Technical staff, 2CA.
Thomas, H. K. R. Technical staff, 2GB.
Thomas, Madge, Miss. Announcer, 3XY.
Thomas, N. Asst. secretary, 6AM, 6PM.
Thomas, R. C. Manager, 7HT.
Thomas, S. Sales staff, 3XY.
Thompson, E. J. K. Secretary, 3SR.
Thompson, M. Engineer, 3DB.
Thompson, W. Sales staff, 2UE.
Thompson, Mr. Director, 2MG.
Thorn, H. A. Announcer, 5KA.
Thring, Olive. Director. 3XY.
Thurling, S. Technical staff, 3KZ.
Toakley, T. Chief engineer, 2KA.
Tonkin, Stan. Technical staff, 2LM.
Toohey, A. Announcer, 2UE.
Topal, H. J. Sales staff, 3KZ.
Towner, A. D. Director, 7BU, 7DY, manager 7BU.
Tozer, J. Sales manager, 6AM, 6PM.
Tredrea, F. Chief engineer, 6AM, 6PM.
Trethewie, James. Technical staff, 7BU.
Try, R. K. Engineer, 2XL.
Tupper, Fred. Announcer, 3AW.
Turnbull, I., Miss. Announcer. 3DB-LK.
Twyford, John. Sales staff, 2NZ.
Tyson, Russell. Announcer, 4BH.

U

Underhill, B., Miss. Production staff, 5DN.
Urquhart, M. Technical staff, 6ML.

V

Varley, Gwen. Announcer, 3AW.
Varley, Joyce. Announcer, 3AW.
Vaude, C. Announcer, 3DB-LK.
Vautier, Miss Dorothy. Production and announcing staff, 2GB.
Vidor, Ann. Announcer, 2GZ.
Vertigan, J. Announcer, 7HT.
Vertigan, R. Chief announcer, 7HT.
Virgona, Wm. Engineer, 3UZ.
Voigt, Rion. Announcer, 2KY.

W

Walker, J. Announcer, 2UW.
Walker, Margaret. Women's session, 3YB.
Walker, R. Continuity, 3KZ.
Walker, R. Technical staff, 4ZR.
Walker, R. Announcer, 2RG.
Walker, Eric. Announcer, 2KY.
Wallace, M. Announcer, 2GZ.
Wallace, W. J. Announcer, 2GF.
Walls, June. Secretary, 3HA, 3SH, 3TR.
Walpole, Frank S. Manager, 2DU.
Walsh, E. Announcer, 2UE.
Walsh, O. J. Director, 7UV.
Walters, Les. Sales staff, 2HD.
Walters, Mona. Programme directress, 4IP.
Ward, R. Manager, 7QT.
Ward, Tom. Announcer, 2LM.
Wardle, T. R. Sales staff, 3AW.
Watson, R. Technical staff, 2GB.
Wayne, Mercia. Announcer, 7EX.
Wearne, Hazel. Announcer, 2QN.
Webb, E. K. Engineer, 3AK.
Webber, A. Announcer, 2HR.
Webber, Fred. 2SM.
Weir, W. Announcer, 2TM.
Welch, Colin. Announcer, 4MB.
Welch, E. Announcer, 3DB-LK.
Weldon, Dan. Production staff, 2KY.
Wells, F. F. Transcription and sound effects, 5DN.
Wells, H. Programme manager, 6AM, 6PM.
Wells, John. Announcer, 7EX.
Wharf, Harry. Announcer, 2NZ.
Wharton, R. Sales staff, 2KY.
Wheeler, J. Announcer and sales staff, 2UW.
Wheller, J. Technical staff, 4BC.
Whistler, A. H. Announcer, 2MW.
Whistler, Mrs. H. Announcer, 2MW.
Whitcomb, T. Director and chief engineer, 2TM.
White, D. Secretary, 6AM, 6PM.
White, James. Technical staff, 2KY.
White, Randal M. Assistant manager, 5DN.
White, S. Technical staff, 3AW.
Whitford, A. A. Director, 6AM, 6PM.
Whitford, Archer P. H. Director, 6AM, 6PM.
Whitford, E. I. Director, 6AM, 6PM.
Whitford, F. R. Director (managing) 6AM, 6PM.
Whitham, H. B. Director, 2LF, 2RG.
Whitmore, J. W. Musical director, 2TM.
Whykes, E. J. W. Secretary and advertising manager, 3BA.
Whyte, A. S. Director, 3DB-LK.
Wilby, Dorothy. Announcer, 3UL.
Wilde, F. Sales staff, 4IP.
Wilke, N., Miss. Announcer, 6PR.
Wilkenson, D. A. Technical staff, 5DN.
Wilkinson, L. Sales and announcer, 3MA.
Willesden, F. E., Mrs. Announcer, 4IP.
Williams, A. Technical staff. 2WG.
Williams, Esme. Publicity officer, 2KY.
Williams, R. Announcer, 2UE.
Wilson, G. Announcer, 2CH.
Wilson, H. B. Engineer, 5AD-MU-PI-SE.
Wilson, Harper. Programme Director 3UZ.
Wilson, J. Technical staff, 7HT.
Wilson, J. H. Sales staff, 7EX.
Wilson, Pat. Executive staff, 2LM.
Wilson, W. A. Engineer, 3BA.
Winn, A. Announcer, 4BC.
Witt, F. Asst. Musical Director, 2KY.
Wolff, R. Secretary, 2UE.
Wood, Miss C. H. Secretary to the general manager, 2UW.
Wood, E. A. Director, 2HD, and manager 7UV and Melb. representative.
Wood, D. Technical staff, 6WB.
Woodland, C. V. Manager, 4BU.
Woolley, B. Announcer, 5DN.
Worrall, D. T. Manager, 3DB-LK.
Wright, L. Chief engineer, 3AK.
Wynyard, Mr. Announcer, 2UE.

Y

Yates, H. Sales staff, 2UE.
Yeldon, Russell A. Director and general manager, 2WL.
Young, J. Announcer, 5AD-MU-PI-SE.
Young, N. Technical staff, 2HR.
Young, R. Director, 7HT.

Broadcasting Station Representatives

The following list of Station Representatives is compiled from information received, and while every care has been exercised, there may be omissions, but the publishers cannot accept any responsibility for inaccuracies. The station callsign alongside a name indicates the station advised as being represented.

SYDNEY.

AMALGAMATED WIRELESS (A/SIA) LTD., Radio Advertising Department, 47 York Street, Sydney. 2CH, 2GF, 2GN, 2AY, 3BO, 4CA, 4TO, 4PM, 4WK, 7LA, VPD2 Suva, Fiji, 2AD, 2LM, 6GE, 7BU, 7DY, 7HO, 7QT.

ARMSTRONG, JOHN A., C/- Richard Thompson, 133 Pitt Street, Sydney. 3KZ.

BARNES, L., 30 Carrington Street, Sydney. 7HO.

BOURKE, A. D., 5-7 Barrack Street, Sydney. 2UW, 3YB, 4ZR, 2HR, 2XL. 2WL, 4RO, 4MB, 4LG, 4GR, 4BC, 4AY, 3UZ, 3SR, 3MB.

BREWER, E. H., Assembly Hall, Margaret Street, Sydney. 2CA, 2LM, 3AW, 5DN, 4IP, 6PR, 7BU.

COUGHLIN, K., Warwick Building, 15 Hamilton Street, Sydney. 6IX, 6ML, 6WB.

COUNTRY BROADCASTING SERVICES LTD., Hosking Place, 84½ Pitt Street, Sydney. 2NZ, 2GZ.

COX, E. S., 3rd Floor, Shell House, Carrington Street, Sydney. 2KO.

FINN, A. L., A.C.A. Bldg., King Street, Sydney. 7HT.

HEATH, L. R., offices of "The Age" and "The Leader," 117 Pitt Street, Sydney. 3HA, 3TR, 3SH, 2QN.

HILL, G., Chamber of Commerce Bldg., Grosvenor Street, Sydney. 3BA, 3GL. 3MA. 2MW.

MACQUARIE BROADCASTING SERVICES PTY., LTD., 29 Bligh Street. Representing the following stations of the Macquarie Broadcasting Network: 2CA, 2HR, 2WL, 3AW, 3HA, 3TR, 3SH, 5DN, 5RM, 4BH, 6PR, 6KG, 7HO, 7LA, 7BU, 7QT, 7DY.

MONKS, C. A., Shell House, Carrington St., Sydney. 2HD, 2MG, 2MO, 2PK, 3AK, 5KA, 5AU, 7UV.

MORSE, P. A., 102 Sussex Street, Sydney. 6AM, 6PM.

PHILLIPS, I. W., Warwick House, Hamilton Street, Sydney. The Major Network, and 2BH, 4BU.

RIVERINA BROADCASTING PTY., LTD., 30 Carrington Street, Sydney. 2WG, 2BS.

SCOTT, D. N., Watson House, Bligh Street, Sydney. 2RG, 3XY, 7EX.

SMYTH, WALTER J., Chandler's Broadcasting Service, Australia House, Carrington Street, Sydney. 4BH.

TAMWORTH RADIO DEVELOPMENT CO. LTD., Australia House, Carrington Street, Sydney. 2TM.

(Continued overleaf.)

Station Representatives (contd.)

THOMPSON, FRED., Warwick Building, 15 Hamilton Street, Sydney. 5AD, 5MU, 5PI, 5SE.

TRANSCONTINENTAL BROADCASTERS LTD., 19 Bligh Street, Sydney. 2KM, 2KA.

WILSON, R., Watson House, Bligh Street, Sydney. 2BE, 2DU, 2LF.

MELBOURNE.

ALLAN, STANFORD M., Newspaper House, 247 Collins Street. Melbourne. 3MA.

AMALGAMATED WIRELESS (A/SIA LTD., 167-9 Queen Street, Melbourne. 2CH, 2GF, 2GN, 2AD, 2AY, 3BO, 4CA, 4TO, 4PM, 4WK, 7LA, VPD2 Suva, Fiji, 2LM, 3MA, 6GE, 7BU, 7DY, 7HO, 7QT.

ANDERSON, HUGH, 130 Exhibition Street, Melbourne. 2BE, 6AM, 6PM.

BEDNALL, G. N., Newspaper House, Collins Street, Melbourne, 2BH, 5AD, 5MU, 5PI, 5SE.

BYRNE, R. M., 499 Little Collins Street. Melbourne, 2QN.

DAHLBERG, L. E., 499 Bourke Street, Melbourne. 3BA.

DINNENY, V. M., 365 Elizabeth Street, Melbourne. 3YB, 3UL, 3SR.

McCARTNEY, R. J., Newspaper House, 247 Collins Street, Melbourne. 2SM, 2BS.

MACQUARIE BROADCASTING SERVICES PTY., LTD., 37 Queen Street. Representing the following stations of the Macquarie Broadcasting Network: 2CA Canberra, 2GB Sydney, 2UE Sydney, 2HR Hunter River, 2WL Wollongong, 5DN Adelaide, 5RM Renmark, 4BH Brisbane, 6PR Perth, 6KG Kalgoorlie, 7HO Hobart, 7LA Launceston, 7BU Burnie, 7QT Queenstown, 7DY Derby.

PROCTOR, A. M., A.C.A. Building, Queen Street, Melbourne. 2GZ, 2NZ, 2KO.

RIEUSSET, B., A.P.A. Building, 379 Collins Street, Melbourne. 6IX, 6ML, 6WB. 7HO.

ROBERTSON, I. V., 329 Collins Street. 2WG. 2BS.

SHAVE, C., Newspaper House, Collins Street. 4BK and 4AK.

SULLIVAN, P., 18 Queen Street, Melbourne. C.B.N. (2UW, 2HD, 2WG. 3UZ, 3SR, 3UL, 3YB, 4BC, 4GR, 4ZR, 4MB, 4RO, 4AY, 4SB, 4AT, 4VL, 2TM, 5KA, 7UV).

WOOD, E., 532 Bourke Street, Melbourne. 2HD, 2MG, 5AU. 5KA, 7UV.

BRISBANE.

FAIR, ROGER, 289 Queen Street, Brisbane. 2CH, 2GF, 2GN, 4TO, 2AY, 3BO, 4CA, 4PM, 4WK, 7LA, VPD 2 Suva, Fiji, 2AD, 2LM, 6GE, 7BU, 7DY, 7HO, 7QT.

NOBLE BARTLETT ADVERTISING, Adelaide Street, Brisbane. 4LG.

PORTER, C. R., Queen and Turbot Streets, Brisbane. 2TM.

ADELAIDE.

THE ADVERTISER NETWORK, Weymouth Street, Adelaide. 5AD, 5SE, 5PI, 5MU, and 2BH.

PERTH.

BISHOP, A., 55 St. George's Terrace, Perth. 3AK.

TASMANIA.

COMMERCIAL BROADCASTERS PTY., LTD. (Station 7HO), 82 Elizabeth Street, Hobart. 7DY, 7QT, 7LA, 7BU.

BURNIE BROADCASTING PTY., LTD. (Station 7LA), 67 Brisbane Street, Launceston. 7DY, 7HO, 7QT, 7BU.

OVERSEAS.

CHARD, A. J., 92 Fleet Street, London, England. 5AD, 5MU, 5PI, 5SE, 3DB-LK.

POWERS, JOSHUA B., 220 East 42nd Street, New York. 5AD, 5MU, 5PI, 5SE.

Particulars of Commercial Broadcasting Stations in Australia

2AD ARMIDALE.

Operator: New England Broadcasters (proprietors, The Armidale Newspaper Co. Ltd.). Studios, Armidale, N.S.W. Transmitter three-quarters of a mile north, 300 feet above town. Licensed power 100 watts.* Operating power, 100 watts. Wavelength 265 m. (1,130 KC.)

*Application lodged for increase to 200 watts.

Commenced operations: February 5, 1936.

Directors: Dr. R. B. Austin, A. H. McArthur, Hon. E. C. Sommerlad, M.L.C., C.B.E., Hon. D. H. Drummond, and E. Simpson. **Executive staff:** Roy L. Blake (manager). **Production and announcing staff:** H. L. V. Taylor, John Ferguson, Marion McArthur. **Technical staff:** H. L. V. Taylor, R. Kingdom. **Sales staff:** All staff. **Total full time staff:** 7.

Representatives: Sydney, Amalgamated Wireless (A/sia) Ltd. and A. D. Bourke. Melbourne: A.W.A.

Daily transmission hours: Weekdays, 7—10 a.m., 12—2 p.m., 5.30—10 p.m.; Sundays, 10.45 a.m.—12.30 p.m., 7 p.m.—10 p.m.

Recording facilities: Nil.

Transmitter: Standard Telephones and Cables.

Studio equipment: S.T.C.

Type of aerial system: Type "T," directional, north and south, 120 feet high.

Production facilities: Two studios, 78 and 33 r.p.m. turntables.

Radio Clubs: Aunty Bee's Busy Bees (children), 2AD Women's Club, 2AD Swimming Club.

2AY ALBURY.

Operator: Amalgamated Wireless (A/sia) Ltd. Studios: Pool's Hill, Albury. Transmitter: Pool's Hill, Albury. Licensed Power: 200 watts. Operating Power: 200 watts. Wavelength: 203 m. (1,480 KC.).

Commenced Operations: December 17, 1930.

Network Affiliation: A.W.A.

Executive Staff: John Dower (manager). Total full-time staff: 5.

Representatives: A.W.A. Ltd.

Daily Transmission Hours: Monday to Thursday: 12 noon to 2 p.m., 5.30 p.m. to 10.30 p.m. Friday: 12 noon to 2 p.m., 5 p.m. to 10.30 p.m. Saturday: 12 noon to 2 p.m., 5.30 p.m. to 12 p.m. Sunday: 8 a.m. to 2 p.m., 7 p.m. to 10.30 p.m.

Transmitter: A.W.A.

Studio Equipment: A.W.A.

Type of Aerial System: A.W.A.

2BE BEGA.

Operator: Bega and Far South Coast Broadcasters Ltd. Studios: Carp Street, Bega. Transmitter: Carp Street, Bega. Licensed power: 100 watts. Operating power: 100 watts. Wavelength, 201 m. (1,490 KC.).

Commenced operation: September 30, 1937.

Directors: W. H. Balmain (chairman). **Executive staff:** J. R. Kirkland (manager), J. S. Longhurst (secretary), E. N. James. **Production and announcing staff:** E. N. James (production manager and chief announcer), J. R. Kirkland.

Technical staff: T. J. Ling (chief engineer). **Sales staff:** J. R. Kirkland (advertising manager), Roy Wilson.

Representatives: Melbourne, Bedgood Advertising Service, 129 William Street. Sydney, R. Wilson, Watson House, Bligh Street.

Transmission hours: Week days, noon to 2 p.m., 6 p.m. to 10 p.m.; Sundays, 6.30 p.m. to 10 p.m.

Transmitter: Colville built.

Studio equipment: Colville built.

Type of aerial system: Quarter waves with counterpoise transmission—line fed.

Radio clubs and membership: Listeners' League, 380; Joybells Koala Club, 296.

2BH BROKEN HILL.

Operator: Radio Silver City Pty., Ltd. Studios: Cummins Street, Broken Hill. Head office, "The News," North Terrace, Adelaide. Transmitter: Cummins Street, Broken Hill. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 283 m. (1,060 KC.).

Commenced operations: June 30, 1934.

Directors: J. Stanley Murray (chairman), H. Burston (managing director), A. C. R. Hay. **Executive staff:** A. C. R. Hay (manager), J. B. Ryan (advertising manager), R. B. Taylor (secretary). **Production and announcing staff:** R. P. James (chief announcer), G. L. Crago, Mrs. R. P. James. **Technical staff:** H. M. Brown (chief engineer), R. Hipwell. **Sales staff:** J. B. Ryan. Total full-time staff: Seven.

Representatives: Sydney, I. W. Phillips; Melbourne, G. N. Bednall; Adelaide, Station 5AD.

Daily transmission hours: Monday to Friday, 7 a.m. to 9 a.m., 12 noon to 2 p.m., 5 p.m. to 10.30 p.m. Saturday, 7 a.m. to 9 a.m., 5 p.m. to 10.30 p.m. Sunday, 10.30 a.m. to 1 p.m., 6 p.m. to 10 p.m.

Transmitter: Station engineers. Low level Heising modulator, crystal control.

Studio equipment: Station engineers.

Type of aerial system: Marconi inverted L.

Radio clubs and membership: Smilers' Club (1,954).

Station Particulars (contd.)

2BS BATHURST.

Operator: Bathurst Broadcasters Pty., Ltd. Studios: 51a Keppel Street, Bathurst. Transmitter, 51a Keppel Street. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 200 m. (1,500 KC.).

Commenced operations: January 1, 1937.

Network affiliation: C.B.N.

Directors: E. V. Roberts, N. Roberts. **Executive staff:** O. J. Storey (general manager), J. W. Leigh-Cooper (secretary and assistant manager). **Production and announcing staff:** O. J. Storey, T. L. Croke, J. W. Leigh-Cooper.

Technical staff: T. L. Croke, J. W. Leigh-Cooper. **Sales staff:** O. J. Storey. Total full time staff: 6.

Representatives: Sydney, L. S. Decent, 30 Carrington Street. Melbourne, I. V. Robertson, 379 Collins Street.

Daily transmission hours: 7 a.m. to 9 a.m., 12 noon to 2 p.m., 5 p.m. to 10 p.m.

Transmitter: Single output—Class A output—203A valves; Class B modulated, two 800 valves.

Studio equipment: Built by 2WG engineers.

Type of aerial system: Quarter-wave Marconi.

Production facilities: Four programme lines. Effects department.

Radio clubs and membership: 2BS Radio Club (700).

2CA CANBERRA.

Operator: Canberra Broadcasters Ltd., Canberra. Studios: "Broadcasting House," Civic Centre, Canberra, F.C.T. Transmitter: "Belconnen," Gungahlin, 4½ miles from Canberra on Yass Road. Licensed power: 2,000 watts. Operating power: 2,000 watts. Wavelength: 286 m. (1,050 KC.).

Commenced operations: 1932.

Network affiliation: Macquarie Broadcasting Services.

Directors: R. E. Denison, Esq., C. Ogilvy, Esq., A. J. Ryan, Esq. **Executive staff:** Chris S. Sharp (general manager), A. J. Ryan (chief engineer). **Production and announcing staff:** Wyn. Gilmour, Eileen Coates, M. Power, P. Furley, D. Maguire. **Technical staff:** Geo. Barlin, A. Ellis, Charles Knight, Don. Thomas. **Total full time staff:** 16.

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

Transmission hours: Monday to Friday, 7 a.m.—9 a.m., 10.30 a.m.—2 p.m.; 3.30 p.m.—10.30 p.m.; Saturday, 7 a.m.—9 a.m., 1 p.m.—10.30 p.m.; Sunday, 9 a.m.—1 p.m., 3 p.m.—10.30 p.m.

Aerial system: Quarter-wave vertical radiator.

Radio clubs and membership: 2CA Women's Radio Club, 650; 2CA Younger Set (just formed).

2CH SYDNEY.

Operator: Amalgamated Wireless (Australasia) Ltd., 47 York Street, Sydney. Studios: 77 York Street, Sydney. Transmitter: Spurway Street, Dundas. Licensed power: 1,000 watts. Operating power: 1,000 watts. Wavelength: 252 m. (1,190 KC.).

Commenced operations: February 15, 1932.

Network affiliation: Major Commercial Network

Directors: Sir Ernest Fisk (chairman). **Executive staff:** T. Spencer (manager), A. S. Cochrane, C. E. Coldwell-Smith, B. C. Button, C. Bird, L. W. Dart, Misses G. Gibson, M. Hugill, R. Marcus. **Production and announcing staff:** A. S. Cochrane (senior announcer), K. Layton, G. Wilson, P. Geeves, Chas. Stanley, E. Bennett Bremner, Janet Austen, Meg. McSpearin. **Technical staff:** F. S. Stevens (chief engineer), A. B. Sharland, D. Marshall, R. Stewart, H. Allen, R. Currie. **Sales staff:** R. E. Lane (chief of sales staff), S. O. Clarke, J. Minto, F. Knowles, G. McGuinness, B. C. Button. Total full-time staff: 51.

Representatives: Melbourne: C. J. Sproule, D. Gilder, J. S. Jones, A. W. Cummins, C/o A.W.A. Brisbane: Roger Fair, 289 Queen Street.

Daily transmission hours: Mondays to Saturdays, 5.45 a.m. to 11 p.m.; Sundays, 9 a.m. to 12.30 p.m., 2.30 p.m. to 6.15 p.m., 7 p.m. to 10 p.m.

Recording facilities: At station.

Transmitter: A.W.A. (series modulation).

Studio equipment: A.W.A.

Type of aerial system: "T" type.

Programme production facilities: Equipment includes a producer's control panel, enabling producer to mix 12 inputs and provides two-way communication between producer and artists with aid of a special two-way channel.

Radio clubs and membership: Australian Women's League (5,000); 2CH Smile Club.

2CK CESSNOCK.

Licensee: Coalfields Broadcasting Co. Pty., Ltd., Cessnock.

Licensed power: 200 watts. Wavelength: 205 metres, (1,460 KC.). Station not in operation as at May, 1938.

2DU DUBBO.

Operator: Western Broadcasters Pty., Ltd. Studios: Tamworth Street, Dubbo. Transmitter: Tamworth Street, Dubbo. Licensed power: 200 watts. Operating power: 100 watts. Wavelength: 455 m. (660 KC.).

Commenced operations: July 3, 1936.

Directors: E. I. Body (chairman), A. K. K. Scott, M. G. Mitchell, F. N. B. Fitzhardinge. **Executive staff:** Frank S. Walpole (manager), D. E. Holmes (chief engineer). **Production and announcing staff:** Misses B. Drew and Blight, R. Ayling, M. Moore. **Technical staff:** D. E. Holmes, M. Moore, R. Ayling. **Sales staff:** Frank S. Walpole, D. E. Holmes. Total full time staff: Six.

Transmitter: Station built, Class C with high fidelity class A modulation.

(Continued on Page 184.)

Station Particulars (contd.)

2DU DUBBO (Continued).

Studio equipment: Built by station engineers. All equipment in duplicate, with provision for incoming and outgoing relays.

Type of aerial system: T type Marconi with low counterpoise.

Radio clubs and membership: "Waggon Wheelers" club (250).

2GB SYDNEY.

Operator: 2GB Broadcasting Station Pty., Ltd., 29 Bligh Street, Sydney. Studios: 29 Bligh Street, Sydney. Transmitter: Homebush Pt., Parramatta Road, Sydney.

Licensed power: 1 KW. Operating power: 1 KW. Wavelength: 345 metres (870 KC.'s).

Network affiliation: Macquarie Broadcasting Network.

Commenced operations: August 23, 1926.

Directors: Sir Hugh Denison, R. E. Denison, L. A. Denison, Frederick Daniell, A. W. Perriam. **Executive staff:** H. G. Horner, general manager; D. R. Armstrong, assistant manager; C. A. Fletcher, advertising manager; K. Blakeney, programme manager; E. Colman, chief announcer; L. N. Schultz, chief engineer; W. H. Calley, accountant; W. B. Baverstock, publicity manager. **Production and announcing staff:** Eric Colman, C. H. Cousens, John Dease, Harry Dearth, George Saunders, Miss Dorothy Vautier, Miss Goodie Reeve, Jack Lumsdaine, Jack Davey, Mrs. E. M. Stelzer, Mrs. Dorothy Jordan, William Hart, Frank Grose, Ellis Price, Albert Russell, Reg. Morgan, Derek Maguire, Richard Hughes, R. A. Jesson, Mr. G. Jackson, Miss E. Power, Mr. E. Mason-Wood, James G. Harrison, Arthur Hahn (Bimbo). **Technical staff:** L. N. Schultz, C. K. Louer, H. K. R. Thomas, R. F. Meakes, C. Hibbert, M. Callow, J. Morrow, D. Dargie, L. Cumston, R. Watson, A. Gibbons, J. Stewart, T. Smith. **Sales staff:** C. A. Fletcher, W. J. Stelzer, R. Hughes, M. Ashton, W. Firth, G. A. Saunders, H. Buxton. Total full time staff, 72.

Representatives: Melbourne, Macquarie Broadcasting Services, 37 Queen Street.

Transmission hours: Monday to Saturday, 6 a.m.—11.30 p.m. Sunday, 8 a.m.—11 p.m.

Recording plant at station.

Transmitter and studio amplifier equipment manufactured by 2GB technical staff.

Aerial system: Quarter-wave vertical radiator.

Programme production facilities: 2GB retains a department of highly skilled copy and continuity writers, who are always at the service of advertisers in compiling scripts and programme ideas. Full recording facilities are also available, together with direct permanent telephone lines to 2UE and 2WL Wollongong. Affiliation with Macquarie Players.

Radio Club: 2GB Happiness Club (16,000).

2GF GRAFTON.

Operator: Grafton Broadcasting Co. Pty. Ltd. **Studios:** 180 Turf Street, Grafton. **Transmitter:** 180 Turf Street, Grafton. Licensed power: 200 watts. Operating power: 200 watts. Wavelength: 248 m. (1,210 KC.).

Commenced operations: December 12, 1933.

Network affiliation: A.W.A. associate station.

Directors: Sir Ernest Fisk (chairman). **Executive staff:** A. E. R. Fox. **Production and announcing staff:** A. E. R. Fox, A. E. Hoad, H. H. Peaston, W. J. Wallace, Miss Margaret Saunders, Miss Kitty Langborne. **Technical staff:** A. E. R. Fox (chief engineer), A. E. Hoad, H. H. Peaston.

Representatives: Sydney, A.W.A. Ltd., 47 York Street. Melbourne, A.W.A. Ltd., 167 Queen Street. Brisbane, R. Fair, C.M. Building, Queen Street.

Daily transmission hours: Monday to Saturday: 7 a.m. to 8.30 a.m., 12 noon to 2 p.m., 5.30 p.m. to 10.30 p.m. Sunday: 12 noon to 2 p.m., 7 pm. to 10 p.m.

Recording facilities: Available through A.W.A. recording studios, Sydney.

Transmitter: A.W.A. 200 watt Class "B" modulated broadcast transmitter utilising two Radiotron Type 203A valves paralleled in modulated amplifier and two Radiotron Type 838's in push-pull as modulators.

Type of aerial system: Multi-wire cage type "T" aerial with reflector concentrating radiation inland, supported by 160 ft. twin telescopic steel masts.

Programme production facilities: A.W.A. transcription and script library. Regular dramatic and musical productions by local and visiting artists.

Radio clubs and membership: North Coast Radio Players (40), 2GF Smile Club (4,200).

Station Particulars (contd.)

2GN GOULBURN.

Operator: Goulburn Broadcasting Co. Pty., Ltd. Studios: River Road, Goulburn. Transmitter: River Road, Goulburn. Licensed Power: 200 watts. Operating Power: 200 watts. Wavelength: 216 m. (1.390 KC.).

Commenced Operations: December 17, 1931.

Network Affiliation: A.W.A.

Executive Staff: H. J. Lewis (manager). Total full-time staff: 5.

Representatives: A.W.A. Ltd.

Daily Transmission Hours: Monday to Friday: 7 a.m. to 9 a.m., 12 noon to 1.45 p.m., 5.30 p.m. to 10.30 p.m. Saturday: 12 noon to 1 p.m., 5.30 p.m. to 10.30 p.m. Sunday: 10.45 a.m. to 1 p.m., 7 p.m. to 10 p.m.

Transmitter: A.W.A.

Studio Equipment: A.W.A.

Type of Aerial System: A.W.A.

2GZ CENTRAL NEW SOUTH WALES.

Operator: Country Broadcasting Services Ltd., Hosking House, 84½ Pitt Street, Sydney. Studios: 84½ Pitt Street, Sydney, and Lord's Place, Orange. Transmitter: Amaroo, N.S.W. Licensed power: 2,000 watts. Operating power, 2000 watts. Wavelength, 303 m. (990 KC.).

Commenced operations: October 31, 1935.

Network affiliation: T.P.N.

Directors: A. F. Manchee (chairman), J. P. Abbott, F. B. Fleming, J. H. Middleton, D. J. Gilligan. **Executive staff:** J. E. Ridley (general manager), C. K. Millar, A.F.I.A. (secretary). **Production and announcing staff:** Raymond F. Bermingham (studio manager), Frank Cayley, Gordon Ratcliffe, Charles L. Cunnington, Arthur O'Keefe, Laurence C. Collings, Ron Scott, Ann Vidor, Barbara McGhie, Joan Orchard, Leicester O. Briggs, Brian Maxwell. **Technical staff:** E. C. Crouch (chief engineer), C. Breed, C. Hutchison, R. Scott, H. Hannam, W. Hart, F. Hanna. **Sales staff:** Alan Ridley, F. B. Haines, H. P. Clarke. Other staff: Misses J. Bartlett, V. Kenny, A. Pearce, M. Checkley, W. Hadley, J. Maitland, B. Adey, D. James, M. Jamieson, B. Skirrow, T. Radford, A. McLaren, G. Palmer.

Representatives: Melbourne, A. M. Proctor, A.C.A. Building, Queen Street, Melbourne.

Daily transmission hours: Monday, Tuesday, Thursday, Friday, 6.30 a.m. to 10 a.m., 11 a.m. to 2 p.m., 3.30 p.m. to 11 p.m. Wednesday, 6.30 a.m. to 10 a.m., 11 a.m. to 11 p.m. Saturday, 6.30 a.m. to 10 a.m., 11 a.m. to 12 p.m. Sunday, 9 a.m. to 10.30 p.m.

Transmitter: A.W.A. Ltd., series modulated.

Studio equipment: Audio control, designed and built by Country Broadcasting Services' engineering staff.

Type of aerial system: Folded-back type antenna—buried cartwheel earth system.

Radio clubs: Country Service Club and Junior Country Service Club.

2HD NEWCASTLE.

Operator: Airsales Broadcasting Co. Studios: Sandgate and Newcastle. Transmitter: Sandgate, via Newcastle. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 263 m. (1,140 KC.).

Commenced operations: January 27, 1925.

Network affiliation: C.B.N., Empire State.

Directors: R. C. Sparkes, E. A. Wood, T. C. Kitto, W. Moss. **Executive staff:** John Jameson (manager), Wm. W. Johnston (secretary), J. R. Hudson, F.I.S.A., F.I.A.S. (auditor). **Production and announcing staff:** E. W. Rowe, D. Hutton, Geo. Bolland, M. Jameson, Les. Walters, M. Johnston, K. Morrissey. **Technical staff:** A. K. Armistead, C. Marple. **Sales staff:** Les. Walters.

Representatives: Sydney, C. A. Monks, Shell House, Carrington Street; Melbourne, H. W. Allison, 532 Bourke Street.

Daily transmission hours: 17 hours; Thursday, Saturday and Sunday 18 hours.

Transmitter: Manufactured by station engineers to Philips' design, using low level plate modulation.

Studio equipment: Station engineers.

Type of aerial system: Inverted "L."

Production facilities: Studios in Newcastle and Sandgate equipped to handle any type programme; 78 and 33 1/3 turntables in studios and control room to play all types of recordings.

Radio clubs and membership: Joy Club (junior), 10,000; Joyster Club (adults), 4,500.

2HR LOCHINVAR, HUNTER RIVER.

Operator: The Hunter River Broadcasters Pty. Ltd. Studios: High Street, Maitland, and Vincent Street, Cessnock. Transmitter: Lochinvar, N.S.W. Licensed power: 300 watts. Operating power: 300. Wavelength: 441 m. (680 KC.).

Commenced operations: September 6, 1937.

Network affiliation: Macquarie Broadcasting Network.

Directors: R. E. Denison, F. Daniell, E. Robinson, D. Robinson, C. H. Dunlop, Alex. Mather. **Executive staff:** J. A. Radford (manager), A. S. Mather (chief engineer). **Production and announcing staff:** A. Webber, N. Hallsworth (programme director), Ian Healy, Moira Downie, Reg. Kelly, J. O'Brien (sporting). **Technical staff:** A. S. Mather, N. Young, H. Brosie. **Sales staff:** B. Palmer, R. Kelly, E. Hall. **Total full time staff:** 17.

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

Transmission hours: 7 a.m. to 9 a.m., 10.30 a.m. to 1.30 p.m., 5.30 p.m. to 10.15 p.m.; Wednesday and Saturday, noon to 5 p.m.; Saturday, 5.30 p.m. to 11 p.m.; Sunday, 6 p.m. to 10 p.m.

Transmitter: Constructed by Hunter River Broadcasters Pty., Ltd.

Studio equipment: Constructed by Hunter River Broadcasters Pty., Ltd.

Aerial system: Marconi quarter-wave.

Station Particulars (contd.)

2KA KATOOMBA.

Operator: Transcontinental Broadcasting Corporation Ltd., 19 Bligh Street, Sydney. Studios: 19 Bligh Street, Sydney. Location of transmitter: Wentworth Falls. Licensed power: 1,000 watts. Operating power: 1,000 watts, unmodulated input to the aerial. Wavelength: 385 (780 KC.'s).

Commenced operations: 7/9/1935. Taken over by T.B.C. Corp. Ltd., 26/8/'37.

Transmission hours: 7.15 a.m.—2 p.m., 6 p.m.—10.30 p.m.; Wednesdays and Saturdays, 2 p.m.—6 p.m. additional (to be increased).

Directors: John P. O'Neill, A. L. McCauley, A. C. Paddison, Geo. E. McCauley (managing). **Executive staff:** Managing director, Geo. E. McCauley; Service manager and publicity officer, Harold S. Darke. Sales and studio manager, John Murray; Programme director, John Ryan; Field organiser, J. Morris; Club organiser, Ann Macdougall. **Production and announcing staff:** Frank Jenkin, Peter MacGregor, H. G. Barry, Ian McDonald, Neville Macdonald, Ann Macdougall. **Technical staff:** W. Grant (chief engineer), T. Toakley, T. Stirk, C. Bischoff. **Sales staff:** H. S. Darke, J. Morris, Joan Harvey, F. W. Simpson. Full time staff: Total 25.

Transmission hours: Sunday to Friday, 7.15 a.m. to 2 p.m., 6 p.m. to 11 p.m.; Wednesday 2 p.m. to 6 p.m. additional; Saturday, 7.15 a.m. to midnight.

Transmitter: A.W.A.

Studio amplifier equipment: A.W.A.

Aerial system: Folding top, A.W.A.

Clubs: 2KA Radio Service Club.

2KM KEMPSEY.

Operator: Radio Kempsey Ltd., 16 Barrack Street, Sydney. Studios and transmitter: 61 Belgrave Street, Kempsey. Licensed operating power: 100 watts. Wavelength 306 metres (980 KC.).

Commenced operations: 20/9/1937.

Directors: J. P. O'Neill (chairman), A. L. McCauley, A. C. Paddison, C. A. Ryan, F. H. Moses. **Executive staff:** Val Hutchinson (manager), H. S. Darke (F.O.A.) (service manager), John Murray (sales manager). **Production and announcing staff:** Graham Chisholm, E. Kahle. **Technical staff:** W. T. Grant (chief engineer). **Sales staff:** J. Murray (sales manager), F. W. Simpson, J. Morris, H. S. Darke. Total full time staff: Seven.

Transmission hours: Monday to Saturday, 7.30—9 a.m., 6 p.m.—10.30 p.m.; Sunday, 10 a.m.—2 p.m., 6 p.m.—10 p.m.

Transmitter: Philips KVFHP 500/11b suppressor modulated. Philips Lamps (A/sia) Pty., Ltd.

Studio amplifier equipment: Colville Wireless Equipment Co. Pty., Ltd. Type OV5/16. Four input channels and split amplifier, uses velocity microphones.

Aerial system: "T" type.

Club: "Gumnut" Children's Club.

2KO NEWCASTLE.

Operator: Newcastle Broadcasting Co. Pty. Ltd. Studios: 72 Hunter Street, Newcastle. Transmitter: Sandgate. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 213 m. (1,410 KC.).

Commenced operations: August 8, 1931.

Network affiliation: Major Network and T.P.N.

Total full time staff: 22.

Daily transmission hours: Monday to Friday, 7 a.m. to 4 p.m., 5 p.m. to 10.30 p.m.; Saturday, 7 a.m. to 12 noon, 2 p.m. to 11 p.m.; Sunday, 9 a.m. to 4 p.m., 6 p.m. to 10.30 p.m.

Transmitter: Own manufacture.

Type of aerial system: Flat top.

Production facilities: Four studios, two control booths, two sets equipment for O.B. Portable ultra H.F. transmitter.

2KY SYDNEY.

Operator: The Labour Council of New South Wales, Trades Hall, Goulburn Street, Sydney. Studios: 428 George Street, Sydney. Transmitter: Beacon's Hill, French's Forest. Licensed power, 1,000 watts. Operating power: 1,000 watts. Wavelength: 294 m. (1,020 KC.).

Commenced operations: October 31, 1925.

Executive staff: H. E. Beaver (manager), R. A. King, M.L.C. (secretary), H. M. Garden (programme manager), F. Witt (asst. musical director), E. Esme Williams (publicity officer). **Production and announcing staff:** John Harper (chief announcer), Captain Bairnsfather, Jack Farrelly, Eric Walker, Ian Garden, Rion Voigt, John Fox, Ken Howard, Mrs. Grey, Myra Dempsey, Dan Weldon, Moncrieff McCallum, John Saul, Colin Jones, J. K. Morley, Frank Sturge Harty, Lionel Lunn, Vernon Sellars, Fred. Bluett, Brian Howard. **Technical staff:** J. H. Brown (chief engineer), H. E. Edwards, Arthur Carlin, Massey Harmer, Leslie Spinner, James White, Thomas Davison, Jack Pullan. **Sales staff:** H. E. Beaver, J. Dunn, R. Wharton, John Harper, Jack Farrelly. Total full time staff, 30.

Daily transmission hours: 6.45 a.m. to 12 midnight Monday to Saturday inclusive, 7.30 a.m. to 11.30 p.m. Sunday.

Recording facilities: At station.

Transmitter: Crystal, designed by J. H. Brown.

Studio equipment: J. H. Brown.

Type of aerial system: Type "T."

Production facilities: Production manager and company.

Radio clubs and membership: 2KY Women's Club, "Smilin' Thru'" Club.

2LF YOUNG.

Operator: Young Broadcasters Pty., Ltd., A.M.P. Building, Young. Studios and transmitter: Young, N.S.W. Operating power: 300 watts. Wavelength: 224 metres (1,340 KC.).

Commenced operations: February 16, 1937.

Representatives: Roy Wilson, Watson House, Bligh Street, Sydney.

Station Particulars (contd.)

2LM LISMORE.

Operator: Richmond River Broadcasters Pty. Ltd. Studios, Molesworth Street, Lismore. Transmitter, Ballina Road, Goonellabah. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 333 m. (900 KC.).

Commenced operations: September 21, 1936.

Network affiliation: T.P.N.

Directors: C. M. Robertson (chairman), Dr. A. J. Opie, J. C. McIntosh, Junr., Jack McLean, A. E. Brand. **Executive staff:** Eric Harrison (manager), Molly Noonan, Pat. Wilson. **Production and announcing staff:** Geo. Foster, Tom Ward, Miss Pam Manning. **Technical staff:** Stan Tonkin, Pat. O'Sullivan, B. Aked, J. Biggins. **Sales staff:** Geo. Foster. Total full time staff: 10.

Representatives: Country Broadcasting Services Ltd., Sydney and Melbourne.

Daily transmission hours: 12.

Transmitter: A.W.A. type J2221. 500 watts aerial power modulated to 100 per cent.

Studio equipment: A.W.A. Whole system within 2DB between 30 and 10,000 cycles.

Production facilities: A.W.A. folded half-wave aerial for very low angle radiation.

Radio clubs and membership: 2LM Good Companions, Children's Club (4,000).

2MG MUDGEE.

Operator: Mudgee Broadcasting Co. Pty., Ltd., Wellington Road, Mudgee. Studios and transmitter: Wellington Road, Mudgee. Licensed and operating power: 100 watts. Wavelength: 207 metres (1,450 KC.).

Commenced operations about June, 1938.

Network affiliation: Empire State.

Directors: H. Milton, E. Milton, Messrs. Thompson, and Hodges. **Executive staff:** S. A. Clay, station manager, H. Meton.

Transmission hours: 7—9 a.m., noon—2 p.m., 5.30—10 p.m.

Transmitter: S.T.C.

Studio equipment: Lekmek.

Production facilities: Two studios.

2MO GUNNEDAH.

Operator: 2MO Gunnedah Ltd., Gunnedah. Studios and transmitter, Marquis Street, Gunnedah. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 219 m. (1,370 KC.).

Commenced operations: June 16, 1930.

Network affiliation: Empire State.

Directors: M. J. Oliver (chairman), Dr. T. Goddard, L. M. Oliver. **Executive staff:** L. M. Oliver (manager), T. R. Heimann (advertising manager), J. Crago (studio manager). **Announcers:** J. C. Crago (chief), Mervyn Beeh, M. J. Oliver (news), L. M. Oliver, C. Brady, V. Pliver, D. Palmer (racing), C. Hussey (sport). **Technical staff:** M. J. Oliver (chief engineer), T. R. Heimann, A. Oliver.

2MO GUNNEDAH (Continued)

Representatives: Sydney, C. A. Monks, Shell House, Carrington Street; Amalgamated Wireless (Aust.), Ltd., Box 2516BB, G.P.O., Sydney. Melbourne: L. Dahlberg, 499 Bourke Street.

Daily transmission hours: 7—9 a.m., 12—2 p.m., 5.15—10 p.m.

Radio clubs: Smilers' Club and Theatre Club.

Transmitter: Heising Mod. 4 stage.

Type of Aerial System: Marconi quarter-wave.

Studio equipment: Crystal PU. Velocity microphones.

2MW MURWILLUMBAH.

Operator: Tweed Radio and Broadcasting Co. Pty., Ltd. Offices: Austral Building, Commercial Road, Murwillumbah; Studios and Transmitter: Condong Road, Murwillumbah. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 204 m. (1.470 KC.).

Commenced operations: September 2, 1937.

Directors: A. A. Budd (chairman), F. E. Nicholl, A. C. Pratt, J. C. Price, J. T. Raward. **Executive staff:** A. A. Budd, Managing Director; J. A. Sharpe, manager; T. A. Small, secretary. **Production and announcing staff:** J. A. Sharpe, John Creighton, A. H. Whistler, H. Budd, T. A. Small, Miss Joyce Palmer, Mrs. H. Whistler. **Technical staff:** T. A. Small, first engineer; A. Simonds, second engineer. **Sales staff:** J. A. Sharpe, A. H. Whistler. Total full time staff: 5.

Daily transmission hours: 7 a.m. to 9 a.m., 10 a.m. to 11.30 a.m., 12.30 p.m. to 2.30 p.m., 5.30 pm. to 10.30 p.m. Sunday, 8.30 a.m. to 10.30 a.m., 6.30 p.m. to 10 p.m.

Transmitter: Standard Telephones and Cables.

Studio equipment: Lekmek Radio Laboratories.

Type of aerial system: T type, quarter wave.

Programme production facilities: Two studios.

Radio Clubs and membership: 2MW Smile Club (2,000).

2NZ INVERELL.

Operator: Northern Broadcasters Pty. Ltd., Inverell. Studios: Broadcasting House, 20 Otho Street, Inverell. P.O. Box 3. Telephones: Inverell 9 and 4. Telegrams: "TWONZ." Transmitter: Little Plain, 9.4 miles west of Inverell. Licensed power: 2,000 watts. Wavelength: 256 m. (1,170 KC.).

(The station was opened under the callsign of 2LV on March 30, 1936. In January, 1937, the callsign was changed to 2NZ.)

Network affiliation: T.P.N.

Directors: H. T. Knapton (chairman), Hon. E. C. Sommerlad, M. L.C., Hon. D. H. Drummond, M.L.A., J. E. Ridley, A. F. Manchee, J. H. Middleton. **Executive staff:** A. R. Chaloner (secretary and accountant). **Production and announcinff staff:** Laurie Gordon (chief announcer), Harry Wharf, Rodney Douglas, Helen Kingsley, R. M. Roberts, Errol Hugh, Bert Condon (general sporting commentator). **Technical staff:** E. C. Crouch, E. S. Stevens, M. J. Chatfield, O. Bartle, A. Gardiner. **Other staff:** Misses Jessen, Ryan, Chapman, Pearse. Total full time staff: 14.

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Station Particulars (contd.)

2NZ INVERELL (Continued).

Representatives: Sydney, Melbourne and Newcastle, Country Broadcasting Services Ltd., Hosking Place, 84½ Pitt Street.

Daily transmission hours: Monday-Friday, 7 a.m. to 9 a.m., 11 a.m. to 2 p.m., 3.30 p.m. to 10.30 p.m.; Saturday, 7 a.m. to 9 a.m., 11 a.m. to 2 p.m., 5 p.m. to 10.30 p.m.; Sunday, 9 a.m. to 10 p.m

Transmitter : Low power Heinsing modulated transmitter. Linear amplifier consisting of 4 x 279A standard valves. Intermediate amplifier 2 x 242 standard valves is modulated by 2 x 242 standard valves.

Studio equipment: Standard Telephones and Cables.

Production facilities: Announcers' studio, main studio, control room, and dramatic control panel controlling two microphones and four pick-ups. Microphones throughout are W. E. dynamics, pick-ups throughout are W.E. type 4A.

Type of aerial system: Transmission line fed "T" type.

Radio clubs and membership: Radiance Club (women), branches at Glen Innes, Bingara, Delungra and others forming; Koala Club for Children (950).

2PK PARKES.

Operator: Parkes Broadcasting Co. Pty., Ltd., 20 Close Street, Parkes. Studios: Close Street, Parkes. Telephone No.: Parkes 480. Telegrams "Twopekay." Transmitter: Close Street, Parkes. Licensed power: 150 watts. Operating power: 150 watts. Wavelength: 214 m. (1,400 KC.).

Commenced operations: October 5, 1938.

Network affiliation: Empire State.

Directors: A. J. Matthews (chairman), Hon. F. W. Spicer, M.L.C. (managing director), J. P. Sheahan, C. Johnson. **Executive staff:** J. D. Miller (manager). **Production and announcing staff:** Alan Chaplin, Max Abrahams, J. D. Miller, Misses S. Ryall and K. Darkin. **Technical staff:** J. D. Miller, Alan Chaplin. **Sales staff:** F. J. Humfrey. Total full time staff: 8.

Representatives: Sydney, C. A. Monks, Shell House, Carrington Street, Sydney; Melbourne, A.W.A. Ltd.; Brisbane, A.W.A. Ltd.

Daily transmission hours: Monday to Saturday, 7 a.m. to 9 a.m., 11.30 a.m. to 2 p.m., 5.30 p.m. to 10 p.m.; Sunday, 8.45 a.m. to 12 noon, 5.30 p.m. to 10 p.m.

Total transmission hours for the week: 62 hours.

Transmitter and studio equipment: Standard Telephones and Cables Pty., Ltd.

Type of aerial system: "T" type, 105 feet high, 60 feet flat top.

Radio clubs and membership: Koala Children's Club conducted by Miss Ryall (Cousin Sybil), 500; Amateur Club, 60; Musical and Dramatic Radio Players' Club, 25.

Total number of transmission hours since commencement: 2,400.

2QN DENILIQUIN.

Operator: Deniliquin Broadcasting Co. Ltd., End Street, Deniliquin. Studios and transmitter: Deniliquin. Licensed and operating power: 100 watts. Wavelength: 208 metres (1,440 KC.).

Commenced operations: November 11, 1935.

Executive staff: J. V. Reilly (manager). **Announcing staff:** J. Reilly, J. Parris, Wyn Levy (Ladies' Club), Hazel Wearne (children's session), Bob Donovan (sporting commentator).

Representatives: Sydney, C. A. Monks, Shell House, Carrington Street; Melbourne, B. J. Jackson, Henty House, Little Collins Street.

2RG GRIFFITH.

Operator: Irrigation Area Newspapers Pty., Ltd., Ulong Street, Griffith. Studios: Griffith. Transmitter: Griffith. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 280 m. (1,070 KC.).

Commenced operations: September 14, 1936.

Directors: H. B. Whitham, Dr. L. M. Jones. **Executive Staff:** Dr. L. M. Jones (managing director), Miss E. Miller (secretary). **Production and announcing staff:** J. P. Powell, R. Walker, Misses K. O'Donnel and G. Hunter. **Technical staff:** V. Jarvis, W. Rangott. **Sales staff:** E. Coe. Total full-time staff: Six.

Representatives: Sydney, D. N. Scott; Melbourne, M. Anderson.

Daily transmission hours: Week-days, 6 p.m. to 10 p.m.; Saturday, 5 p.m. to 10 p.m.; Sunday, 9 a.m. to 2 p.m., 6 p.m. to 10 p.m.

(Continued on opposite page.)

Station Particulars (contd.)

2RG GRIFFITH (Continued).

Transmitter: Built by Murrumbidgee Broadcasters, Type B.

Studio equipment: Built by Murrumbidgee Broadcasters.

Type of aerial system: Marconi quarter-wave, counterpoise.

Radio clubs and membership: Sunbeamers' Club (543).

2SM SYDNEY.

Operator: The Catholic Broadcasting Co. Ltd., Australia House, Carrington Street, Sydney. Studios and offices, Australia House, Carrington Street, Sydney. Transmitter: A.W.A. Radio Centre, Pennant Hills. Licensed and operating power, 1,000 watts. Wavelength 236.2 metres (1,270 KC.).

Commenced operations: December 24, 1931.

Directors: Monsignor J. A. Meany, W. Hurley, T. G. Murray, M. O'Neill, R. Fagan, M. L'Estrange, E. Lashmar. **General manager** and managing director, J. A. Meany. Secretary, P. J. Egan. **Studio manager** John Dunne. Production manager, Reg. Hawthorne. **Announcing and production staff:** Dom. Harnett, Richard Fair, Doreen Mackay, Fred Webber. **Advertising manager:** L. P. Quirk, assistant advertising manager and publicity officer: B. B. Stapleton. **Sales staff:** E. C. Farris, S. C. Linsley-Freeman, J. Digby-Bennett.

2SM SYDNEY (Continued).

Representatives: A.W.A. in all States; Melbourne, J. Jordan, Flinders Way.

Transmission times: Monday to Saturday; Breakfast session, 6 a.m.—9 a.m.; midday sessions, 1 p.m.—3 p.m.; women's afternoon session, 3—5 p.m.; Monday, Tuesday, Wednesday, Thursday and Friday, children's session, 5—6 p.m.; early evening session, 6—8 p.m.; evening, 8—10.30 p.m.

Transmitter: A.W.A.

Studio equipment: A.W.A.

Type of aerial: Half wave, vertical.

2TM NORTHERN N.S.W.

Operator: Tamworth Radio Development Co. Ltd. Studios: 312 Peel Street, Tamworth. **Transmitter:** Duri, 12 miles (approx.) from Tamworth. Licensed power: 2,000 watts. Operating power: 2,000 watts. Wavelength: 231 m. (1,300 KC.).

Commenced operations: February 27, 1935.

Network affiliation: C.B.N. and T.P.N.

Directors: E. Higginbotham (chairman), O. Bennett A. Joseph, H. M. Sheffer, T. Whitcomb. **Executive staff:** H. Higginbotham (managing director), H. F. Dyball (manager and secretary), C. I. Huxley (accountant). **Production and announcing staff:** A. L. Bennett, J. W. Whitmore, K. Moginie, K. Godfrey, W. Weir, Mrs. A. Penny. **Technical staff:** T. Whitcomb (chief engineer), F. Potter, L. Pengilley, D. Dawson. **Sales staff:** J. Leiper, R. Davidson, R. B. Stewart. Total full time staff: 25.

Station Particulars (contd.)

2TM NORTHERN N.S.W. (Continued).

Representatives: Melbourne: Mather and Stelling, 37 Queen Street. Brisbane: C. R. Porter, Queen and Turbot Streets.

Daily transmission hours: Monday to Saturday, 6 a.m. to 11 p.m.; Sundays, 8 a.m. to 11 p.m.

Transmitter: Type KVFP2/4 transmitter manufactured by Colville Wireless Equipment Co. Pty. Ltd., under license and in collaboration with Philips', Eindhoven, Holland.

Studio equipment: Built by station engineering staff.

Type of aerial system: Quarter-wave "T" type.

Production facilities: Programme production facilities include a four turntable manual, and a portable control turret, with provision for three microphone channels, and three additional channels which may be set up as desired. Studio "A" is equipped with two turntables and a turret giving control of a remote microphone and one incoming line. Control room equipment provides for fifteen incoming telephone lines and also complete audition equipment.

Radio clubs and membership: 2TM Possum Club (8,315), 2TM Women's Radio Club (757).

2UE SYDNEY.

Operator: Radio 2UE Sydney Pty., Limited, 29 Bligh Street, Sydney. Studios, 4th Floor, 29 Bligh Street, Sydney. Transmitter: Lillipilli, Port Hacking. Power: 1000 watts. Wavelength: 319 m. (950 KC.).

Commenced Operations: January 26, 1925.

Network affiliation: Macquarie Broadcasting Network.

Directors: Sir John Butters, Mr. R. E. Denison, Mr. N. L. Shaw and Mr. C. V. Stevenson. **Executive staff:** Managing Director, Mr. C. V. Stevenson; Assistant Manager, Mr. J. G. Armitage; Secretary, Mr. R. Wolff; Advertising Manager, Mr. S. E. Baume; Programme Superviser, Mr. A. Carr; Supervisor of Sporting and Outside Broadcasts, Mr. P. O. Phillips; Senior Announcer, Mr. R. Gainford; Service Supervisor, N. M. Stevenson; Assistant Production Supervisor, J. Eaton. **Announcing staff:** R. Gainford, E. Walsh, S. Meredith, C. Holland, A. Toohey, W. Ewart, G. McKillop, R. Williams, Mrs. Filmer, Miss Shaw, T. Wynyard, K. Johnston. **Technical staff:** M. Stevenson, Chief Engineer; W. Robinson, Assistant Engineer; B. Munnings, R. Pieremont, G. W. Dukes, A. H. Llewellyn, B. Pieremont, R. Pieremont, Jnr. **Senior Staff:** J. Pettett, G. Cole, P. Seaton. **Junior Staff:** W. Pieremont, R. Cameron, S. Kruger. **Sales Staff:** F. McShane, C. N. Baeyertz, W. Thompson, G. Brotchie, H. Yates. Total number of full time staff: 75.

Representative: Macquarie Broadcasting Networks, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

Daily transmission hours: Mon. to Sat. inclusive—6.00 a.m. to 11.30 p.m. Sunday—8 a.m. to 11 p.m.

Recording facilities: At station (78 or 33 1-3 r.p.m. on any size disc, playback—processing).

Transmitter: Radio 2UE. Low power modulation (Heising).

2UE SYDNEY (Continued).

Studio equipment: Radio 2UE.

Type of aerial system: Inverted "L".

Programme production facilities: 3 complete studio equipments, 5 studios, 3 control rooms.

Clubs: 2UE Mothercraft, 2UE Call to Youth Club, 2UE Tailwaggers Club.

2UW SYDNEY.

Operator: Commonwealth Broadcasting Corporation Pty., Ltd. Studios and transmitter, State Shopping Block, 49 Market Street, Sydney. Wavelength: 270 m. (1,110 KC.). Power: 750 watts.

Commenced operations: February 13, 1925.

Network affiliation: Commonwealth Broadcasting Network.

Directors: Stuart F. Doyle, M. F. Albert, A. F. Albert. Chairman of Directors, Stuart F. Doyle. **General Manager,** C. F. Marden. **Secretary,** W. Sayle. **Station Manager,** N. Lyons. Director of Production, George Edwards. Maurice Francis Author and Dramatist, George Edwards Productions. Nell Stirling, George Edwards Productions. Secretary to the General Manager, Miss C. H. Wood. Acccountant, C. Carter. Service Department, Miss R. Foott. Publicity Manager, F. Clarke-Cottrell. Programme Department, Miss G. Lammas. Production, C. J. Arnold. Announcers, J. M. Prentice, J. Wheeler, V. Lisle, C. James, J. Walker, T. Hudson, E. Scott, E. Collibee, W. Hardy, J. A. Crawcour, H. Gregory, Hilda C. Morse. Sporting Department: Sporting Editor, A. Anderson; Sporting Annotator, C. Lawrence; Sporting Commentator, C. Angles. **Sales staff:** Sales Manager, F. E. Levy; C. Gilder, Assistant Sales Manager; E. Collibee, W. Hardy, J. McConnell, H. Ringland, R. McMahon, H. Gregory, R. McKinnon, J. Wheeler, J. McKay. **Technical staff:** T. A. McNeil, Chief Engineer; J. P. Phillips, J. Phillips, C. Hammer, E. D. Austwick, B. Stephenson.

Interstate Representatives: Peter Sullivan, Alkira House, 18 Queen Street, Melbourne, Victoria, and Station 4BC, Brisbane, Queensland.

Transmission: 24 hours continuous service.

Recording facilities: At station ("Presto").

Transmitter: A.W.A. High Fidelity.

Studio amplifier equipment: A.W.A.

Type of aerial system: "T" Aerial System.

2WG RIVERINA.

Operator: Riverina Broadcasting Pty. Ltd., Wagga, N.S.W. 'Phone, Wagga 164. Telegrams "Twowg." Studios, Fitzmaurice Street, Wagga. Transmitter, Oura Road (7 miles). Licensed power: 2,000 watts. Operating power: 2,000 watts. Wavelength: 260 m. (1,150 KC.).

Commenced operations: June 29, 1932.

Network affiliation: C.B.N.

Directors: E. V. Roberts, Mrs. I. A. Roberts. **Executive staff:** E. V. Roberts (managing director), I. A. Roberts (general manager). **Secretary:** I. A. Roberts.

(Continued overleaf.)

Station Particulars (contd.)

2WG RIVERINA (Continued).

Production and announcing staff: M. Baker, R. Devereaux, J. O'Brien, Kay Millin, M. Keiren, N. Batty, R. Jenkins, M. Cullen, R. Phillips, M. Brentnall. **Technical staff:** P. Roberts, A. Williams, H. Rudd. **Sales staff:** R. Jenkins (Wagga), L. S. Decent (Sydney), I. V. Robertson (Melbourne). Total number of full time staff: 35.

Representatives: Sydney office, 30 Carrington Street; Melbourne office, I. V. Robertson, 329 Collins Street.

Daily transmission hours: 7—9 a.m., 11 a.m.—11 p.m.

Recording facilities: At station.

Transmitter: Class "B" modulation, built by 2WG engineers.

Studio equipment: By 2WG engineers, with R.C.A. microphones, pick-ups, etc.

Type of aerial system: Marconi T, radial earth mat.

Production facilities: Two main studios, audition rooms, theatrette, club room.

Radio clubs and membership: Children's Glee Club (7,500), Women's Service Club (4,750).

2WL WOLLONGONG.

Operator: Wollongong Broadcasting Pty., Ltd. **Studios:** Edward Street, Wollongong and Sydney. **Transmitter:** Farnborough Road, Unanderra (5 miles distant from studios). **Licensed power:** 500 watts. Operating power: 500 watts. Wavelength: 210 m. (1,430 KC.).

Commenced operations: July 18, 1931.

Network affiliation: Macquarie Broadcasting Network.

Directors: Russell A. Yeldon, Reginald E. Denison, Frederick Daniell, Frederick de R. Duncan. **Executive staff:** R. A. Yeldon (general manager), J. A. Byron (secretary), W. G. Herring (district sales manager), H. L. Butson (accountant). **Production and announcing staff:** Noel Judd (chief announcer), W. J. Merchant, Lawrence Gray. **Technical staff:** C. B. Sautelle, J. Gray, C. Hutchison. Total full time staff: 14.

Representatives: Macquarie Broadcasting Services. 29 Bligh Street, Sydney; 37 Queen Street, Melbourne.

Transmission Hours: Monday and Thursday, 10 a.m. to 11.30 a.m., 5.30 p.m. to 10.45 p.m.; Tuesday and Friday, 10 a.m.—11.30 a.m., 5.30 p.m. to 10.15 p.m.; Wednesday, 10 a.m. to 11.30 a.m., 12 noon to 5 p.m., 5.30 p.m. to 10.15 p.m.; Saturday, 10 a.m. to 11.30 a.m., 12 noon to 5 p.m., 5.30 p.m. to 10.45 p.m.; Sunday, 7 p.m. to 10.15 p.m.

Recording facilities: At station.

Transmitter: High-power, plate-modulated, American design.

Studio equipment: Built by station engineers.

Aerial system: Supported by lattice steel towers.

Production facilities: Permanent land-line from 2WL to Sydney—free to advertisers for relayed programmes. Four studios, velocity and crystal microphones. Several types of pick-ups employed.

2XL COOMA.

Operator: Cooma Broadcasters Pty., Ltd., Cooma. Licensed and operating power: 100 watts. Wavelength: 341 m. (880 KC.).

Commenced operations: August 8, 1937.

Representatives: A. D. Bourke, 5-7 Barrack Street, Sydney.

Managing Director: W. A. Evans. **Engineer:** R. K. Try.

3AK MELBOURNE.

Operator: Melbourne Broadcasters Pty. Ltd. Studios, 480 Bourke Street, Melbourne. Transmitter, 8 Yerrin Street, Balwyn. Licensed power, 200 watts. Operating power, 200 watts. Wavelength: 200 m. (1,500 KC.).

Commenced operations: 1931.

Directors: V. Edgar, W. H. Harrison. **Executive staff:** Arthur J. Mathers. **Production and announcing staff:** Carl Weiss, Miles Upton, Keith Morrow, John Oliver, Alfred Andrew. **Technical staff:** L. Wright, F. K. Temby, E. K. Webb. **Sales staff:** J. Oliver, K. Metaxa.

Representatives: Sydney, C. A. Monks, Shell House, Carrington Street; Perth, Mr. A. Bishop, 55 St. George's Terrace.

Daily transmission hours: 11.30 p.m. to 7 a.m.; Sundays, 12.30 to 2.30 p.m., and 10 p.m. to 7 a.m.

Type of aerial system: Type "T," single wire.

Radio clubs and membership: Listeners' League (8,000), Melbourne Boys' Club (6,000).

Station Particulars (contd.)

3AW MELBOURNE.

Operator: 3AW Broadcasting Co. Pty. Ltd. **Studios:** 382 Latrobe Street, Melbourne, C.1 **Transmitter:** 382 Latrobe Street, Melbourne, C.1. Licensed power: 600 watts. Operating power: 600 watts. Wavelength: 234 m. (1,280 KC.).

Commenced operations: February 22, 1932.

Network affiliation: Melbourne Headquarters, Macquarie Broadcasting Network.

Directors: J. H. Syme (chairman), John H. Tait, G. Sutherland, G. Syme, F. Allan, F. S. Tait, F. Daniell. **Executive staff:** John T. Taylor (general manager), Hector Harris (secretary), John W. Ryan (chief engineer), Frank Allen (continuity manager), Terry Dear (chief announcer). **Production and announcing staff:** John Masters, Fred Tupper, Cliff Nichols, Kathleen Lindgren ("Nancy Lee"), Gwen Varley, Joyce Varley, Frank Allen, Rosalind Miller, Dorothy Dungan, Alan Carmichael. **Technical staff:** John W. Ryan, J. Scarlett, S. White, M. Israel, M. Cookson. **Sales staff:** Fred W. Russell, Jack O'Hagan, David Duff, T. R. Wardle. Total full-time staff: 46.

Representatives: Sydney, Macquarie Broadcasting Services, 29 Bligh Street.

Daily transmission hours: Monday to Saturday, 6.30 a.m. to 11.30 p.m. Sundays, 10 a.m. to 12.30 p.m., 2.30 p.m. to 10.30 p.m.

Recording facilities: At station.

Transmitter: 3AW engineers. High-powered modulation.

Studio equipment: Designed by 3AW engineers.

Type of aerial system: "T" type Marconi.

Programme production facilities: Four studios and a special audition studio.

Radio clubs and membership: "Chatterbox Corner" (71,000), "Chums," 3AW Women's Association (8,000), 3AW Youth Association (3,500), Junior Tennis Association (2,000).

3BA BALLARAT.

Operator: Ballarat Broadcasters Pty., Ltd. Studios: 56 Lydiard Street North, Ballarat. Transmitter: Cardigan, 4½ miles west of Ballarat Post Office. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 227 m. (1,320 KC.).

Commenced operations: July 31, 1930.

Directors: J. H. Davey, C. P. A. Taylor, K. Taylor, S. W. J. Clark. **Executive staff:** J. H. Davey (managing director), E. J. W. Whykes (secretary and advertising manager). **Technical staff:** A. D. Kerr, W. A. Wilson, B. Scetrine, W. D. Mather, A. M. Cox. **Sales staff:** E. J. W. Whykes, L. Dahlberg. **Full time staff:** 16.

Representatives: Sydney, G. Hill, cnr. George and Grosvenor Streets.

Transmitter: Transmission Equipment Pty., Ltd.; low level, modulation one single-ended linear.

Studio equipment: Composite.

Type of Aerial System: Quarter wave vertical mast —radial ground.

Clubs and membership: Bluebirds (children's), 9,432; Friendship Circle (ladies' club), 2,506.

3BO BENDIGO.

Operator: Amalgamated Wireless (A/sia) Ltd. Studios: Pall Mall, Bendigo. Transmitter: Kangaroo Flat. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 309 m. (970 KC.).

Commenced operations: June 4, 1931.

Network affiliation: A.W.A.

Executive staff: J. P. Banney (manager). Total full-time staff: Nine. Representatives: A.W.A. Ltd.

Daily transmission hours: Monday to Friday, 7 a.m. to 9.30 a.m., 10 a.m. to 2 p.m., 5 p.m. to 10.30 p.m. Saturday, 7 a.m. to 9.30 a.m., 10 a.m. to 11 p.m. Sunday, 9 a.m. to 2 p.m., 5 p.m. to 10 p.m.

Transmitter: A.W.A.

Studio equipment: A.W.A.

Type of aerial system: A.W.A.

3CV CHARLTON.

(Late 3MB Birchip)

Operator: Mallee Broadcasters Pty., Ltd. Studios: Bendigo and Charlton. Transmitter: Charlton. Licensed power: 200 watts. Operating power: 200 watts. Wavelength: 204 m. (1,470 KC.).

Commenced operations: June 18, 1935.

Network affiliation: C.B.N. and "Argus."

Directors: G. V. Lansell, C.M.G., M.L.C. (chairman), W. J. Stephens, E. Holloway. **Executive staff:** Ernest Holloway (managing director). **Production and announcing staff:** E. Holloway (chief announcer), J. Seymour, C. Carter, A. Doolette, Miss Denise Stowell. **Technical staff:** A. Hopton, R. Cannon. **Sales staff:** J. Hedger, E. Holloway.

Representatives: Sydney, Radiovision Pty., Ltd., 61 Hunter Street. Melbourne, I. V. Robertson, 397 Collins Street.

Daily transmission hours: Week-days, 7 a.m. to 9 a.m., 12 noon to 2 p.m., 6 p.m. to 10.30 p.m. Sunday, 9 a.m. to 2 p.m., 6 p.m. to 10.30 p.m.

Transmitter: Transmission Equipment Pty., Ltd.—high power Heising modulation.

Studio equipment: Transmission Equipment Pty., Ltd.

Type of aerial system: Half wave, vertical steel.

Production facilities: 78 and 33 1/3 r.p.m. tables.

3DB-LK MELBOURNE.

Operator: 3DB Broadcasting. Studios: 36 Flinders Street, Melbourne, C.1. Transmitter: 36 Flinders Street, Melbourne, C.1. Licensed power: 600 watts, 3DB; 2,000 watts, 3LK. Operating power: 3DB, 600 watts; 3LK, 2,000 watts. Wavelength: 3DB, 291 m. (1,030 KC.); 3LK, 275 m. (1,090 KC.).

Commenced operations: 1927.

Network affiliation: Major network.

Directors: Sir Keith Murdoch, T. Fink, W. Dunstan, H. Pacini, A. S. Whyte, G. Taylor. **Executive staff:** D. T. Worrall (manager), R. Mc. C. Russell, F. W. Fardell. **Production and announcing staff:** C. E. Taylor, Renn Miller, C. Vaude, J. Stuart, E. Welch, M. Blandford, K. Eden, M. Callard, C. Harvey, Miss L. Homfrey, I. Turnbull. **Technical staff:** M. Hooper (chief engineer), F. Maughan, M. Sleep, M. Thompson, H. Kauper, A. Potter. 3LK, N. Buzacott, H. Boast, H. Longmore. Total full time staff, 47.

(Continued on Page 198.)

Station Particulars (contd.)

3DB-LK MELBOURNE (Continued).

Representatives: Sydney, I. W. Phillips, Warwick House, Hamilton Street.

Daily transmission hours: Monday—Friday, 6.30 a.m. to 11.30 p.m.; Saturday, 6.30 a.m. to 1 p.m.; Sunday, 10 a.m. to 12.30 p.m.; 2.30 p.m. to 10.30 p.m. Sunday (for 3LK), 12.30 p.m. to 2.30 p.m.

Recording facilities: At station.

Transmitter: 3DB, own manufacture. 3LK, A.W.A. low power modulation.

Studio equipment: 3DB, own manufacture; 3LK, A.W.A.

Type of aerial system: Flat top "T" type.

Production facilities: Musical and dramatic staff. Four studios fully equipped with necessary effects.

Radio clubs and membership: 3DB Smile Away Club (17,000); 3DB Woollies Appeal Club.

3GL GEELONG.

Operator: Geelong Broadcasters Pty. Ltd. **Studios:** Moorabool Street, Geelong. **Transmitter:** Little Malop Street, Geelong. Licensed power: 100 watts. Operating power: 100 watts. Wavelengths: 222 m. (1,350 KC.)

Director: Ramsay Burns Cook. **Executive staff:** J. R. McKenzie (manager), W. Gray (studio manager). **Production and announcing staff:** W. Gray, I. Dickson, J. Brebner, Miss V. Cartwright, J. Henry. **Technical staff:** J. Matthews, J. Brebner, L. Blackney, A. Philpott. **Sales staff:** W. Gray. Total full-time staff: 8.

Representative: George Hill, Chamber of Commerce Building, Grosvenor Street, Sydney.

Daily transmission hours: Monday to Friday, 7 a.m. to 9.30 a.m., 1 p.m. to 10.30 p.m. Saturday, 7 a.m. to 9.30 a.m., 6 p.m. to 11 p.m. Sunday 7 p.m. to 10 p.m.

Transmitter: O. J. Nilsen Pty. Ltd., Melbourne.

Studio equipment: Constructed by station technical staff.

Type of aerial system: Inverted "L".

Programme production facilities: 33-1/3 r.p.m., 78 r.p.m. turntables. Live artist productions.

Radio clubs and membership: Old King Cole's Court (13,200).

3HA HAMILTON.

Operator: Western Province Radio Pty. Ltd. Studios: 37 Gray Street, Hamilton. Transmitter: Mount Bainbridge, five miles from Hamilton. Licensed power: 750 watts. Operating power: 750 watts. Wavelength: 297 m. (1,010 KC.).

Commenced operations: October 24, 1931.

Network affiliation: Macquarie Broadcasting Network and Victorian Broadcasting Network.

Directors: David F. Syme, G. S. Featonby, G. Sutherland, E. I. Fisk.

Executive staff: David F. Syme (managing director), R. A. Fitts (general manager), June Walls (secretary), C. V. Bradshaw (station manager).

3HA HAMILTON (Continued).

Production and announcing staff: Richard Burrows, Grace Pither, Oscar Mason, S. MacDonald. **Technical staff:** R. A. Fitts (consulting engineer), V. Monoghan, J. Murphy, E. Evans. Sales staff: Neville Dixon.

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

Transmission hours: Week-days, 7 a.m. to 11 p.m. Saturday, 7 a.m. to 1 a.m. Sunday, 11 a.m. to 4.30 p.m., 6 p.m. to 11 p.m.

3KZ MELBOURNE.

Operator: 3KZ Broadcasting Co. Pty. Ltd. (Licence owned by Industrial Printing and Publicity Co. Ltd.), Studios: 40 Victoria Street, Carlton, N.3. Transmitter: 40 Victoria Street, Carlton, N.3. Licensed power: 600 watts. Operating power: 600 watts. Wavelength: 254 m. (1,180 K.C.).

Commenced operations: December 8, 1930.

Directors: S. Morgan, W. V. Morgan, M. G. Sloman. **Executive staff:** S. Morgan (managing director), W. V. Morgan, A. J. Murray, A. Isaacson. **Production and announcing staff:** N. E. Balmer, K. Hudson, D. Joyce, R. Walker, Miss K. Dunlop, Norman Banks, George Lilburne, Douglas Elliot, Kenrick Hudson, Norman Swain, Norman Balmer, Zeris Dunoon, Iris Greenham. **Technical staff:** A. Grace, S. Thurling, E. Barwick. **Sales staff:** C. Rose, A. Gray, A. Banks, H. J. Topal. Total full time staff: 28.

Representatives: Sydney, John A. Armstrong, 75 Pitt Street.

Daily transmission hours: Monday to Friday, 6.30 a.m. to 11.30 p.m.; Saturday, 6.30 a.m. to 1 a.m.; Sunday, 10 a.m. to 12.30 p.m., 2.30 p.m. to 10.30 p.m.

Recording facilities: Manufactured by Precision Engineering Co., "Neuman," Cutting Head. Records at 33 1/3 and 78 r.p.m. Cuts 93, 112 and 130 lines to the inch.

Transmitter: Built by technical staff of 3KZ, using low-powered modulation. Type 4228A. Water-cooled valve in output stage.

Studio equipment: Built by technical staff of 3KZ.

Type of aerial system: Flat top "T" type. Quarter-wave.

Radio clubs and membership: "Happiness Club" (children). "3KZ's Friendship Circle," "Women's Radio Magazine" (social section).

3LK LUBECK.

(Relay Station of 3DB.)

Licensed power: 2000 watts. Operating power: 2000 watts. Wavelength, 276 m. (1,090 KC.).

Technical staff: N. Buzacott, H. Boast, H. Longmore.

Daily transmission hours: Monday—Friday, 6.30 a.m. to 11.30 p.m.; Saturday, 6.30 a.m. to 1 p.m.; Sunday, 10 a.m. to 10.30 p.m.

Transmitter: A.W.A. low power modulation.

Studio equipment: A.W.A.

Station Particulars (contd.)

3MA MILDURA.

Operator: Sunraysia Broadcasters Pty. Ltd., Mildura. Studios: T. & G. Buildings, cnr. Eighth Street and Langtree Avenue, Mildura. Transmitter: T. & G. Buildings, cnr. Eighth Street and Langtree Avenue, Mildura. Licensed power, 100 watts. Operating power, 100 watts. Wavelength, 221 m. (1,360 KC.).

Commenced operations: May 25, 1933.

Directors: R. D. Elliot, G. S. Baxter, C. D. Lanyon. **Executive Staff:** Val. J. Anderson (manager), C. D. Lanyon (secretary). **Production and announcing staff,** Val. J. Anderson, M. Folie, Miss D. Sarah, Miss L. McNeilly, Murray Linton, W. Byrne. **Technical staff:** Max Folie, Ken Parker. **Sales staff:** Les. Wilkinson. Total full time staff: 6.

Representatives: Sydney, George Hill, Chamber of Commerce Building, Grosvenor Street. Melbourne, Stanford Allan, 247 Collins Street.

Daily transmission hours: Week-days, 7 a.m. to 10 a.m., 12 p.m. to 2 p.m., 5.30 p.m. to 10.30 p.m. Sundays, 9 a.m. to 2 p.m., 7 p.m. to 10.30 p.m.

Transmitter: Thermostatically controlled crystal, high-level push-pull modulation.

Studio equipment: Transmission Equipment Pty. Ltd.

Type of aerial system: "T" type, supported by two 110 ft. masts.

Production facilities: New studio, 32 ft. x 14 ft. New transmission room and new offices. Three 33 1/3 and one 78 rev. turntables. Outside pick-up points to all local theatres, dance-halls, etc., and special trunk lines for relays from all points to Commonwealth.

Radio Clubs and membership: Amazon Club (children), 550; Sunraysia Boys' Club, 3,000.

3SH SWAN HILL.

Operator: Central Murray Broadcasters Pty. Ltd. (Licence owned by Swan Hill Broadcasting Co. Pty. Ltd.) Studios: Campbell Street, Swan Hill, Victoria. Transmitter: Campbell Street, Swan Hill. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 226 m. (1,330 KC.).

Commenced operations: August 27, 1931.

Network affiliation: Victorian Broadcasting Network, and Macquarie Broadcasting Network.

Directors: David F. Syme, Maisie A. Syme, George A. Featonby. **Executive staff:** David F. Syme (managing director), R. A. Fitts (general manager), Norman J. Blee (manager-announcer), June Walls (secretary), Frank S. Chamberlain (station manager). **Production and announcing staff:** Norman Blee, Margaret Curdie, W. Bowie. **Technical staff:** E. Evans (chief engineer), G. Chandler (assistant engineer). **Sales staff:** Neville Dixon.

Representatives: Sydney, Macquarie Broadcasting Services, 29 Bligh Street.

Daily transmission hours: Monday to Friday, 12.30 p.m. to 4.30 p.m., 6 p.m. to 10.30 p.m. Saturday, 10.30 a.m. to 1.30 p.m., 6 p.m. to 11 p.m. Sunday, 12.15 p.m. to 2.15 p.m., 4.15 p.m. to 6 p.m., 7.15 p.m. to 10.30 p.m.

Radio Clubs and membership: Merrymakers' Club (3,500).

3SR SHEPPARTON.

Operator: "The Argus" Broadcasting Services Pty. Ltd., Melbourne. Studios: Fraser Street, Shepparton. Transmitter: Congupna, Victoria. Licensed power, 2,000 watts. Operating power, 2,000 watts Wavelength, 238 m. (1,260 KC.).

Commenced operations: February 1, 1937.

Network affiliation: C.B.N. and "Argus" 3UZ Network.

Directors: Sir G. Dalziel Kelly (chairman), Staniforth Ricketson, Kingsley A. Henderson, J. B. Aitken, Allan Spowers, E. J. K. Thompson. **Executive Staff:** N. S. Sheppard, S. J. A. Kemp. **Production and announcing staff:** Peter Hemery, Gordon Bell, John Dexter, John Jermyn, Mrs. E. H. Miller ("Mary Ann"), Frank Ruler, Miss Leslie Morris. **Technical staff:** R. Shortell (chief engineer), H. Fuller, J. Burrage. **Sales staff:** E. McRae. Total full time staff: 18.

Representatives: Sydney, A. D. Bourke, 5-7 Barrack Street.

Daily transmission hours: 6 a.m. to 2 p.m., 3 p.m. to 11 p.m. (Saturdays, to midnight).

Recording facilities: At station.

Transmitter: A.W.A. Ltd.

Studio equipment: A.W.A. Ltd.

Type of aerial system: Inverted top aerial.

Radio clubs and membership: Sunny Radio Club (3,000), Friendship Club (1,000).

Station Particulars (contd.)

3TR GIPPSLAND.

Operator: Broadcast Entertainments Pty., Ltd. Studio: 7 Raymond Street, Sale. Transmitter: Myrtlebank, Maffra Road, Sale. Licensed power: 1,000 watts. Operating power: 1,000 watts. Wavelength: 242 m. (1,240 KC.).

Network affiliation: Victorian Broadcasting Network. **Melbourne studio:** "Age" Chambers, Collins Street, Melbourne.

Directors: David F. Syme, Maisie A. Syme. **Executive staff:** R. A. Fitts (general manager), June Walls (secretary), Frank S. Chamberlain (station manager). **Production and announcing staff:** Colin Binks, Donald Moore, Judy Willing, "Countrywoman" (Mrs. Angus McDonald). **Technical staff:** Geo. Nolte (chief engineer), R. Schmidt, G. McGowan.

Representatives: Sydney, Macquarie Broadcasting Services, 29 Bligh Street.

Transmission hours: Monday—Friday, 7 a.m. to 9 a.m., 11 a.m. to 4 p.m., 5.15 p.m. to 10.30 p.m. Saturday, 7 a.m. to 9 a.m., 10.30 a.m. to 5.15 p.m., 6 p.m. to midnight. Sunday, 10.45 a.m. to 2 p.m., 6.30 p.m. to 10.30 p.m.

This station has the use of recording facilities at its Melbourne studio.

3UL CENTRAL GIPPSLAND.

Operator: The Argus Broadcasting Services Pty. Ltd. Studios: South Road, Warragul. Transmitter: South Road, Warragul. Licensed power: 200 watts. Operating power: 200 watts. Wavelength: 333 m. (900 KC.).

Commenced operations: May 19, 1937.

Network affiliation: 3UZ and C.B.N.

Directors: Sir G. D. Kelly, K.B. (chairman), Staniforth Ricketson, Kingsley A. Henderson, Allan Spowers. **Executive staff:** N. M. Sheppard (sup. manager), E. J. Lewis (station manager). **Production and announcing staff:** Eric Broughall, Miss D. Wilby, J. Salmon (sport and sales), Ken. P. G. Lloyd. **Technical staff:** E. Murray Clyne (chief engineer), R. R. McGregor. Office, Miss Jean Trathan. Total full time staff: 8.

Radio clubs and membership: Cheerio Club (children), 1,839; Friendly Circle (women), 987; Breakfast Club, 441.

3UZ MELBOURNE.

Operator: Nilsen's Broadcasting Service Pty. Ltd. Studios: 45-47 Bourke Street, Melbourne. Transmitter: 45-47 Bourke Street, Melbourne. Licensed power: 600 watts. Operating power: 600 watts. Wavelength: 323 m. (930 KC.).

Commenced operations: March 8, 1925.

Network affiliation: "Argus" and C.B.N.

(Continued overleaf.)

Station Particulars (contd.)

3UZ MELBOURNE (Continued).

Directors: Oliver J. Nilsen, Chas. T. Cromie, O. Victor Nilsen, E. Cottrell. **Executive staff:** A. N. Kemsley (general manager), J. S. Larkin, Eric Cottrell, Harper Wilson, Walter Pym, Stephani Bini. **Production and announcing staff:** Walter Pym, Roly Barlee, Gilbert Charlesworth, John McMahon, Jack Gurry, Mrs. Ida Coffey (Penelope), Miss Louise Homfrey (Louise). **Technical staff:** Les. Glew, Sydney Riches, William Vergona, L. Archibald, W. Murphy. **Sales staff:** Olaf Abramowski, Stanley Fawcett, L. Scholfield.

Representatives: Sydney, A. D. Bourke, 5 Barrack Street.

Recording facilities: At station.

Radio Clubs and membership: Bobby Bear Club, Grub Club (Gardening for Children), Bonio Pets Club, Look Up and Laugh Club.

3XY MELBOURNE.

Operator: Efftee Broadcasters Pty. Ltd. Studios: Princess Theatre Buildings, Spring Street, Melbourne. Transmitter: Princess Theatre Buildings, Spring Street, Melbourne. Licensed power: 600 watts. Operating power: 600 watts. Wavelength: 211 m. (1420 KC.).

Commenced operations: September 8, 1935.

Directors: V. G. H. Harrison (chairman), Olive Thring, P. W. Ettelson, L. Shepherd. **Executive staff:** Tom Holt (general manager), F. R. Mogg (secretary). **Production and announcing staff:** C. G. French, Geo. Blunt, Roy Steyne, Donald Day, John Barnes, W. Sharland, J. Storr, E. Fambly, C. Bleazby, Geo. Blackshaw, Eric Snell, Misses Madge Thomas, Ann Harvey, Catherine Neill. **Technical staff:** L. Shepherd (chief engineer), W. Rowland, L. Cottrell, W. Chamberlain. **Sales staff:** K. M. Campbell, B. Campbell, S. Thomas, A. Robinson. Total full time staff: Approximately 60.

Representatives: Sydney, D. N. Scott..

Daily transmission hours: Week-days, 6.30 a.m. to 11.30 p.m.; Sundays, 10 a.m. to 10.30 p.m.

Transmitter: Amalgamated Wireless (A/sia) Ltd. High fidelity series modulated.

Studio equipment: Amalgamated Wireless (A/sia) Ltd.

Type of aerial system: Quarter wave "T" type.

Radio clubs and membership: 3XY Good Companions (6,000); Peter Pals Club (11,000).

3YB, WARRNAMBOOL.

Operator: The Argus Broadcasting Services Pty., Ltd., Studio and office: Commonwealth Bank Buildings, Liebig Street, Warrnambool, Victoria. Location of transmitter: Weir Road, Spring Gardens. Licensed and operating power: 200 watts. Wavelength: 248 m. (1,210 KC.).

Commenced operation: January 18, 1936.

Network affiliation: "Argus" 3UZ Network and C.B.N.

Directors: Staniforth Ricketson, Kingsley A. Henderson, G. Dalziel Kelly, George Fairbairn, J. B. Aitken, Alfen Spowers. **Secretary:** E. J. K. Thompson.

3YB WARRNAMBOOL (Continued).

Superintending Manager: N. M. Sheppard. **Manager:** C. A. Strange; Chief Announcer, J. B. Henderson; other announcers, V. Haycroft and A. H. Sowden; Chief Engineer, G. Glover; Assistant Engineer, L. Kermond; Cadet Engineer, A. Smith. Women's session, Margaret Walker. Sporting, Jack Frawley.

Representatives: A. D. Bourke, 5 Barrack Street, Sydney; V. M. Dinneny, 365 Elizabeth Street, Melbourne.

Daily transmission times: 7—9.30 a.m., 11 a.m.—4 p.m., 6—10.45 p.m.; Sunday, 6—10.30 p.m.

4AK DARLING DOWNS.

Operator: Brisbane Broadcasting Pty., Ltd., "Courier Mail" Building, Brisbane. Transmitter: Kingside, near Oakey, 15 miles from Toowoomba. Licensed power: 2,000 watts. Operating power: 2,000 watts. Wavelength: 246 m. (1,220 KC.).

Commenced operations: August 31, 1935.

Network affiliation: Major network.

Directors: Sir Edward Macartney. **Executive staff:** Alec. Robertson (general manager), H. M. Bayley (secretary), H. Harper (studio manager), R. A. Fremlin (advertising manager). **Technical staff:** A. L. Dixon (chief engineer).

Representatives: Sydney, I. W. Phillips, 8th Floor, Warwick Building, Hamilton Street. Melbourne, C. Shave, Newspaper House, Collins Street.

Daily transmission hours: 6 a.m. to 11 p.m. Monday to Friday; 6 a.m. to midnight Saturday; 9.30 a.m. to 10.30 p.m. Sunday.

4AT ATHERTON.

441 metres, 680 KC. Not in operation as at August 1, 1938.

4AY AYR.

Operator: Ayr Broadcasters Pty. Ltd. Studios: Ayr, North Queensland. Transmitter: Airdmillan, North Queensland. Licensed power: 500 watts. Operating power, 500 watts. Wavelength: 349 m. (860 KC.).

Commenced operations: October 1, 1934.

Network affiliation: C.B.N.

Directors: J. L. Humphrey, R. D. Low. **Executive staff:** E. M. L. Dahl (general manager). **Production and announcing staff:** Keith Spencer (studio manager), Don Simpson, A. V. Hitch, R. C. Bleechmore (sport). **Technical staff:** W. J. Faber. **Sales staff:** D. H. Simpson (advertising manager), A. V. Hitch. **Office staff:** Misses F. Statham, L. M. J. Searle, P. Brown. Total full time staff: 9.

Representatives: Brisbane, 4BC; Sydney, A. D. Bourke; Melbourne, P. J. Sullivan.

Daily transmission hours: 6.30 a.m. to 8 a.m., 9.30 a.m. to 11.30 a.m., 6 p.m. to 10.30 p.m. Wednesdays-Saturdays, sporting sessions, 1—5 p.m.

Transmitter: Colville Pentode.

Studio equipment: Colville.

Type of aerial system: Quarter wave.

Production facilities: 4AY Players and all latest recordings and transcriptions.

Radio clubs and membership: Joybells' Club (2,432).

Station Particulars (contd.)

4BC BRISBANE.

Operator: Commonwealth Broadcasting Corporation (Queensland) Ltd., Brisbane. Studios: Winter Garden Theatre, Queen Street, Brisbane. Transmitter: Oxley. Licensed power, 1000 watts. Operating power, 1000 watts. Wavelength, 268 m. (1,120 KC.).

Commenced operations, August 16, 1930.

Network affiliation: C.B.N.

Directors: Stuart F. Doyle (chairman), F. Albert (vice-chairman), A. F. Albert, C. F. Marden, Chas. Bowly. **Executive staff:** Russell F. Roberts (manager), E. P. Griffin (secretary), Arthur L. Prince (sales manager), Eric Bessemer (chief of staff), Tom McGregor (programme manager), R. Sheppard (musical director), R. R. Clifford (accountant), E. Mavis Riding (publicity officer). **Production and announcing staff:** Ruth Rutherford (Mrs. R. L. Reid), Max Sorelle, Gerry Connolly, Richard Mathews, Keith Howard, Dr. W. G. Goddard, Jim Anderson, Stan Phillips, Barney Cook, Dean Casos, Harry Millard, Ailsa Krimmer, Leisha Bonfield, Dorothy Dash, Herbert Stallard, E. Littleton, N. Craig, J. McKenzie, M. Lebanon, P. Hutton, R. Everard. **Technical staff:** Frank Elliott, Stuart Smith, D. Dunstan, Bill Jack, Jack Griffin, G. Leach, M. Enticknap, J. Wheller. **Sales staff:** R. M. Graham, A. J. Simons. Total full time staff: 48.

Representatives: Sydney, A. D. Bourke; Melbourne, P. G. Sullivan.

Daily transmission hours: Week-days, 6.30 a.m. to 11 p.m.; Sundays, 7 a.m. to 10.30 p.m.

Recording facilities: At station.

Transmitter: A.W.A. Standard Broadcasting Equipment.

Studio equipment: A.C. amplifier system.

Type of aerial system: Inverted "L" centre fed.

Production facilities: Full equipment and staff for all live-artist programme demands.

Radio clubs and membership: Pals' Club (5,000), Round Table Club (5,000).

4BH BRISBANE.

Operator: Broadcasters (Aust.) Pty. Ltd. Studios: 43 Adelaide Street, Brisbane. Transmitter: Bald Hills, Queensland. Licensed power, 1,000 watts. Operating power, 1,000 watts. Wavelength: 217 m. (1,380 KC.).

Commenced operations: January 2, 1932.

Network affiliation: Macquarie Broadcasting Network (associate).

Directors: J. B. Chandler (chairman), V. F. Mitchell, Neil O'Sullivan, Frank Chandler. **Executive staff:** C. R. Carson (manager), Howard Sleath (programme director). **Production and announcing staff:** Frank Hatherley, Sydney Everett, Les Daley, George Hardman, Loftus Hyde, Richard Pile, Walter G. Elliott, Russell Tyson, Dulcie Scott, Mary Bulcock. **Technical staff:** G. Ham, C. D. Moran, A. Kemp, B. Harte, W. Beaney, G. Gibbs, W. Feekings. **Sales staff:** G. Gordon Forsythe, G. Stokes, H. V. Drake, L. Jeffrey.

4BH BRISBANE (Continued).

Representatives: Sydney, W. J. Smythe, Chandler's Broadcasting Service, Australia House, 52 Carrington Street; Melbourne, Macquarie Broadcasting Services, 37 Queen Street.

Daily transmission hours: Week-days, 6 a.m. to 11 p.m.; Sunday, 7 a.m. to 11 p.m.

Recording facilities: At station.

Transmitter: Crystal-controlled, low-power Heinsing modulation. Mast 140 feet. Transmitter designed by Mr. L. Schultz and built by Mr. N. W. Cruickshank.

Studio equipment: J. B. Chandler and Co.

Type of aerial system: "T" type current-fed quarter wave.

Production facilities: Five studios.

Radio clubs and membership: Kookaburra Club (children), 5,000; Bridge Club, 270 playing members.

4BK BRISBANE.

Operator: Brisbane Broadcasting Pty., Ltd., Fourth Floor, "Courier-Mail" Building, Queen Street, Brisbane. Transmitter: "Courier-Mail" Building. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 233 m. (1,290 KC.).

Network affiliation: Major Network.

Directors: Sir Edward Macartney. **Executive staff:** Alec. Robertson (general manager), E. M. Bayley (secretary), H. Harper (studio manager), R. A. Fremlin (advertising manager). **Technical staff:** A. L. Dixon (chief engineer).

Representatives: Sydney, I. W. Phillips, 8th Floor, Warwick Building, Hamilton Street. Melbourne, C. Shave, Newspaper House, Collins Street.

Daily transmission hours: Monday to Friday, 6 a.m. to 11 p.m. Saturday, 6 a.m. to midnight. Sunday, 9.30 a.m. to 10.30 p.m.

Transmitter: A.W.A.

Studio equipment: A.W.A.

4BU BUNDABERG.

Operator: Bundaberg Broadcasters Pty. Ltd. Studios: Bourbong Street, Bundaberg. Transmitter: Coast Road, Kalkie, 4 miles from the city. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 226 m. (1.330 KC.).

Commenced operations: December 16, 1935.

Directors: W. J. Harvey (chairman), R. G. Curtis, A. J. Christensen. **Executive staff:** C. V. Woodland (manager), Percival Moller (secretary). **Production and announcing staff:** William Diamond (chief announcer), Norman Harvey, Beth Gibson. **Technical staff:** James Jordan, Herbert Bull, Ray Howe, Keith Meredith. **Sales staff:** C. V. Woodland, William Diamond. Total full time staff: 10.

Representatives: Sydney, I. W. Phillips, Warwick Buildings, Hamilton Street; Melbourne, A.W.A. Ltd., Queen Street.

Daily transmission hours: Week-days, 6.30 a.m. to 8.30 a.m., 10.30 a.m. to 1.30 p.m., 5.30 p.m. to 10 p.m. Sundays, 8.30 a.m. to 10.30 a.m., 6 p.m. to 10 p.m.

Transmitter: Colville Wireless Equipment Co., Sydney; 5-stage crystal, Type K.V.F.H.200/2C.

(Continued overleaf.)

Station Particulars (contd.)

4BU BUNDABERG (Continued).

Studio equipment: Colville Wireless Equipment Co., Sydney.

Type of aerial system: Quarter-wave, vertical. Fabricated steel mast—172 ft.

Production facilities: Dramatic, comedy and musical productions directed by C. V. Woodland. Live shows—plays, minstrel entertainments and community concerts featured.

Radio Clubs and membership: Radio Sunday School (over 1,000).

4CA CAIRNS.

Operator: Amalgamated Wireless (A/sia) Ltd. Studios: Grove Street, Cairns. Transmitter: Grove Street, Cairns. Licensed power: 200 watts. Operating power: 200 watts. Wavelength: 300 m. (1,000 KC.).

Commenced operations: May 16, 1936.

Network affiliation: A.W.A.

Executive staff: F. M. Basden (manager). Total full-time staff: Five.

Representatives: A.W.A. Ltd.

Daily transmission hours: Monday to Friday, 7.30 a.m. to 9 a.m., 12 noon to 2 p.m., 5.30 p.m. to 10.30 p.m. Saturday, 7.30 a.m. to 9 a.m., 5.30 p.m. to 10.30 p.m. Sundays: 8.30 a.m. to 1 p.m., 6.30 p.m. to 10 p.m.

Transmitter: A.W.A.

Studio equipment: A.W.A.

Type of aerial system: A.W.A.

4GR TOOWOOMBA.

Operator: Gold Radio Service Pty. Ltd., Toowoomba. Studios: Ruthven Street, Toowoomba. Transmitter: Drayton. Licensed power, 500 watts. Operating power: 500 watts. Wavelength: 300 m. (1,000 KC.).

Commenced operations: August, 1925.

Network affiliation: C.B.N.

Directors: S. F. Doyle, E. E. Gold, A. F. Albert, C. F. Marden, M. F. Albert. **Executive staff:** E. E. Gold (managing director). **Production and announcing staff:** N. Carter, R. Beattie, R. Grimstone, Miss Joan White. **Technical staff:** N. Bishop (chief engineer), H. Buzacott, J. Walker, K. Smith, Ron Nichol. **Sales staff:** G. R. Harrington. Total full time staff: 14.

Representatives: Sydney, A. D. Bourke; Melbourne, P. Sullivan; Brisbane, 4BC.

Daily transmission hours: Week-days, 6.30 a.m. to 2 p.m., 3 p.m. to 4.30 p.m., 5.30 p.m. to 11 p.m.; Saturdays, 6.30 a.m. to 10 a.m., 5.30 p.m. to 11 p.m.; Sundays, 11 a.m. to 1 p.m., 6 p.m. to 10 p.m.

Recording facilities: At studios.

Transmitter: Gold Radio Services Pty., Ltd.

Studio equipment: Gold radio.

Type of aerial system: Quarter wave vertical steel tubular radiator.

Production facilities: 78 and 33⅓ r.p.m. tables. Two studios.

4IP IPSWICH.

Operator: The Ipswich Broadcasting Co. Pty. Ltd., Ipswich. Studios: 233 Brisbane Street, Ipswich. Transmitter: 233 Brisbane Street, Ipswich. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 208 m. (1,440 KC.).

Commenced operations: September 2, 1935.

Directors: F. J. Meacham (chairman), W. J. Johnson, E. B. Johnson, W. S. Parkinson. **Executive staff:** Mona Walters, Phyllis Scrivener. **Production and announcing staff:** Terence Lambart (manager), W. J. Johnson, W. Nowlan, Terry Forsyth, Mrs. F. E. Willesden, June Saunders. **Technical staff:** Keith Fairweather (chief engineer), Ronald Smith. **Sales staff:** W. J. Johnson, Fred Wilde. Total full time staff: 8.

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

Daily transmission hours: Monday to Friday, 6.30 a.m. to 10 a.m., 5 p.m. to 10 p.m.; Saturday, 6.30 a.m. to 10 a.m., 11 a.m. to 12.30 p.m., 6.30 p.m. to 10 p.m.; Sunday, 10.30 a.m. to 12.30 p.m., 6 p.m. to 10 p.m.

Transmitter: Colville Wireless Equipment Co. KVFH 100/2C.

Studio equipment: Colville Wireless Equipment Co.

Type of aerial system: Inverted "L" type oscillating against a periodic counterpoise 75 ft. below it.

Radio clubs and membership: Smiles Club conducted by "Uncle Bill" (W. J. Johnson), 700.

Station Particulars (contd.)

4LG LONGREACH.

Operator: The Central Western Broadcasting Co. Pty. Ltd. **Studios:** Eagle Street, Longreach and East Longreach. **Transmitter:** Three miles east of Longreach. Licensed power: 1,000 watts. Operating power: 500 watts. Wavelength: 273 m. (1,100 KC.).

Commenced operations: May 5, 1936.

Directors: R. M. Nicholson, Mrs. R. M. Nicholson. **Executive staff:** D. Gardner, E. Connor. **Production and announcing staff:** W. D. Eversen, E. Osbourne. Total full-time staff: 8.

Representatives: Brisbane, Noble Bartlett Advertising, Adelaide Street. Sydney, A. D. Bourke, 7 Barrack Street.

Transmitter: Standard Telephones and Cables.

Studio equipment: Standard Telephones and Cables.

Type of aerial system: Vertical.

Radio clubs and membership: "Buck Jones Club" (2,450).

4MB MARYBOROUGH.

Operator: Maryborough Broadcasting Co. Pty., Ltd. Studios: Kent Street, Maryborough. Transmitter: Kent Street West, Maryborough. Licensed power: 200 watts Operating power: 200 watts. Wavelength: 214 m. (1,400 KC.).

Commenced operations: August 16, 1932.

Network affiliation: C.B.N.

Directors: S. F. Doyle, F. Albert, A. Albert, A. P. Wynne.

Executive staff: A. P. Wynne (managing director). **Production and announcing staff:** D. Hill, N. McCormack, Colin Welch. **Technical staff:** R. J. Beatson, W. Pearson. **Sales staff:** D. Hill. Total full-time staff: Six.

Representatives: Brisbane, Commonwealth Broadcasting Co. Sydney, A. D. Bourke, 2UW. Melbourne, P. G. Sullivan.

Daily transmission hours: Monday to Saturday, 7 a.m. to 10 a.m., 12 noon to 2 p.m., 5.30 p.m. to 10 p.m.; Sunday, 10.30 p.m. to 12.30 p.m., 5.30 p.m. to 6 p.m.

Transmitter: J. B. Chandler & Co.

Studio equipment: J. B. Chandler & Co.

Type of aerial system: Horizontal T.

Programme production facilities: Five microphones; three twin-speed turntables (33/78).

Radio Clubs and membership: Adams Happiness Brigade (600).

4MK, MACKAY.

Operator: Mackay Broadcasting Service Pty., Ltd., 64 Nelson Street, Mackay, Queensland. Transmitter: Mackay. Licensed and operating power: 100 watts. Wavelength: 216 m. (1,390 KC.).

Commenced operations: January 12, 1931.

Representatives: Amalgamated Wireless (A/sia) Ltd., 47 York Street, Sydney.

Transmission hours: 6.30 a.m.—8 a.m., 12 noon—2 p.m., 3 p.m.—5 p.m., 6—10.30 p.m.

4PM PORT MORESBY.

Operator: Amalgamated Wireless (A/sia) Ltd. Studios: Port Moresby, Papua. Transmitter: Port Moresby, Papua. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 221 m. (1,360 KC.).

Commenced operations: October 25, 1935.

Network affiliation: A.W.A.

Executive staff: K. Frank (manager). Total full-time staff: Five.

Representatives: Amalgamated Wireless (A/sia) Ltd.

Daily transmission hours: Monday to Saturday, 1 p.m. to 2 p.m., 6 p.m. to 8 p.m.

Transmitter: A.W.A. unit.

Studio equipment: A.W.A. unit.

Type of aerial system: A.W.A.

4RO ROCKHAMPTON.

Operator: Rockhampton Broadcasting Co. Pty., Ltd. Studios: Cnr. East and William Streets, Rockhampton. Transmitter: Cnr. East and William Streets, Rockhampton. Wavelength: 278 m. (1,080 KC.).

Network affiliation: C.B.N.

Directors: Stuart F. Doyle (chairman), Frank Albert (vice-chairman), A. F. Albert, C. F. Marden. **Executive staff:** E. J. Rheuben (general manager). **Production and announcing staff:** G. Keir, C. Beck, Miss M. Meldon, P. Glancy. **Technical staff:** E. Semfel, D. Guthrie. Total full-time staff: 8.

Representatives: Brisbane: 4BC, Queen Street. Sydney: A. D. Bourke, 5-7 Barrack Street; 2UW, State Shopping Block, Market Street. Melbourne: 2UW office.

Transmitter: A.W.A.

Studio equipment: A.W.A.

Radio Clubs and membership: 4RO Children's Club (400).

4SB KINGAROY.

Operator: South Burnett Broadcasting Co. Ltd., Alford Street, Kingaroy. Studios: Alford Street, Kingaroy. Transmitter: Wooroolin, 10 miles air-line from Kingaroy. Licensed power: 2,000 watts. Operating power: 2,000 watts. Wavelength: 283 m. (1,060 KC.).

Commenced operations: March 11, 1938.

Network affiliation: C.B.N.

Directors: C. F. Adermann, J. B. Chandler, Stuart F. Doyle, S. G. Darrow, H. C. Muston. **Executive staff:** V. F. Mitchell (manager), H. C. Muston (sec.). **Production and announcing staff:** Peter Le Brun, Norman Cruickshank. **Technical staff:** Norman W. Cruickshank, M.I.R.E. **Sales staff:** Peter Le Brun. Total full-time staff: 5.

Daily transmissions: Week days: 6.30 a.m. to 10 a.m., 11.30 a.m. to 2 p.m., 6 p.m. to 10 p.m., except Wednesdays and Saturdays, 6.30 a.m. to 10 a.m., 11.30 a.m. to 5 p.m., 6 p.m. to 10 p.m. Sunday, 8 a.m. to 2 p.m., 6 p.m. to 10 p.m.

Transmitter: A.W.A. 3KW series modulated.

Studio equipment: A.W.A.

Type of aerial system: Folded back T on masts 220 ft. high.

Station Particulars (contd.)

4TO TOWNSVILLE.

Operator: Amalgamated Wireless (A/sia) Ltd. Studios: Beak House, Flinders Street, Townsville. Transmitter: Bell Street, South Townsville. Licensed power: 200 watts. Operating power: 200 watts. Wavelength, 385 m. (780 KC.).

Commenced operations: October 5, 1931.

Network affiliation: A.W.A.

Directors: Amalgamated Wireless Board of Directors: **Executive staff:** H. E. Cox, Ass.M.I.R.E. (Aust.), **Production and announcing staff:** R. Kidd, F. D. Badger. **Sales staff:** H. E. Cox, F. D. Badger. **Technical staff:** H. E. Cox, R. Kidd. Total full time staff: 5.

Representatives: Sydney, A.W.A.; Melbourne, A.W.A.; Brisbane, Roger Fair.

Daily transmission hours: Week-days, 9 hours; Sundays, 5 hours.

Transmitter: Designed and manufactured by A.W.A.

Studio equipment: Designed and manufactured by A.W.A.

Type of aerial system: Lecher feed vertical type.

Production facilities: Studio properly equipped to produce any class of radio entertainment.

4VL CHARLEVILLE.

Operator: Charleville Broadcasting Service Pty., Ltd., Alfred Street, Charleville, Queensland. Transmitter: Alfred Street, Charleville. Licensed and operating power: 100 watts. Wavelength: 526 m. (570 KC.).

Commenced operations: February 12, 1936.

Network affiliation: C.B.N.

Directors: A. G. B. Mars, J. Falknemier. Manager, A. B. Searle. Assistant Announcer, Miss June Falknemier.

Representatives: Sydney, A. D. Bourke, 5-7 Barrack Street; Melbourne, Mr. Sullivan, 2UW Agency, Queen Street.

Transmission times: 7.30—8.30 a.m., 12—1.30 p.m., 6—10 p.m.

Transmitter: Three-stage C.C. high level modulation —town power supply 480 D.C. to generate 240 A.C. 1½ K.W.

4WK WARWICK.

Operator: Warwick Broadcasting Co. Pty., Ltd. Studios: Albion Street, Warwick. Transmitter: Albion Street, Warwick. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 341 m. (880 KC.).

Commenced operations: May 5, 1935.

Network affiliation: A.W.A.

Executive staff: A. E. Lawrence (manager). Total full time staff: Four.

Representatives: A.W.A. Ltd.

Daily transmission hours: Monday to Saturday, 7 a.m. to 8.30 a.m., 12.30 p.m. to 1.30 p.m., 5.30 p.m. to 10.30 p.m., 7.30 p.m. to 9.30 p.m. Sunday, 7.30 p.m. to 9.30 p.m.

Transmitter: A.W.A. unit.

Studio equipment: A.W.A.

Type of aerial system: A.W.A.

4ZR ROMA.

Operator: Maranoa Broadcasting Co. Ltd., McDowell Street, Roma. Studios and transmitter: Bowen Street, Roma. Licensed operating power: 100 watts. Wavelength 201 m. (1,490 KC.).

Commenced operations: July 23 1937.

Network affiliation: C.B.N.

Directors: E. Gold (chairman), R. S. McGeoch, W. G. Mayne, F. E. Smith. Production and announcing staff: Wilfred Robertson. Technical staff: R. Walker. Total full time staff: Two.

Daily transmission hours: 7—8.30 a.m., 12 noon—2 p.m., 6—10.30 p.m.

Transmitter: Gold Radio Service Pty., Ltd., Toowoomba. 300 watt B'cast T'mitter employing high level modified Heising Modulation.

Studio equipment: Gold Radio Service Pty., Ltd.

Type of aerial system: Single wire "T".

5AD ADELAIDE.

Operator: Advertiser Newspapers Ltd., Waymouth Street, Adelaide. **Studios:** "The Advertiser" Building, Waymouth Street, Adelaide. **Transmitter:** Adelaide. Licensed power, 500 watts. Operating power, 500 watts. Wavelength, 229 m. (1,310 KC.). This station owns and relays to 5PI, 5MU and 5SE).

Commenced operations: August 2, 1930.

Network affiliation: "Advertiser" Network.

Executive staff: A. L. Holtze (manager). **Announcing and production staff:** Miss E. Benson (programme manager), Miss D. Edwards (commercial supervisor), K. A. Macdonald (casting director), Jack Burgess (chief announcer), C. Norton, J. Young, J. Cameron, R. Browne, C. Davis, V. A. Jacques (continuity), Steve McKee (sports editor). **Technical staff:** D. Gooding (chief engineer), H. B. Wilson. **Sales staff:** Maurice Chapman (sales manager).

Representatives: Sydney, Fred Thompson, Warwick Building, 15 Hamilton Street. Melbourne, G. N. Bednall, Newspaper House, Collins Street. London, A. J. Chard, 92 Fleet Street. New York, Joshua B. Powers, 220 East 42nd Street.

Transmission hours: 6 a.m.—11 p.m. Mondays to Saturdays, 5.30 p.m.—10 p.m. Sundays.

5AU PORT AUGUSTA.

(Regional unit of 5KA)

Operator: Sport Radio Broadcasting Co. Ltd., Richards Buildings, 99 Currie Street, Adelaide, South Australia. Transmitter: Port Augusta. Wavelength: 214 m. (1,400 KC.).

Commenced operations: May 25, 1938.

5DN ADELAIDE.

Operator: Hume Broadcasters Ltd. Studios: 12th Floor, C.M.L. Building, King William Street, Adelaide. Transmitter: 12th Floor, C.M.L. Building, King William Street, Adelaide. Licensed power: 500 watts, Operating power: 500 watts. Wavelength, 313 m. (960 KC.).

Commenced operations: February 24, 1925.

(Continued overleaf.)

Station Particulars (contd.)

5DN ADELAIDE (Continued).

Network affiliation: Macquarie Broadcasting Network.

Directors: Wm. Queale, H. R. Pinkerton, G. W. Marsh, B. Roberts, M. Syme. **Executive staff:** Gordon W. Marsh (general manager), Randal M. White (assistant manager), D. Nicholson, E. J. Hume, Kenneth Crossman, A. J. Carvosso. **Production and announcing staff:** K. Crossman, D. Nicholson, B. Woolley, R. Sullivan, L. Newall, Mrs. E. Pullman, D. Stevens, R. Anthoney, Miss D. Balk, Miss S. O'Sullivan, Miss B. Underhill. **Technical staff:** E. J. Hume (chief engineer), F. T. Hill, C. R. Howie, R. R. Davies, A. F. Fisher, D. A. Wilkinson, F. F. Wells. **Sales staff:** P. A. Smyth, Mrs. E. Pullman. Total full time staff: 26.

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney; 37 Queen Street, Melbourne.

Daily transmission hours: Monday to Friday, 6.50 a.m. to 11.15 p.m.; Saturday, 6.50 a.m. to 1 p.m.; 6 p.m. to midnight; Sunday, 9.30 a.m. to 10.15 p.m.

Recording facilities: At station.

Transmitter: Low level modulation with two linear amplifiers. Crystal controlled oscillator. Manufactured by L. Schultz.

Studio equipment: Manufactured by E. J. Hume.

Type of aerial system: "T" type cage system.

Production facilities: Five studios. Transcription equipment is provided for both 33 1/3 and 78 r.p.m. lateral cut records, and Western Electric wide range equipment has been installed for Hill-and-Dale (vertical cut) recordings. Production studios. "World" Wide Range Library.

Radio clubs and membership: 5DN Kipling Boys' Club, 16,000; "Adventure Bound" Club (Alaska Ice Cream Co.), 461; "Malvern Star" Radio Moneybox (Bruce Small Pty. Ltd.), 100; "Nutlaq" Radio Club (Premier Varnish and Paint Co.), 600.

5KA ADELAIDE.

Operator: Sport Radio Broadcasting Co. Ltd. Studios: Richards Buildings, Currie Street, Adelaide. Transmitter: Richards Buildings, Currie Street, Adelaide. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 250 m. (1,200 KC.).

Commenced operations: August, 1926.

Network affiliation: C.B.N.

Directors: R. Lincoln, W. K. Schneider, M. O'Halloran, C. A. Tareha, H. Hunter. **Executive staff:** R. Lincoln, W. K. Schneider, M. O'Halloran, C. A. Tareha, H. Hunter. **Production and announcing staff:** A. Auchterlonie, H. A. Thorn, Mrs. W. K. Schneider, Les. Gibson, Cyril Freeman. **Technical staff:** C. A. Tareha, R. A. Oakley. **Sales staff:** M. O'Halloran, H. Hunter. Total full-time staff: 40.

Representatives: Sydney, C. A. Monks, Shell House, Carrington Street. Melbourne, E. A. Wood, 532 Bourke Street.

Daily transmission hours: Monday to Friday, 5.30 a.m. to 11 p.m., excepting Thursday (5.30 a.m. to midnight). Saturday, 5.30 a.m. to 12 p.m. Sunday, 8.30 a.m. to 11 p.m.

5KA ADELAIDE (Continued).

Transmitter: Manufactured by 5KA staff.

Studio equipment: Manufactured by 5KA staff.

Type of aerial system: Inverted "L" with counterpoise.

Production facilities: One studio with control room and three other studios.

Radio clubs: The Merrymakers' Club (adults); 5KA-I Junior Radio Club.

5MU MURRAY BRIDGE.

(Relay Station of 5AD.)

Operator: Advertiser Newspapers Ltd., Waymouth Street, Adelaide. **Studio:** "The Advertiser" Building, Waymouth Street, Adelaide. **Transmitter:** Murray Bridge. Licensed power: 10° watts. Wavelength: 207 m. (1,450 KC.).

Commenced operations: September 16, 1934.

5PI CRYSTAL BROOK.

(Relay Station of 5AD.)

Operator: Advertiser Newspapers Ltd., Waymouth Street, Adelaide. **Studios:** "The Advertiser" Building, Waymouth Street, Adelaide. **Transmitter:** Near Crystal Brook. Licensed power: 2,000 watts. Wavelength: 288 m. (1,040 KC.).

Commenced operations: January 1, 1932.

Station Particulars (contd.)

5RM MURRAY HEIGHTS.
(Relay Station of 5DN).

Operator: River Murray Broadcasters Ltd., 29 Rundle Street, Adelaide. Location of studios and transmitter: Renmark. Licensed power: 1,000 watts. Operating power: 1,000 watts. Wavelength: 370 m. (810 KC.).

Commenced operations: February 5, 1935.

5SE MOUNT GAMBIER.
(Relay Station of 5AD.)

Operator: Advertiser Newspaper Ltd., Waymouth Street, Adelaide. **Studios:** Mount Gambier. Transmitter: Mount Gambier. Licensed power: 100 watts. Wavelength: 219 m. (1,370 KC.).

Commenced operations: July 3, 1937.

6AM NORTHAM.

Operator: 6AM Broadcasters Ltd., St. George's House, St. George's Terrace, Perth. Studios: St. George's House, St. George's Terrace, Perth. Transmitter: Four miles west of Northam, 48 air miles from Perth. Licensed power: 2,000 watts. Operating power: 2,000 watts. Wavelength: 306 m. (980 KC.).

Commenced operations: June 1, 1934.

Network affiliation: 6PM Broadcasters Ltd.

Directors: Archer P. H. Whitford, F. R. Whitford, A. A. Whitford, E. I. Whitford. **Executive staff:** F. R. Whitford (managing director), D. White (secretary), N. Thomas (assist. secretary). **Production and announcing staff:** H. Wells, Morry J. Powell, J. Cortez, Goff. Carter, E. Broad, M. Ruck, H. Hay, C. Muhling. **Technical staff:** F. Tredea (chief engineer), A. L. Read, R. Henwood. **Sales staff:** J. Tozer, W. Fuhrman, J. P. Patton. Total full-time staff: In conjunction with 6PM, 27.

Representatives: Sydney, P. A. Morse, 102 Sussex Street. Melbourne, H. Anderson, Poster House, 130 Exhibition Street.

Daily transmission hours: Monday to Friday, 6.30 a.m. to 8.30 a.m., 12 noon to 2 p.m., 5.30 p.m. to 10.30 p.m. Saturday, 12 noon to 12.45 a.m. Sunday, 8.30 a.m. to 1 p.m., 5.30 p.m. to 10 p.m.

Transmitter: 6AM Broadcasters Ltd., 3,000 watt low-level modulation.

Studio equipment: 6AM Broadcasters Ltd. and Colville Wireless Equipment Co. Pty., Ltd.

Type of aerial system: Marconi quarter-wave.

Production facilities: Two studios, audition room, extensive library.

Radio clubs and membership: Willie Weeties Club (4,200), Happy Hour Club.

6GE GERALDTON.

Operator: Great Northern Broadcasters Ltd. Studios: 191 Marine Terrace, Geraldton. Transmitter: Deepdale, 5 miles on Mullewa Road. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 219 m. (1,370 KC.).

6GE GERALDTON (Continued).

Commenced operations: October 8, 1937.

Directors: Dr. Louis Gelle (chairman), Len Shepheard, A. P. Rock, J.P. **Executive staff:** Herbert Ebrall (manager), W. R. Campbell (secretary). **Production and announcing staff:** H. Ebrall (chief announcer), R. H. Muir, Miss N. Leen, Miss M. Foster. **Technical staff:** C. G. Morrison, H. Ebrall. **Sales staff:** F. McLeod, H. Ebrall. Total full time staff: 9.

Representatives: Perth, F. McLeod. Eastern States, A.W.A.

Daily transmission hours: Week-days, 6.30 a.m. to 9.30 a.m., 12 noon to 2 p.m., 5 p.m. to 10.30 p.m. Saturday, 6.30 a.m. to 9.30 a.m., 12 noon to 2 p.m., 5 p.m. to 11 p.m. Sunday, 9.30 a.m. to 11.30 a.m., 2.30 p.m. to 3.30 p.m., 6 p.m. to 10 p.m.

Transmitter: A.W.A., Class B modulation.

Studio equipment: A.W.A., Class B modulation.

Type of aerial system: T type, 150 feet high, two lattice towers surmounted by oregon masts.

Radio Clubs and membership: 6GE Joy Club (children). 6GE Cheerio Club (adults).

6IX PERTH.

Operator: W.A. Broadcasters Ltd. Studios: Lyric House, Murray Street, Perth. Transmitter: Newspaper House, St. George's Terrace, Perth. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 242 m. (1,240 KC.).

Commenced operations: November, 1933.

Network affiliation: Major network.

Directors: H. B. Jackson, K.C., C.P. Smith, H. Greig, M. D'O. Musgrove, F. C. Kingston. **Executive staff:** B. Samuel (manager), E. C. Churchward, E. H. Rosman, H. T. Simmons. **Production and announcing staff:** F. A. Atkinson, R. Gledhill, B. Carter, Miss J. Robertson, L. Lewis. **Technical staff:** N. Parker, G. Butterfield, C. Robson, J. Canavan. **Sales staff:** E. C. Churchward, E. L. Gower, K. P. Hayward, C. Giraud. Total full time staff: 22.

Representatives: Melbourne, B. Rieusset, A.P.A. Building, 379 Collins Street. Sydney, K. Coughlin, Warwick Building, 15 Hamilton Street.

Daily transmission hours: Monday to Friday, 7 a.m. to 10.30 a.m., 2 p.m. to 3 p.m., 6 p.m. to 11 p.m. Saturday: 7 a.m. to 10.30 a.m., 6 p.m. to 11 p.m. Sunday: 2 p.m. to 5 p.m., 6 p.m. to 10.30 p.m.

Recording facilities: At station.

Transmitter: Philips' Lamps (A/sia) Pty. Ltd.

Studio equipment: Philips' Lamps (A/sia) Pty. Ltd.

Type of aerial system: "T" type.

6KG KALGOORLIE.

Operator: Goldfields Broadcasters (1933) Ltd., 209 Hannan Street, Kalgoorlie, Western Australia. Location of studios: Kalgoorlie. Location of transmitter: Parkston, two miles N.E. of Post Office. Licensed and operating power: 500 watts. Wavelength: 248 m. (1,210 KC.).

Commenced operations: September 16, 1931.

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

Station Particulars (contd.)

6ML PERTH.

Operator: W. A. Broadcasters Ltd. Studios: Lyric House, Murray Street, Perth. **Transmitter:** Lyric House, Murray Street, Perth. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 265 m. (1,130 KC.).

Commenced operations: March 19, 1930.

Directors: H. B. Jackson, K.C., C. P. Smith, H. Greig, M. D'O. Musgrove, F. C. Kingston. **Executive staff:** B. Samuel (manager), E. C. Churchward, E. H. Rosman, H. T. Simmons. **Production and announcing staff:** E. O. Simms, R. McGregor, N. Taylor, Miss L. Berryman. **Technical staff:** M. Urquhart, J. R. Tapper. **Sales staff:** E. Churchward, E. L. Gower, K. P. Hayward, C. Giraud. Total full-time staff: 19.

Representatives: Melbourne, B. Rieusset, A.P.A. Building, 379 Collins Street, Melbourne. Sydney, K. Coughlin, Warwick Building, 15 Hamilton Street.

Daily transmission hours: Monday to Saturday: 7 a.m. to 9 a.m., 10.30 a.m. to 12.30 p.m., 5.30 p.m. to 10.30 p.m. Sunday, 7 p.m. to 10.30 p.m.

Recording facilities: At station.

Transmitter: Philips' Lamps (A/sia) Pty. Ltd.

Studio equipment: Philips' Lamps (A/sia) Pty. Ltd.

Type of aerial system: "T" type.

6NA NARROGIN.

Operator: The Great Southern Broadcasters Ltd., Narrogin, Western Australia. Licenced power: 500 watts. Wavelength: 224 m. (1,340 KC.).

Station not in operation as at May, 1938.

6PM PERTH.

Operator: 6PM Broadcasters Ltd. Studios: St. George's House, St. George's Terrace, Perth. Transmitter: Fremantle. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 216 m. (1,390 KC.).

Commenced operations: April 22, 1937.

Network affiliation: Associated with 6AM.

Directors: Archer P. H. Whitford, F. R. Whitford, A. A. Whitford, E. I. Whitford. **Executive staff:** F. R. Whitford (managing director), D. White (secretary), N. Thomas (asst. secretary). **Production and announcing staff:** H. Wells, Juan Cortez, C. Muhling, Goff. Carter, M. Powell, M. Ruck, Edith Broad, H. Hay. **Technical staff:** F. Tredrea (chief engineer), W. Phipps, R. Choate. **Sales staff:** J. Tozer, W. Fuhrman, J. P. Patton. Total full-time staff: In conjunction with 6AM, 27.

Representatives: Sydney, P. A. Morse, 102 Sussex Street. Melbourne, Hugh Anderson, Poster House, 130 Exhibition Street.

Daily transmission hours: Monday to Friday, 6.30 a.m. to 9 a.m., 12 noon to 2 p.m., 4.30 p.m. to 10.30 p.m. Saturday, 6.30 a.m. to 9 a.m., 12 noon to 12.45 a.m. (Sun.). Sunday, 8.30 a.m. to 12.30 a.m., 5.30 p.m. to 10 p.m.

6PM PERTH (Continued).

Transmitter: 6PM Broadcasters Ltd., 200 watts, high level modulation.

Studio equipment: 6PM Broadcasters Ltd., and Colville Wireless Equipment Co. Pty., Ltd.

Type of aerial system: Marconi quarter-wave.

Programme production facilities: Two studios, audition room, extensive library, etc.

Radio clubs and membership: Willie Weeties Club (4,200), Happy Hour Club.

6PR PERTH.

Operator: Amalgamated Wireless (A/sia) Ltd. (Owned by Nicholson's Ltd.). Studios: 86-90 Barrack Street, Perth. Transmitter: Applecross Radio Station (six miles from Perth). Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 341 m. (880 KC.).

Commenced operations: October, 1931.

Network affiliation: Macquarie Broadcasting Network.

Directors: H. P. Downing (chairman), A. H. Dickson, E. M. Barker, J. L. Paton, J. D. Stodart. **Executive staff:** T. St. John Kennedy (manager). **Production and announcing staff:** E. Parrant, A. Kurts, B. Hender, Miss N. Wilke, Mrs. D. James, Miss M. Slater, P. Mantle.. **Technical staff:** W. Rodda, W. Peterson. **Sales staff:** E. A. Lovegrove, R. Hender, A. Kurts. Total full-time staff: 12.

Representatives: Macquarie Broadcasting Network, 29 Bligh Street, Sydney and 37 Queen Street, Melbourne.

Daily transmission hours: Week-days, 7 a.m. to 11 a.m., 5.30 p.m. to 10.30 p.m.; Sunday, 9 a.m. to 1 p.m., 7 p.m. to 10 p.m.

Recording facilities: At station.

Transmitter: A.W.A. type—Class "B" modulated, final stage water cooled linear.

Aerial system: Cage type, inverted L.

Production facilities: Own recording apparatus. Up-to-date studio equipment.

Radio clubs and membership: 6PR Listener's Club (1,400).

6WB PERTH.

Operator: W.A. Broadcasters Ltd. **Studios:** Lyric House, Murray Street, Perth. **Transmitter:** Katanning, W.A. Licensed power: 2,000 watts. Operating power: 2,000 watts. Wavelength: 280 m. (1,070 KC.).

Commenced operations: September, 1936.

Network affiliation: Major network.

Directors: H. B. Jackson, K.C., C. P. Smith, H. Greig, M. D'O. Musgrove, F. C. Kingston. **Executive staff:** B. Samuel (manager), E. Churchward, E. H. Rosman, H. T. Simmons. **Production and announcing staff:** R. Gledhill, L. Lewis. **Technical staff:** N. C. Greer, C. Sirl, A. Spooner, D. Wood. **Sales staff:** E. C. Churchward, E. L. Gower, K. P. Hayward, C. H. Giraud. Total full-time staff: 22.

Representatives: Melbourne, B. Rieusset, A.P.A. Building, 379 Collins Street, Melbourne. Sydney, K. Coughlin, Warwick Building, 15 Hamilton Street.

(Continued overleaf.)

Station Particulars (contd.)

6WB PERTH (Continued).

Daily transmission hours: Monday to Saturday: 6.30 a.m. to 8.30 a.m., 11.30 a.m. to 1.30 p.m., 6 p.m. to 10.30 p.m. Sunday: 1 p.m. to 5 p.m., 6 p.m. to 10.30 p.m.

Recording facilities: At station.

Transmitter: Philips' Lamps (A/sia) Pty. Ltd.

Studio equipment: Philips' Lamps (A/sia) Pty. Ltd.

Type of aerial system: "P" type, quarter wave, counterpoise.

7BU BURNIE.

Operator: The Burnie Broadcasting Service Pty. Ltd. Studios: Wilson Street, Burnie, and Devonport. Transmitter: Wilson Street, Burnie. Licensed power: 200 watts. Operating power: 200 watts. Wavelength: 455 m. (660 KC.).

Commenced operations: October 19, 1935.

Network affiliation: Findlay's Tasmanian Network, and Macquarie Broadcasting Network.

Directors: A. P. Findlay, P. A. Findlay, A. D. Towner. **Executive staff:** Arthur D. Towner (general manager), A. P. Findlay (managing director). **Production and announcing staff:** Basil O'Brien, Betty Raymond. **Technical staff:** Tasman Lord, James Trethewie. **Sales staff:** Trevor Brain, Francis Holmes. Total full time staff: 8.

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

7BU BURNIE (Continued).

Daily transmission hours: 7 a.m. to 9 a.m., 11 a.m. to 2 p.m., 5 p.m. to 10.30 p.m.

Recording facilities: At associate station, 7LA Launceston.

Studio equipment: Findlay's Pty. Ltd., Tasmania.

Studio equipment: Findlay's Pty. Ltd., Tasmania.

Type of aerial system: Inverted "L" grounded Marconi.

Production facilities: Modern concert studio. Grand piano and organ.

Radio clubs and membership: Sunpolishers' Club (5,756), Women's Club.

7DY DERBY.

Operator: North East Tasmanian Radio Broadcasters Pty. Ltd. Studios: Derby. Transmitter: Derby. Licensed power, 200 watts. Operating power, 200 watts. Wavelength: 214 m. (1,400 KC.).

Network affiliation: Findlay Tasmanian Network and Macquarie Broadcasting Network.

Commenced operations: February, 1938.

Network affiliation: Findlay's Tasmanian Network, and Macquarie Broadcasting Network.

Directors: A. P. Findlay (managing director), H. G. Riley, A. D. Towner. **Staff:** H. R. Parish (manager-announcer), L. Parish (assistant), H. Riley (producer), M. F. Findlay, "Aunt Madge," V. Chappell (assistant engineer), A. D. Towner (sales representative).

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

Daily transmission hours: 7.30 a.m. to 9 a.m., 10.30 a.m. to 2 p.m., 5.30 p.m. to 11 p.m.

7EX LAUNCESTON.

Operator: 7EX Pty., Ltd. (Messrs. W. R. Rolph and Sons Pty., Ltd.). **Studios:** 74 Charles Street, Launceston. **Transmitter:** St. Leonards. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 300 m. (1,000 KC.).

Commenced operations: February 5, 1938.

Directors: W. R. Rolph, G. B. Rolph. **Executive staff:** John Devine. **Production and announcing staff:** Denis Cossins, John Wells, Max Green, Margaret O'Brien, Mercia Wayne. **Sales staff:** J. H. Wilson, Mabel Munro. Total full time staff, 20.

Representatives: Melbourne, Lez. Mather, 422 Collins Street. Sydney, Don Scott, Watson House, 9 Bligh Street.

Daily transmission hours: Monday—Friday, 6.30 a.m. to 2 p.m., 5 p.m. to 11 p.m. Saturday, 6.30 a.m. to 12 noon, 5.30 p.m. to midnight. Sunday, 10 a.m. to 4 p.m., 5.30 p.m. to 10.30 p.m.

Recording facilities: At station.

Transmitter: Transmission Equipment Pty., Ltd.

Studio equipment: Transmission Equipment Pty., Ltd.

Type of aerial system: "T," fed by transmission line.

Programme production facilities: Large record libraries, frequent transcriptions of first-class programmes, male and female continuity writers and programme arrangers.

Radio clubs and membership: Children's session (150); Women's session (130).

Station Particulars (contd.)

7HO HOBART.

Operator: Commercial Broadcasters Pty. Ltd., Hobart. Studios: 82 Elizabeth Street, Hobart. Transmitter: Mt. Nelson, 1,000 ft. above sea level. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 349 m. (860 KC.).

Commenced operations: June 1, 1930.

Network affiliation: Findlay's Tasmanian Network, and Macquarie Broadcasting Network.

Directors: Selwyn H. Findlay, Len Nettlefold, G. E. Davies. **Executive staff:** S. H. Findlay (managing director), G. BillsThompson (station manager), D. J. Clark (accountant). **Production and announcing staff:** G. Bills-Thompson, Russell Callow, A. Clayton, H. Ward, Susan Barry, Mollie Findlay, Brian Hodgman. **Technical staff:** W. Nicholas, J. Dodds, R. Brundle. **Sales staff:** J. L. Rycroft, G. Rycroft. Total full time staff: 17.

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

Daily transmission hours: 7 to 9 a.m., 10.30 a.m. to 2 p.m., 3 p.m. to 11 p.m.

Recording facilities: At station.

Transmitter: High level Class B modulation, frequency control by duplicated "cold" type crystal oscillators, and push-pull circuits throughout both audio and radio frequency stages. Designed and built in Hobart by W. R. Nicholas (chief engineer).

Production facilities: Studio amplifier equipment provided in duplicate, together with six channel mixer, and a total of six gramo. turntable units complete with mixers. Provision is made for controlling a total of five microphones as well as incoming lines. The overall performance of the equipment is up to high fidelity standards and was designed and built by the technical staff to meet the station's requirements.

Type of aerial system: Marconi "T" type with a vertical portion one $\frac{1}{8}$-wave in length working in conjunction with a short (3) wire flat top. The system is supported by two 150 ft. masts located approximately 850 ft. above sea level. The earth mat consists of 75 radial wires covering an area of approximately $2\frac{1}{2}$ acres. The antenna is fed from the transmitter by an open wire transmission line of 600 ohms impedance.

Radio clubs and membership: Children's Club (2,000); Housewives' Association (400).

7HT HOBART.

Operator: Metropolitan Broadcasters Pty. Ltd. Studios: 51 Murray Street, Hobart. Transmitter: Rosney. Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 278 m. (1,080 KC.).

Commenced operations: April 19, 1937.

Directors: Messrs. R. Young, R. Morris, B. McCann, L. McCann. **Executive staff:** R. C. Thomas (manager), Col. T. Spencer (secretary). **Production and announcing staff:** R. Vertigan, chief announcer; J. Vertigan, J.

(Continued overleaf).

Station Particulars (contd.)

7HT HOBART (Continued).

Spencer. **Technical staff:** G. Miles (chief engineer), E. Cooper, N. Stone, J. Wilson. **Sales staff:** C. J. Cross, W. Barwick. Total full time staff: 22.

Representatives: Melbourne, L. Mather; Sydney, A. L. Finn.

Daily transmission hours: 7 a.m. to 11 a.m.; 12 noon to 3 p.m.; 5.30 p.m. to 11 p.m.

Transmitter: Ashwin Transmission Co. Ltd.

Studio equipment: Ashwin Transmission Co. Ltd.

Type of aerial system: Quarter-wave Vertical Radiator.

Radio clubs and membership: Women's Association (1,450), Children's Association (1,780), Scout Troop (20).

7LA LAUNCESTON.

Operator: Findlay and Wills Broadcasters Pty., Ltd. Studios: Findlay's Building, George Street, Launceston. Transmitter: Prospect, South Launceston (four miles from studio). Licensed power: 500 watts. Operating power: 500 watts. Wavelength: 273 m. (1,100 KC.).

Commenced operations: December 13, 1930.

Network affiliation: Findlay's Tasmanian Network, and Macquarie Broadcasting Network.

Directors: Sir Ernest Fisk, Senator J. D. Millen, A. P. Findlay, N. A. Findlay. **Executive staff:** John Gough (station manager), D. L. Richardson (studio manager and chief of staff), A. E. Garrott(secretary). **Production and announcing staff:** D. Caddy, E. W. Davies, N. Young, H. Coe, H. Duncan, K. Coe, D. Lay. **Technical staff:** V. Sydes, L. Harris, R. McLean, A. Morrison. **Sales staff:** J. T. Gough, D. L. Richardson, Mrs. H. Coe. Total full-time staff: 12.

Representatives: Macquarie Broadcasting Network, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne, and A.W.A.

Daily transmission hours: 7 a.m. to 9 a.m., 10.30 a.m. to 2 p.m., 5 p.m. to 11 p.m.; 12 p.m. on Saturdays.

Recording facilities: At station.

Transmitter: A.W.A., low power modulation.

Type of aerial system: Marconi.

Radio clubs and membership: Juvenile Club (2,000); Women's Association (250); Boys' Club (400).

7QT QUEENSTOWN.

Operator: West Coast Broadcasters Pty. Ltd., Studios: Conlon Street, South Queenstown. Transmitter: Conlon Street, South Queenstown. Licensed power: 100 watts. Operating power: 100 watts. Wavelength: 441 m. (680 KC.).

Commenced operations: May 29, 1937.

Network affiliation: Findlay's Tasmanian Network, and Macquarie Broadcasting Network.

Directors: L. P. R. Bean (chairman), N. A. Findlay (managing), A. E. Garrott. **Executive staff:** R. Ward (manager), A. E. Garrott (secretary). **Production and announcing staff:** Miss Peter Armstrong, F. R. Holland. **Technical staff:** L. Harris. Total full time staff: 3.

7QT QUEENSTOWN (Continued).

Representatives: Macquarie Broadcasting Services, 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

Daily transmission hours: Mondays—Fridays, 7.30 a.m. to 9 a.m., 1 p.m. to 2 p.m., 5.15 p.m. to 10.30 p.m.; Saturdays, 7.30 a.m. to 9 a.m., 5.15 p.m. to 10.30 p.m.; Sundays, 7 p.m. to 10 p.m.

Transmitter: Designed by Constructional Engineer S. V. Sydes. Built in conjunction with Stromberg-Carlson (Aust.) Ltd.

Type of aerial system: "T" type, 120 ft. masts.

Radio clubs and membership: "Peter's Sunshine Club" (800).

7UV ULVERSTONE.

Operator: Northern Tasmania Broadcasters Pty. Ltd. Studios: Town Hall Building, Reibey Street, Ulverstone, and Main Street, Devonport. Transmitter: Gawler. Licensed power: 300 watts. Operating power: 300 watts. Wavelength: 205 m. (1,460 KC.).

Commenced operations: October, 1933.

Network affiliation: C.B.N.

Directors: O. J. Walsh, T. C. Kitto. **Executive staff:** E. A. Wood (manager), G. Bray (asst. manager). **Production and announcing staff:** Stewart Edwards, Ivy Wood, Ralph Bonney. **Technical staff:** T. C. Kitto (chief engineer), R. Kinley. **Sales staff:** G. A. Bray. Total full time staff: 10.

Representatives: Sydney, C. A. Monks, Shell House, Carrington Street; Melbourne, E. A. Wood, 532 Bourke Street.

Daily transmission hours: Week days, 7 a.m. to 9 a.m., 11 a.m. to 2 p.m., 5 p.m. to 10.30 p.m.; Sundays, 10 a.m. to 2 p.m., 5 p.m. to 10.30 p.m.

Transmitter: Low level modulated.

Studio equipment: Designed by station engineers. Parts A.W.A. and Transmission Equipment Pty. Ltd.

Type of aerial system: "T."

Production facilities: 78 and 33 1/3 motors. Playwright and a cast of studio players.

Radio clubs: Koala Club (for children).

MARINE STATION 9MI (Short Wave)

Operator: McIlwraith McEacharn Ltd., 96 William Street, Melbourne. Studios: on board Motor Vessel "Kanimbla". Transmitter: on board Motor Vessel "Kanimbla".

Licenced power: 50 watts, aerial rating. Wavelength: 11,710 KC. (25.619 m.) and 6010 KC. (49.917 m.).

Commenced operations: Leaving Belfast, April 25, 1935.

Production and announcing staff: Eileen M. Foley, Announcer in Charge. Technical staff: Wireless Officer A.W.A., Mr. Robinson and Mr. John Curry, Electrical Engineer on board. Total full time staff: Two.

Daily transmission hours: Approximately 4 broadcasts weekly.

Transmitter: A.W.A.

Programme production facilities: Music by "Kanimbla" Quartette and recorded library of 2,000.

AUSTRALIAN COMMERCIAL BROADCASTING NETWORKS

The development and formation of network broadcasting systems was a notable feature of commercial radio in Australia during 1937 and the early part of 1938. Networks coming into prominence during this period included the Commonwealth Broadcasting Network (C.B.N.), the Macquarie Broadcasting Network (M.B.N.), the Major Network, the Findlay Tasmanian Network, "The Argus" Network, the Victorian Broadcasting Network, and "The Advertiser" Network. With the many stations affiliated with Amalgamated Wireless (A/sia) Ltd., virtually forming still another network, comparatively few "independent" or non-network stations remain.

Following are some details of the known network formations as at July 30, 1938.

"ARGUS" BROADCASTING NETWORK
(Victoria).

Headquarters: 365 Elizabeth Street, Melbourne. N. S. Sheppard, superintending manager.

Network comprises: 3UZ Melbourne (key station), 3SR Shepparton, 3YB Warrnambool and 3UL Warragul.

Sydney representative: A. D. Bourke 5-7 Barrack Street, and C.B.N. 49 Market Street.

A.W.A. ASSOCIATES
(Australia).

Headquarters: 47 York Street, Sydney. Manager, Broadcasting Division A.W.A., V. M. Brooker.

Associates comprise:—

New South Wales: 2CH Sydney, 2GF Grafton, 2GN Goulburn, 2AY Albury.

Victoria: 3BO Bendigo.

Queensland: 4CA Cairns, 4TO Townsville, 4WK Warwick, 4PM Port Moresby.

Tasmania: 7LA Launceston.

Fiji: VPD2 and ZJV Suva.

World experimental broadcasting stations: VK2ME Sydney, VK3ME Melbourne, and VK6ME Perth.

COMMONWEALTH BROADCASTING NETWORK
(Australia).

Headquarters: State Building, 49 Market Street, Sydney. General manager of key station, C. F. Marden.

Network comprises:—

New South Wales: 2UW Sydney (key station), 2HD Newcastle, 2BS Bathurst, 2WG Wagga, 2TM Tamworth.

Victoria: 3UZ Melbourne (Victorian key station), 3SR Shepparton, 3UL Warragul, 3YB Warrnambool.

Queensland: 4BC Brisbane (Queensland key station), 4SB Kingaroy, 4GR Toowoomba, 4ZR Roma, 4MB Maryborough, 4RO Rockhampton, 4VL Charleville, 4AY Ayr, 4AT Atherton.

South Australia: 5KA Adelaide, 5AU Port Augusta.

Tasmania: 7UV Ulverstone.

Melbourne representative: Peter Sullivan, "Alkira House," 18 Queen Street.

EMPIRE STATE NETWORK
(New South Wales.)

Headquarters: Shell House, Carrington Street, Sydney. Network sales manager, C. A. Monks.

Network comprises: 2HD Newcastle, 2MO Gunnedah, 2PK Parkes, 2MG Mudgee, 2BE Bega, 2QN Deniliquin. Formed 1938.

FINDLAY TASMANIAN NETWORK
(Tasmania).

Headquarters: 80-82 Elizabeth Street, Hobart.

Network comprises: 7HO Hobart, 7BU Burnie, 7QT Queenstown, 7LA Launceston, 7DY Derby.

Representatives: Macquarie Broadcasting Services, Pty., Ltd., 29 Bligh Street, Sydney, and 37 Queen Street, Melbourne.

MACQUARIE BROADCASTING NETWORK
(Australia).

Headquarters: 29 Bligh Street, Sydney. Executive Director: F. Daniell; Director of Broadcasting Services, H. G. Horner; Network Sales Manager, G. H. Anderson.

Network comprises:

Federal Capital Territory: 2CA Canberra.

New South Wales: 2GB Sydney, 2UE Sydney, 2HR Hunter River, 2WL Wollongong.

Victoria: 3AW Melbourne, 3HA Hamilton, 3TR Sale, 3SH Swan Hill.

Queensland: 4BH Brisbane (associate).

South Australia: 5DN Adelaide, 5RM Renmark.

Western Australia: 6PR Perth, 6KG Kalgoorlie.

Tasmania: 7HO-QT Hobart and Queenstown, 7LA-DY Launceston and Derby, 7BU Burnie.

Representatives: Sydney, Macquarie Broadcasting Services Pty., Ltd., 29 Bligh Street; Sales Executives, E. H. Brewer, R. Heath. Melbourne, Macquarie Broadcasting Services Pty., Ltd., 37 Queen Street; Sales Executives: L. G. Mather, L. W. Stelling.

Formed 1938.

(Continued overleaf).

AUSTRALIAN COMMERCIAL BROADCASTING NETWORKS

(Continued from Page 215.)

MAJOR NETWORK
(Australia).

Headquarters: 36 Flinders Street, Melbourne.
Network comprises:—
Victoria: 3DB Melbourne, 3LK Lubeck.
New South Wales: 2CH Sydney, 2KO Newcastle.
Queensland: 4BK Brisbane, 4AK Oakey.
South Australia: 5AD Adelaide, 5PI Crystal Brook, 5MU Murray Bridge, 5SE Mt. Gambier.
West Australia: 6IX Perth, 6WB Katanning.
Sydney representative: I. Phillips, Warwick Building, Hamilton Street.

"THE ADVERTISER" NETWORK
(South Australia).

Headquarters: "The Advertiser" office, Waymouth Street, Adelaide.
Network comprises: 5AD Adelaide, 5MU Murray Bridge, 5PI Crystal Brook, 5SE Mount Gambier.
Representatives: Sydney: Fred. Thompson, Warwick Building, Hamilton Street. Melbourne: G. N. Bednall, 247 Collins Street. London: A. J. Chard, 92 Fleet Street.

THE PROVINCIAL NETWORK
New South Wales.

Headquarters: Hosking House, Hosking Place, Sydney. 'Phone BW1428.
Sales Promotion Manager: H. P. Clarke. 'Phone BW1428.
Network comprises: 2GZ Orange, 2KO Newcastle, 2TM Tamworth, 2NZ Inverell, and 2LM Lismore. . .
Formed 1938.

VICTORIAN BROADCASTING NETWORK

Headquarters: 239 Collins Street, Melbourne. R. A. Fitts, general manager of 3HA-TR-SH.
Network comprises: 3HA Hamilton, 3TR Sale and 3SH Swan Hill, associated with 3AW Melbourne.
Sydney representatives: Macquarie Broadcasting Services Pty., Ltd., 29 Bligh Street, Sydney.

Macquarie Broadcasting Services Pty. Ltd.

Directors: Sir Hugh Denison (Chairman), Mr. N. L. Shaw, R. E. Denison, C. Don Service, S. S. Crick, and F. H. Daniell (Executive Director).

Advisory Directors: H. G. Horner, C. V. Stevenson.

Address: 29 Bligh Street, Sydney. Telephone: B 7887, and 37-41 Queen Street, Melbourne. Telephone F 4878. Cables: Macradio Sydney, and Macradio Melbourne.

ORGANISATION:

Head office: Executive Director, F. H. Daniell.
Director Broadcasting Services, H. G. Horner.
Director Technical Services, C. V. Stevenson.
General Sales Manager Programme Division and Deputy to Executive Director, C. Ogilvy.
Network Sales Manager, G. H. Anderson.
Secretary, G. Millar.
Assistant Manager and Accountant: R. A. Irish.

Programme Division:
Macquarie Players.
Macquarie Commercial Recordings—(Australian Record Company).
American Radio Transcription Agencies.
World Broadcasting System, Inc.
Australian Record Company.

Broadcasting Division:
Macquarie Broadcasting Network—Sales Representatives of 2GB, 2UE, 2CA, 2HR, 2WL, 3AW, 3HA, 3TR, 3SH, 4BH (Associate), 5DN, 5RM, 6PR, 6KG, 7HO-QT, 7LA-DY, 7BU.

REPRODUCING LATERAL-CUT RECORDINGS

THE lateral-cut record, in either its "instantaneous" or "processed" forms, might almost be termed the foundation upon which the broadcasting industry is built, yet it is, without a doubt, one of the least understood factors in the industry. On one hand, one hears complaints about poor quality recordings, and, on the other, complaints are heard about the lack of intelligence of those who use them. One hears, and sees, all kinds of recommendations to do this or that, but rarely hears "why." And all the time, records are being ruined, programmes spoiled and tempers frayed without any concerted effort to rectify the underlying faults or even arrive at the basic reasons for the flood of complaints.

The following article is written in an endeavour to promote a better understanding of the requirements which must be met if lateral-cut discs are to be reproduced satisfactorily. It is hoped that the information presented will not only encourage station operatives to regard the "discs" with a less jaundiced eye, but also help them to analyse their reproducing equipment with a view to eradicating any faults that may exist.

SOME very enlightening figures concerning the mechanical problems involved in the reproduction of a lateral-cut recording were presented in a World Radio Convention paper by V. M. Brooker. These figures, which may not be generally known, do much to explain why the reproduction of a "disc" is by no means such a simple matter as it appears. In short, they show that the sound track on a normal 12-inch, 78 r.p.m. record is about 650 feet long; that the average needle has a bearing diameter of about 0.003 inch when new; that the average pressure on the record groove at the commencement of a record is about 20 tons per square inch; that the average pressure is about 4 tons per square inch at the finish of a record; that the groove speed under the needle point is about 48 inches per second at the outside of the record; and that the groove speed is only 16 inches per second at the inside of the record.

Before going any further, let us summarise the above figures and consider them for a moment. First, a track 650 feet long for an almost microscopic needle point to follow; second, a pressure variation of 5 to 1; and, third, a speed variation of 3 to 1. One does not need to be an engineer to appreciate that these variables in themselves constitute a mechanical problem of the first order, and, further, one does not need to be a mathematician to see that a slight variation in the behaviour of either turntable or pickup under the widely varying load conditions represented will enormously reduce the chance of obtaining first-class reproduction of the material on the record.

The above might be termed "primary" problems, as they exist even if only a single tone of constant amplitude is engraved on the disc. Added to these are the "secondary" problems brought about by the facts that music or speech is never a single tone and is never of constant amplitude for more than a second or so at a time.

Consideration of the above factors should result in a very definite realisation of the fact that the reproduction of a lateral-cut disc is very definitely an engineering problem, and one which can only be regarded as a routine job when all of the factors outlined have been considered and taken care of. If the last does not apply, noone is in a position to say whether a recording is bad or good. Some recordings may reproduce passably well on equipment which is inherently faulty, but such a result can only be regarded as an accident and not as an indication that other recordings, which do not reproduce so well, are faulty.

Before proceeding with a detailed analysis of the various components in a record-reproducing system it will be as well to summarise these components so that they may be dealt with in a logical order. The first item to consider is the turntable used for rotation of the record as, quite obviously, the remainder of the system, however good, cannot function properly if the record is not rotated at its correct speed. The second item, surprising as it will be to many, is the record itself, or rather, the material of which it is made. Next comes the pick-up used for translations of the recorded matter into electrical impulses and in conjunction with this must be considered the input arrangement of the amplifying equipment employed. Finally, due attention must be paid to the little sliver of metal which sits in the pick-up chuck and does so much work.

Turntables and their Motive Power.

When considering the turntable and its motive power there are a number of factors which require attention. First and foremost there is the important question of average speed; unless this is capable of being accurately adjusted and maintained playing times will be out and all reproduced programme material will be off pitch. Next in importance comes the question of regulation under load. It has already been pointed out that the load imposed on the record rotating mechanism varies appreciably from beginning to end of the playing time; in addition, it must be remembered that there is a further considerable variation of load in accordance with the type of material recorded on the disc. A speech recording requires less power (generally speaking) than a musical selection and the requirements for music vary over an extremely wide range.

A further point for consideration is the question of cyclic speed variations. Variations of this nature can be totally independent of average speed and load variations and, if present, result in that exasperating form of distortion known as "wows." The problem of vibration is next in line for attention, as excessive motor vibration will result in pick-up hum and general interference with the reproduced material. Finally, some attention must be paid to the alignment of the entire assembly—

Reproducing Lateral-cut Recordings (cont.)

rotation of the record on a substantially horizontal plane will enable the pick-up needle to track at a definitely lower pressure.

The maintainence of correct average playing speed can only be ensured by choosing a first-class motor. The best insurance against trouble in this respect is to employ a fairly heavy synchronous motor with substantial and accurately aligned bearings. The nature and alignment of the bearings used plays a more important part than is generally realised, because a motor rotor which oscillates longitudinally, due to inaccurately aligned bearings, can set up as many "wows" as any gear train.

Speed regulation under load is a matter for both the motor and turntable. A good motor, with adequate reserve power, helps considerably in this respect, but will not ensure absolutely constant speed unless the turntable has a reasonable moment of inertia. The only thing that will give a turntable a satisfactory moment of inertia is **properly distributed weight**—sheer weight alone will usually only result in a ruined spindle thrust bearing. The correct place for the turntable weight is at the rim—three or four pounds extra weight in the rim of a turntable will do more to ensure speed stability than twenty pounds lumped at the centre.

Cyclic speed variations, with resultant "wows" on sustained musical tones, are caused by inaccurate motor bearing alignment (as mentioned previously) or defective gear trains. The first cause results in a continuous series of "wows" without exact periodicity, while the second will result in "wows" at multiples or sub-multiples of the turntable speed. With these two "clues" in mind, the cause of any "wows" being experienced can usually be located without difficulty and the necessary remedial steps taken in either case.

The problem of vibration is fairly involved, as it can be transmitted to the pick-up in two ways—through the motor board or through the turntable. Vibration transmission through the motor board can usually be eliminated by spring or rubber mounting of the motor on a **heavy** board—the word "heavy" is emphasised because there seems to be a fairly widespread impression that spring or rubber mounting alone will do all that is necessary. A point to be remembered here is that the spring mounting of the motor should not be too loose, otherwise the drag caused by heavy musical passages will tend to be taken up by the motor mounting and result in a rather nasty form of distortion. This means that the ideal motor mounting will be comparatively stiff horizontally in order to avoid trouble of this nature.

Vibration transmitted directly through the turntable constitutes a somewhat more difficult problem. If a well-balanced motor and a smooth gear train are used, very little trouble will be evident from this source, but such an ideal set of circumstances do not always exist, and some way to overcome the difficulty must be found. The most satisfactory means of stopping turntable vibration is undoubtedly a friction drive. A rim drive is one way of providing this and a belt drive is another; both of these methods are popular in recording equipment because they also eliminate the necessity for using a gear train. It is suggested that a combination belt and rim drive, together with a fairly heavy rim-weighted turntable, will provide a most effective way out of most of the troubles to which record rotating mechanisms are heir.

An arrangement such as that outlined above will not always be practicable, however, and the station operative would prefer some system of vibration insulation which will enable him to use his present equipment. Such a method is illustrated in Figure 1, and proves quite effective in practice. It necessitates removal of the turntable drive spindle from the motor, drilling it, and inserting a steel pin, as shown. A metal collar to fit the spindle snugly at the pin level must then be turned up and a channel cut on its underside to fit the pin. A felt or rubber washer, the same size as the collar, is then placed on the spindle, and the turntable placed on top of the washer. If the turntable spindle is of the tapered variety, the level of the pin and supporting collar should be so arranged that the turntable is lifted very slightly off its taper—just enough to prevent the spindle from driving the turntable directly but not enough to introduce appreciable side-play. This simple expedient will effectively reduce turntable vibration in the vast majority of cases, but if the vibration still persists it will be necessary to ream out the turntable hole sufficiently to take a rubber or felt sleeve which will completely insulate the spindle from the turntable; the drive will then be entirely through the felt or rubber washer under the turntable hub.

The final requirement, that of accurately levelling the turntable, is also rather important. The points to bear in mind here are that if the record is canted only slightly to one side with relation to the pick-up arm, the needle cannot sit squarely into the groove, while if the turntable is canted longitudinally with relation to the pick-up arm the needle angle is going to vary from the pick-up designer's original intention. In both cases, the record or the reproduction or both are going to suffer, especially in the case of a tilt to one side because this will usually necessitate extra weight to keep the pick-up needle in the groove.

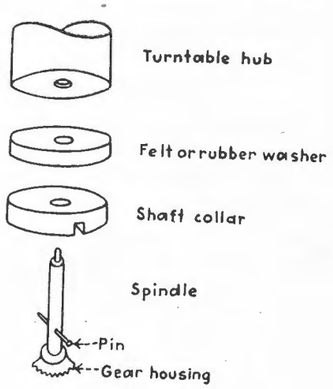


FIGURE 1.

The above remarks on turntable levelling have assumed that the pick-up is also mounted on a horizontal plane. Obviously it is of no use levelling the turntable if the pick-up is canted or mounted at the wrong level (i.e., too high or too low). To overcome any difficulties in this direction a check should be made on the pick-up mounting and care taken to ensure that the pick-up head is parallel to the surface of the record when reproduction is being effected.

The Record Material.

It is safe to say that a very large percentage of disc reproduction troubles are caused by a total lack of appreciation of the difference between "instantaneous" and "processed" records. To many station operatives, records are just records, and it never occurs to them that there are enormous differences in the materials employed for various types of recordings. As a result it is quite common to find a standard shellac pressing being taken off a turntable and replaced by a spot recording on acetate without any other adjustment than merely changing the pick-up needle—and then not always changing it for a different type,

Reproducing Lateral-cut Recordings (cont.)

In many cases this state of affairs is caused by sheer carelessness (or perhaps "indifference" might be a better word) and in others, ignorance is to blame. Whatever the reason, it is bad business, both for the station and the unfortunate sponsor, as the listener to-day is quick to react to persistently high noise level and distorted reproduction.

Two points must be remembered when dealing with "acetate" and "shellac" discs. The first is that "shellac" is hard and "acetate" is relatively soft, and the second is that shellac pressings contain a percentage of abrasives while acetate discs are entirely free from abrasives of any kind.

The relative hardness of the two classes of material means that an appreciable variation in pick-up weight is usually required for best reproduction from discs of either material. While a pick-up can be adjusted to reproduce satisfactorily from both classes of disc, it is normally found that better results are obtained from acetate with a pick-up which is somewhat lighter than that required for best results from shellac pressings.

The presence of abrasives in shellac pressings has quite an appreciable effect on the type of needle required for best reproduction. The function of the abrasives is to grind the needle point to fit the record grove and, consequently, a fairly heavy needle can be employed successfully.

Acetate, on the other hand, contains no abrasives and, as a result, a finer needle, which will fit the groove at the commencement of the recording, must be employed.

Summing up the above remarks, it is apparent that when a changeover from "acetate" to "shellac," or vice versa, is made, an adjustment to both pick-up weight and needle should be made. A compromise is possible if needles of the "trailing" type are available as these present both a finer point and a reduction of the effective pressure on the recording. Like any other compromise, however, the use of such needles entails some loss and in this case it is fidelity that suffers. The most satisfactory way out of the difficulty is to provide a special turntable, with a lightweight lightly-damped pick-up, for "acetate" and use only first-grade "shadowgraph" type needles. If this is not possible, some simple means of pick-up weight adjustment should be provided or, failing this, only "trailing" needles should be used when playing "acetate."

As a final note of warning—a needle that has been used on a "shellac" record, even if only to reproduce two or three bars of music, should never be used on "acetate." The abrasive in the shellac does not take long to convert the needle point into a fair imitation of a chisel and the effect of this on an acetate groove is rather disastrous.

Pick-ups, and their Operation.

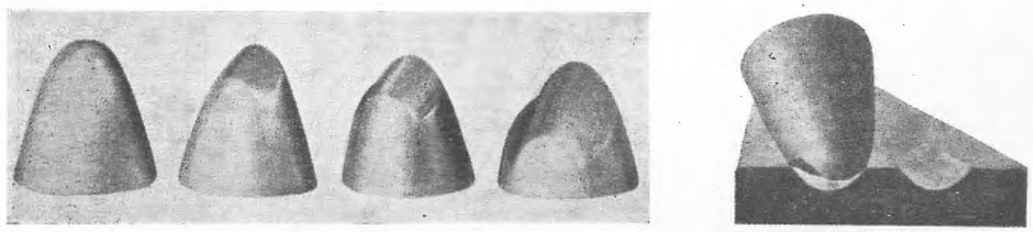
Although quite a fair amount has been said about pick-ups and pick-up mounting in the two preceding sections of this article, there is still a lot more to say.

There are two angles from which a pick-up must be considered before its suitability as a record-reproducing medium can be assessed. The first concerns its electrical characteristics and the second, its mechanical characteristics. These two are of equal importance and must be considered concurrently as they are much more closely related than is usually imagined—so much so, in fact, that the the observation that "it is not so much what a pick-up gives out as what it takes out (of the record) that matters."

The function of a pick-up is to act as an electromechanical transducer which is actuated by the engraving on a record and supplies electrical power, of wave-form corresponding to the engraving, to an amplifying circuit. This definition implies a high degree of fidelity in the translation process and a little thought will soon show that unless a pick-up is properly designed mechanically it will be incapable of even following the wave-form engraved on the record, let alone reproduce it. From this a further fact emerges—that unless it **does** follow the engraved wave-form it can do no other than damage it. This brief analysis serves to emphasise the truth of the observation quoted above and also to draw attention to the fact that record life is largely dependent upon the mechanical design of the pick-up employed.

The reason for this insistence on first-class mechanical design for the pick-up will perhaps be better appreciated if reference is made to recording technique. As is generally known the cutting head in a recorder travels in a straight line between the periphery of the disc and its centre. The guide for this straight line is, of course, the lead screw, which also ensures that the cutting head cuts a spiral groove with predetermined spacing and depth, this spiral groove being modulated by the electrically-controlled vibrations of the cutting stylus. All of these operations are carried out by precision equipment, so designed that the degree of variation from the predetermined characteristics is negligible.

At the reproducing end, a totally different set of circumstances apply. We certainly have an equivalent of the cutting head in the form of the pick-up, but here any similarity between the two processes ends. Instead of the cutting head driven by



The above illustrations show, on the left, the manner in which a needle wears when it is placed in the groove of a rotating record, and on the right, how the "chisel" edge so formed can damage the walls of the record if the pick-up is not tracking correctly.

Reproducing Lateral-cut Recordings (cont.)

a lead screw which follows a straight path across the record disc, we have the pick-up, mounted on the end of a pivoted arm, being carried across the record by the groove itself, in which it (the pick-up) is only held in place by its own weight. This would be bad enough by itself, but in addition to this it must be remembered that the very fact of the pick-up arm being pivoted means that the pick-up **must** follow a curved path across the record. A little thought will soon show that, as a result of the pick-up following this curved path, the needle will only be seated squarely in the groove at one or two points during the entire traverse; at all other times it is skewed to one side of the groove and, consequently, cannot follow the engraved sound track with complete accuracy.

This departure (usually known as "tracking error") from true seating in the groove constitutes one of the most serious mechanical problems to be contended with in pick-up design. The very fact that the needle is not seating properly in the groove means that record wear is increased enormously, if for no other reason than that additional weight is required on the pick-up in order to keep it in the groove at all.

Two methods are available by which the pick-up may be made to follow a path across the record which approximates that of the recording head (a straight line). The first is to use a very long arm and so make the circle described around the arm pivot by the pick-up so large that the portion of its circumference which corresponds to the path across the record is very nearly a straight line. This procedure is fairly effective, if plenty of space is available, as an arm having a total length of 12 inches between pivot and needle point will cause the pick-up to follow a path across a 12 in. record which only diverges by about 3/16 in. from the ideal straight line. The deviation will be somewhat greater than this on a 16 in. record, divergences of up to ½ in. being noted on a fully-recorded disc.

The use of an arm measuring 12 inches from needle-point to pivot will rarely be possible, however, because such an arm would have to be counterweighted and as a result, its total length would not be far from 16 ins. An alternative, of course, would be provided by rigidly mounting the arm at right angles to its pivot and providing a trunnion bearing for the pick-up head at a point near the end of the arm. Such a procedure would, however, make counterweighting of the pick-up head difficult and is not advisable unless a first class engineering job can be executed.

The second means by which a pick-up may be made to follow an approximately straight path across the record is to use a bent arm. This method was first suggested some years ago by Wilson and Webb, two English authorities on gramophone problems, and has found wide acceptance, although not nearly as wide as the advantages it offers would lead one to expect.

The principle of the bent arm is to offset the pick-up head by an angle approximately equal to the average angle of error which would be introduced if the head were mounted squarely on the end of the arm. Fig. 2 shows three methods of introducing the required "offset," and it should be noted that in each case the offset is such that the centre line of the pick-up head lies outside of a line drawn between the needle-point and arm pivot.

The theory of this type of arm has been completely covered elsewhere (see Wilson and Webb's text book, "Modern Gramophones and Electrical Reproducers," pages 121-132, or "Radio Review of Australia," August, 1935, pages 13-15) and need not be repeated here. Instead, we content ourselves by presenting a table of "offset" angles, for various arm lengths, which will enable tracking error to be reduced as far as is practicable. This table should be interpreted in terms of Fig. 2, where "P" is the arm pivot, "N" is the needle point, "p" is the distance between "P" and "N," and "d" is the offset angle. In connection with this last factor, it should be understood that the angle to be considered is that between the plane of the needle pivot and the line "PN." The plane of the needle pivot will almost invariably be the centre line of the pick-up head, but the point is mentioned to ensure that no misunderstanding exists.

A further factor to be considered is the distance between the record centre and the arm pivot. This, of course, varies with each arm and the correct distance is covered in the following table under the heading "C.P."

"p" inches	"CP" inches	"d" degrees
8	7.2	27.8
9	8.3	24.5
10	9.4	22.0
11	10.5	19.8
12	11.5	18.1

The correction introduced by arms bent as indicated in the above table is so great that an arm measuring only 8 inches from needle-point to pivot will track more accurately than a conventional straight arm 12 inches long. It should be noted, however, that the distance between arm pivot and record centre ("CP" in the table) is rather critical and the dimensions given should be rigidly adhered to.

By designing a pick-up arm along the lines indicated in the preceding paragraphs we will have ensured that the pick-up head will follow a track across the record which is as near as possible to a straight line. This means that one of the mechanical problems of the pick-up design is solved, but there are still others to consider.

The first of these concerns the bearings. Every pick-up must have at least two bearings; the arm pivot which allows the pick-up to be carried across the record, and a trunnion bearing which enables the pick-up head (with or without the arm, depending on the location of the bearing) to follow any slight undulations of the record in a vertical plane and also to be lifted from the record for needle replacement, etc. If a pick-up is to possess any real merit, the quality of these bearings must be of a high order.

It has already been pointed out that the pick-up head only moves across the record because it is carried by the groove. The normal function of the groove is merely to move the armature of the pick-up in accordance with the sinuousities of the engraved sound track, so that the work required to move the pick-up as a whole across the record is really an extra function which must be reduced as much as possible if record wear is to be reduced to a minimum. This extra work is made up of two components;

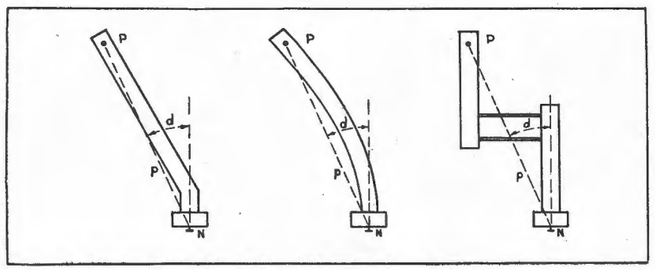


FIGURE 2.

Reproducing Lateral-cut Recordings (cont.)

the weight of the pick-up head and the friction at the pivot bearing. The weight of the pick-up head (by this we mean that nett weight on the needle point) is a quantity fixed by the pick-up type in use and the type of recording, so that the only point at which an improvement can be effected is at the pivot bearing. Consequently, friction should be reduced to the absolute minimum, by the use of a ball-race if possible, and lubrication should not be skimped. In connection with the question of lubrication, it is a rather remarkable fact that very few pick-up manufacturers trouble to lubricate the arm pivot; inspection and lubrication with a little vaseline will improve matters considerably in this respect. Finally, an excellent test for the arm pivot bearing is provided by blowing lightly on the side of the pick-up head when it is suspended clear of a record; if the bearing is as free as it should be, the pick-up will move quite easily.

The trunnion bearing is almost equally important. The function here, as pointed out previously, is to allow the pick-up to adjust itself to slight variations in record level. It follows from this that unless the trunnion bearing is quite free more weight will be required to keep the pick-up in the groove when the record level goes down, and, conversely, the groove will have to do more work when the record level goes up. Another possibility, which can arise if the trunnion bearing friction is severe, is that the effective weight of the pick-up will vary in accordance with its level. Correct lubrication, the use of a good pair of cone or ball bearings, will often work wonders at this point also.

At the other extreme, there is danger in having the pivot and trunnion bearings too loose. A little consideration will show that it is only the inertia of the pick-up head and arm which stops the whole assembly from vibrating in accordance with the groove sinuousities instead of just the pick-up armature. If the pivot and trunnion bearings are too loose, the effective inertia of the pick-up head and arm will be reduced to such an extent that the entire assembly will vibrate on loud passages and both record and reproduction will suffer accordingly. The only way to prevent such a condition arising is to use a pick-up with well-fitted arm pivot and trunnion bearings.

While on the subject of assembly vibration it is just as well to mention that the arm should be as rigid as possible and designed so that its natural resonance is either well outside of the audio range or is heavily damped. Pick-ups have been produced which make use of arm resonance to boost their response at low frequencies. Such a pick-up will prove sudden death to records and should be shunned like the plague; if bass must be lifted do it by means of an electrical equaliser—it will be far cheaper and more satisfactory in the long run.

Observance of the conditions set out above will ensure that we have a free-running pick-up assembly, free from chatter and resonances, which will follow the path of the original cutting stylus fairly accurately. The next item to consider is the armature and its associated electrical circuits.

It has already been pointed out that the inertia of the pick-up head and arm is the only thing that stops the entire assembly from vibrating in accordance with the engraved sound track. At it is, the armature only is actuated by the needle and the movement of the armature is regulated by the damping built into the pick-up and the freedom of the armature, or needle, pivot.

These two factors have a reverse action in that they also regulate the amount of power which is transmitted to the pick-up assembly from the needle and armature. From this it follows that the lighter the damping employed and the freer the needle pivot, the less will be the power transmitted to the main assembly. Consequently, its tendency to follow the armature vibrations will be reduced and less weight will be required to keep the assembly stable. This has a dual effect on the pick-up operation in that the record groove has to do less work, first in moving the needle and armature (because of the lower power losses in the damping), and second, in moving the entire assembly across the record (because of the reduced overall weight); consequently, the more complex groove sinuousities are reproduced much more accurately, simply because the more easily operated pick-up can now follow them.

There is quite a lot that can be said about the electrical design of pick-up heads but there is no particular point in saying it. The subject has recently been covered fairly fully in a World Radio Convention paper by R. Buring, and, in most cases, the station operative will purchase a pick-up head complete and attach it to an arm designed to suit his own specific requirements; the details given previously should be of material assistance when designing this arm.

In the event of a complete pick-up being purchased, the following tests should be of value as they provide a useful guide to the quality of a pick-up assembly. These tests were presented in an article entitled "Quality in Disc Reproduction," by C. J. Le Bel, which appeared in the October 1937 issue of "Electronics" (U.S.A.).

(1) Test for tracking at low frequencies, first on a 60 cycles test record and then on a record with very heavy bass (such as the Gotterdammerung Siegfried Funeral March). The tone should be smooth, with practically no chatter. If there is decided chatter, or the needle utterly fails to track, the pick-up will cause too much record wear, and is hence unsuitable. Some makers claim that there is not enough bass on a normal record to make this test worthwhile. A ruined hundred dollars' worth of the writer's records is a living disproof of this assertion.

(2) Put the pick-up on a good frequency record and plot the response. For the first test, use the needle recommended by the makers; then repeat, using other needles. Pick the best curve. If the response rises appreciably in the bass, reject the unit if a magnetic. Other grounds for rejection are a deep valley or strong peak around 250—300 cycles (excessive arm resonance) or a **strong** resonance peak between 3,000 or 6,000 cycles (armature or crystal resonance), Rising bass response (in a magnetic pick-up) indicates probability of rapid record wear; the excessive arm resonance, "muddy" tone in the upper bass register; and the excessive upper peak causes too much scratch. If the upper peak frequency is between 3,000 and 4,000 cycles, a strong peak will cause a peculiar form of distortion in upper treble tones.

A distinction has been made between magnetic and crystal units with regard to desirability of "built-in" bass boost. In a magnetic unit this is caused by mechanical resonance and the writer's practical experience has found it detrimental to record life. In a crystal unit, this rise is produced by the electrical nature of the crystal, is non-resonant, not harmful to record life, and can be controlled by a circuit of proper design. The bass boost built into some crystal pick-ups is both too much, and of the wrong shape, but, fortunately, inexpensive electrical networks will correct this.

(3) Put the pick-up on a good heterodyne frequency record with known good wave-form and feed the output into a cathode-ray oscillograph. Some pick-ups will develop non-linearity (shown by a depression in the positive and negative peaks of the sine wave) over a band of frequencies a few hundred cycles wide, usually somewhere between 2,000 and 5,000 cycles. Such a pick-up has defective damping and will usually get progressively worse, until the reproduction all over the upper treble becomes very "woolly."

(4) Listen to the pick-up on a wide range of records.

The first reaction of many salesmen to the first three of the above four tests is that the tester is "curve crazy." Nevertheless, they should be regarded with some respect. After listening to an old pick-up for some months, any new unit **sounds** good. The tests given do not in themselves constitute infallible evidence, but some years' experience has shown that the symptoms given invariably precede a growing dissatisfaction with the unit, for the reason given. While it might be quite possible to have a unit check out all right on the first three tests, and fail to satisfy the ear; nevertheless, a unit which fails to pass these tests will never, in the long run, continue to be satisfactory.

The final point to consider in connection with the pick-up proper is its electrical response when operating in conjunction with an amplifier. It has already been pointed out that mechanical methods of equalisation are

(Continued on Page 222.)

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undesirable; consequently electrical systems should be employed. If space permitted, quite a valuable dissertation on the design of equalisers could be given, but, unfortunately, the subject is too involved to dispose of in even two or three pages and the reader is referred to any of the standard texts for any information he may require on the subject. One point that can be mentioned, however, is that the "series" type of equaliser will usually be found more satisfactory in operation than one of the "shunt" type.

Pick-up Needles.

The concluding remarks of this article on record reproduction can profitably be devoted to a few notes on needles. An excellent way of regarding the needle is as the connecting link between the record and the pick-up. Looking at it in this light, it can be seen that the needle must not only fit the record groove accurately, but it must also transmit the groove movements to the pick-up mechanism without loss or distortion if first-class reproduction is required.

To satisfy these requirements, the needle must have a carefully-shaped point and be neither too long nor too thin. The importance of the point shape will be appreciated if it is remembered that the function of the needle is merely to glide over the record groove and follow its sinuousities accurately. If the needle point is rough, friction will be high, and not only will the needle have difficulty in following the groove but serious abrasion of the groove will result. Actually, of course, abrasion occurs in any case, but it will be reduced materially if a finely-polished needle point is used. This factor has received acknowledgment of late years with the introduction of "shadowgraph" needles. These are ordinary hard needles which have been individually sorted by inspection of an enlarged projected image of each needle point. By this means, any distortion or roughness of the point can readily be discerned and only perfect needles allowed to pass.

The question of needle length and thickness is also rather important because, obviously, if the needle is too flexible, it will merely bend instead of transmitting the groove variations faithfully to the pick-up mechanism. The loss occasioned by such flexibility is most pronounced at the higher frequencies, and explains why "highs" are lost when a "soft tone" needle is used. This also explains why pick-up manufacturers are always careful to specify a certain make and type of needle when rating their products for output and fidelity.

The above remarks, taken together with previous references, should be sufficient to indicate that the "little sliver of metal which sits in the pick-up chuck" is an extremely important part of any reproducing system and must be chosen and treated accordingly.

Directory of Recording Organisations Transcription Producers, Talent, and Programme Services

Note: Certain Advertising Agencies have their own recording equipment and departments designed to produce Transcriptions, etc. Refer to Advertising Agencies handling Radio Accounts.

AMALGAMATED WIRELESS (A/SIA) LTD.

Address: 72 Clarence Street, Sydney.

Recording Equipment: A.W.A. High Fidelity.

Interstate Representatives: Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne; Mr. Roger Fair, 289 Queen Street, Brisbane; Amalgamated Wireless (A/sia) Ltd., P.O. Box 830, Wellington, N.Z.

Agents for: National Broadcasting Co., Inc., America.

Transcriptions released during 1937: "Coronets of England," "Mr. and Mrs. Everybody," "Personal Column," "Masked Masqueraders," "Ali Baba," "Our Horatio," "Blue Danube."

AMERICAN RADIO TRANSCRIPTION AGENCIES.

(See Macquarie Broadcasting Services Pty., Ltd.)

AUSTRALIAN RECORD COMPANY.

[Successors to Featuradio Sound Productions (N.S.W.) Pty., Ltd.]

Recording studios and general offices at 29 Bligh Street, with branch studios at 296 Pitt Street and factory for the processing of all types of sound on disc records at Nos. 2-8 Harrington Street, Sydney (B 5213).

Directors: N. L. Shaw (Chairman), Chas. H. Gendle (General Manager), F. Daniell, M. H. Stevenson. Secretary, R. H. Wolff.

EQUIPMENT:

Recording: Studios are equipped with every modern appliance for securing high quality sound recording and reproduction. By reason of the Company's association with the Macquarie Broadcasting Services Pty., Ltd., many facilities are at its disposal both as regards equipment, skilled technicians, actors, artists, specialty announcers and narrators.

Factory: Plant and machinery necessary for the modern treatment of recorded master wax or discs, the making of copper matrices therefrom, and the manufacture of records in diameters 10 to 16 inches, for use on radio broadcast stations and or home entertainment.

In addition to processing recordings effected for its wide clientele, the Company undertakes the processing of records cut by other recording studios, who are not equipped for this class of work.

Following is a schedule of outstanding features forming part of the processing and pressing of records for one client, the Macquarie Broadcasting Services Pty., Ltd. (late B.S.A.). The bracketed figures represent the number of episodes, or complete productions, in the series:—

"Amateur Adventurers" (39), "Aboriginal Legends" (26), "Australia's March to Nationhood" (10), "Adventures with Jules Verne" (104), "Benefits to Mankind" (26), "Boomerang" (52), "Dream Melodies" (226), "Famous Escapes" (52), "High Frequency" (104), "Just Supposing" (15 half-hours), "Just Pilcher" (26), "It's a Great Life" (39), "Life Stories of the Stars" (52), "Leaves of Destiny" (13), "Leaves from the Other Woman's Diary" (52), "My Dream and Yours" (39), "Master of the Gobi" (78), "Nothing Ever Happens" (52), "Proverbially Speaking" (26), "The Pickwick Club" (41), "Revolution in Mexico" (128), "Radio Pie" (29), "Sulman Strikes" (52), "The Screeching Bird" (52), "The Sign of the Purple Spider" (26), "Tales Told to Peter and Pam" (60), "Twilight Melodies" (13), "The Two Jacks" (26), "Tooth and Claw" (39), "20,000 Leagues Under the Sea" (104), "This Happened in Australia" (104), "The Voice of England" (13).

For another client the following B.A.P. features have been processed and pressed:—

"Mutiny of the Bounty" (52), "The Mad Doctor" (26), "Little Women" (13), "The Black Tulip" (13), "Trilby" (13), "The Queen's Necklace" (26), "Cavalcade of Empire' (52), "Wings Above the Diamentina" (52), Lorna Doone" (52).

Records manufactured: For the 12 months under review, no less than 2,700 recordings were processed, and from the matrices thus produced 8,750 records were manufactured. These quantities refer only to feature programmes and commercial announcements for radio broadcasting purposes.

B.S.A. PLAYERS.

(See Macquarie Players.)

BROADCAST ADVERTISING PTY. LTD.

Address: 60 Hunter Street, Sydney.

Directors: C. H. Willmott (chairman), F. Daniell, G. E. Moore (managing director), E. Badgery-Parker, R. Willmott (secretary).

Recording Equipment: S.T.C., Presto and Western Electric.

Interstate Representatives: Broadcast Advertising Pty. Ltd.

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Recording, Programme and Transcription Organisations
(continued)

BROADCAST ENTERPRISES LTD., LONDON.

Directors: Oswald Anderson, E.R. Voigt, E. H. Gossling.

Studios and offices: Abbey House, Westminster, S.W.1., and at Regent Street, Piccadilly, W.1.

The exploitation of English and Continental talent programmes, etc.

BROADCAST SERVICES.

Address: Q.N. Bank Building, Cnr. George and Turbot Streets, B. 12, Brisbane.
Directors: C. R. Porter, E. A. Roush, W. Farmer.
Executive Staff: C. R. Porter (manager). J. Bentley (accountant).
Production Staff: C. R. Porter, R. MacKenzie, R. I. Mitchell.
Technical Staff: F. W. Clarkson, G. Purdey.
Sales Staff: W. P. Milne.
Talent Staff: R. I. Mitchell (plays), C. Harburg, J. Farrell, Mrs. Cross, Misses F. Chatfield, G. Davis.
Recording Equipment: Standard Presto recording installation.

CHAS. E. BLANKS PTY. LTD.

Address: Kelvin House, 15 Castlereagh Street, Sydney.
Directors: Charles Edward Blanks, managing director.
Executive Staff: Charles C. King, manager, recording department.
Production Staff: Albert Russell, Jack Davey, Miss A. Evesleigh.
Technical Staff: Charles C. King, D. Stacey Green, Trevor Green.
Sales Staff: J. T. Gell.
Talent Staff: Cecil L. Scott.
Recording Equipment: Four Stage P.P. Recording Amplifiers on standard racks with associated mixers and faders. "Presto" Commercial Recorders, Amperite and Brush Crystal Microphones.
Interstate Representatives: Monks and Blanks Ltd., Adelaide, S.A.

COLUMBIA GRAPHOPHONE (AUST.) PTY. LTD.

Address: 2 Parramatta Road, Homebush, N.S.W.
Director: W. A. Donner (managing director).
Executive Staff: J. M. Burnett (secretary).
Sales Staff: C. F. Tyler (sales manager).
Technical Staff: R. V. Southey (recording manager).
Recording equipment: Columbia.
Transcriptions released during 1937: "The Mystery Club," "Dad and Dave," and recordings were also carried out for Kraft Walker Cheese Co., Ever Ready Co. (Aust.) Ltd., Pond's Extract Co. Inter. Ltd. Kolynos Incorporated Australian Broadcasting Commission, Beale and Co. Ltd., Tea Market Expansion Bureau, R.K.O. Radio Pictures, United Australia Party, Australian Editorial Business and Publishing Co. ("Women's Weekly"), Institution of Radio Engineers (World Radio Convention), Australian Labour Party, Department of Education—Government of New South Wales, Kellogg (Aust.) Pty. Ltd., Bushell's Ltd.

Recording, Programme and Transcription Organisations (contd.)

DIAMONDPOINT SERVICES PTY. LTD.

Address: 83 Pitt Street, Sydney.
Directors: J. H. Barker, Junr., and M. E. Somerville.
Interstate Representatives: L. H. Lemaire, Box 1121, G.P.O., Melbourne, Vic.
Agents for: Associated Music Publishers, Inc., New York City.
Transcriptions released during 1937: Diamondpoint Libraries to 2UW, 3DB, 4BK, 5AD, 6IX.

DU MAURIER PRODUCTIONS PTY., LTD.

Address: 201 Macquarie Street, Sydney, N.S.W. 'Phone FU 8677. Telegraphic address: Du Maurier, Sydney. Managing director: Northey Du Maurier. Director: Isabel Du Maurier. Producer: Ellis Price.
Overseas Representatives: Michaelson and Sternberg, New York; All Canada Radio Facilities, Calgary, Canada; Broadcast Enterprises, Abbey House, Westminster, London.
Transcriptions released during the past 12 months include: "Robin Hood," "The Tale of Two Cities," and "The Double Event."

FEATURADIO SOUND PRODUCTIONS PTY., LTD.

Address: "Featuradio House," 32 Market Street, Melbourne. C.1 Vic.
Directors: George Sutton (managing director) and J. M. Sayer. **Executive staff:** W. H. Berry (general manager). **Production staff:** John Ormiston Reid (staff producer and script writers. **Technical staff:** R. Roseblade.

FEATURADIO SOUND PRODUCTIONS PTY., LTD. (Continued.)

Transcriptions released for broadcast during 1937: "The Jade Spider," "7.30 Victoria," "New Guinea Patrol," "Swiss Family Robinson," "Crashed in the Jungle," "Victoria of England," "Daisy and Danny," "David Copperfield," "Ghosts of the Tower," "Grand Hotel."

FIDEL-A-TONE SOUND PRODUCTIONS.

Address: Druids' House, 407/9 Swanson Street, Melbourne, Vic.
Director: John Murray.
Recording Equipment: Presto with R.C.A. accessories.

FIDELITY RADIO PTY., LTD.

Address: State Shopping Block, 49 Market Street, Sydney. 'Phone: MA5928. Transcription agency.

LEGIONNAIRE SOUND PRODUCTIONS PTY., LTD.

Address: 68-70 King Street, Melbourne.
Directors: L. L. Wathen, W. T. Curnow, F. Cocks (Sydney), K. L. Corr. **Executive staff:** Managing director, K. L. Corr. **Production:** E. V. Conway.. **Associated in production:** Hal. Percy, Syd. Hollister, Jim Bradley and Reg. Stoneham. **Technical staff:** J. Stewart (chief engineer), A. Reilly (assistant) and Arthur Pyers (sound on film). **Sales staff:** Noel W. Dickson, sales manager.
Recording equipment: Dual heavy duty Presto recorders and portable equipment.

(Continued on Page 230.)

Recording, Programme and Transcription Organisations (contd.)

LEGIONNAIRE SOUND PRODUCTIONS PTY. LTD. (contd.).

Interstate representatives: T. H. Shearman, Sydney; Hudson, Adelaide; V. S. Lloyd, Wellington, New Zealand.

Victorian distributors for Presto recording equipment and supplies and Telefunken equipment, wireless receivers and gramophone records.

Transcriptions released for broadcast during 1937: "The Dark Invader," "The Rhythm Boys," "Under the Big Top," "Sons of Sandy Mac," "The Homestead on the Rise," "Rhythm Revels," "Beau Geste," "Little Man," "'Olmes and Hentwhistle," "Gold."

MACQUARIE BROADCASTING SERVICES PTY. LTD.

"Programme Headquarters"

Incorporating B.S.A. Players and American Radio Transcription Agencies.

Address: 3rd Floor, 29 Bligh Street, Sydney. Telephone: B 7887. Cables: Macradio Sydney. Melbourne Office: 37-41 Queen Street. Telephone: F 4878. Cables: Macradio Melbourne.

Executive director: Mr. F. Daniell. General sales manager and deputy to executive director: Mr. C. Ogilvy. Sales manager: Miss G. Gibson. Production liaison officer: Mr. J. Joyce. Secretary: Mr. G. Millar. Assistant manager: Mr. R. A. Irish.

Studios: 29 Bligh Street and at National Studios, Pagewood.

Disc recording equipment developed and patented by its own engineers following a world-wide investigation.

Processing and instantaneous recordings.

MACQUARIE PLAYERS.

The Macquarie Players are a group of leading radio writers and artists in Australia, and are contracted and directed by Macquarie Broadcasting Services Pty., Ltd.

OSWALD P. SELLERS.

Address: Grace Building, 77 York Street, Sydney.

Agents for: Columbia Recordings of George Edwards' Productions.

Transcriptions released during 1937: "Inspector Scott of Scotland Yard," 156 10-minute episodes; "Darby and Joan," evening session, 16 15-minute episodes; "Darby and Joan at the Breakfast Table," 156 15-minute episodes; "Famous Women," 56 15-minute episodes; "Dust of the Ages," 13 15-minute episodes; "Voice of the People," 26 10-minute episodes; "Notable British Trials," 130 15-minute episodes; "Westward Ho," 65 15-minute episodes; "William the Conqueror," 30 15-minute episodes; "Hunchback of Notre Dame," 35 15-minute episodes; "David and Dawn with George Edwards under The Southern Cross," 130 15-minute episodes; "Knights of the Round Table," 52 15-minute episodes; "The Mystery Club," 52 30-minute episodes.

RADIO THEATRE GUILD.

Studios and general office at Pacific House, 296-300 Pitt Street, Sydney. 'Phone: M 3652.

Chief instructor: Mr. Leonard Bennett.

Organiser: Mrs. J. D. Bristol.

The Radio Theatre Guild has been in operation for a number of years as a talent finding and training organisation. Macquarie Broadcasting Services Pty., Ltd. have now extended the Guild to cover not only radio but also film talent and development.

The object of the Guild is to coach students in dramatic and microphone technique, music, and all other classes of broadcasting and film work. Only students with a definite object in the course they intend to study are accepted. They are given an audition and advised according to results.

Recording, Programme and Transcription Organisations (continued)

RECAUDIO PRODUCTIONS.

Address: 7 Howard Street, Perth.

Director: W. E. Coxon.

Recording Equipment: Telefunken.

SHEARMAN, T. H. SOUND RECORDING STUDIOS.

Address: Eastern Telegraph House, 12 Spring Street, Sydney, N.S.W. 'Phone: B5525.

Equipment: "Presto."

Radio Programme Services: Commercial and private recordings. N.S.W. distributors of Legionnaire programmes.

SOUND RECORDING STUDIOS PTY., LTD.

Address: 160 Castlereagh Street, Sydney, N.S.W. 'Phone MA 4035.

Directors: R. R. Allison, H. J. Brigden, K. A. Fraser, S. E. Tatham.

Executive staff: S. E. Tatham, managing director; C. Godfrey Hill, secretary; Reg. Oxford, studio manager; Harry Howlett, production manager. **Production staff:** Miss V. Gollan, secretary; Harry Howlett, producer; Miss R. Boys, script department. **Technical staff:** R. Oxford, chief studio technical supervisor; A. I. Fraser, sound technician; A. Cornell, supervisor of process and pressing departments. Talent staff available.

Recording equipment: Universal Recording Machines and special high fidelity audio amplifiers complete with broadcast-studio-recording controls, producers' panel, equaliser panels, 10 specially balanced land-lines for inward or outward programmes and recordings. S.R.S. recordings on either acetate-instantaneous or processed discs of 10in., 12in., or 16in. size at either 33 1/3 or 78 r.p.m. cut at course, medium or fine pitch.

Processing and pressing: Complete equipment installed to handle all standard sizes of pressed records.

S.R.S. offer a "complete service" from writing of script or building of programme, supply of artists, recording, pressing, to packing and despatch of discs.

THE ADVERTISER NETWORK.

(Owned and Controlled by Advertiser Newspapers Ltd.)

Address: Waymouth Street, Adelaide, South Australia.

Manager: A. L. Holtze.

Production manager: M. D. Chapman. Casting director: K. A. Macdonald. Chief sound engineer: H. B. Wilson.

Recording equipment: Dual unit high fidelity plant for direct lateral cut or processed discs 10, 12, 16 inch, 78 and 33 1/3 r.p.m.

Studio: Semi-floating.

Features produced during 1937: "Fourth Form at St. Percys," "Carlton Club," "Liar's Club," "Magazine of the Air," "On the Spot," "Bringing up Sally," "Lord and Lumme," "Morgan the Buccaneer." Also commercial recordings.

TRANS-RADIO ADVERTISING AND PROGRAM SERVICE.

Address: 8th Floor, Asbestos House, 65 York Street, Sydney.

Directors: S. A. Maxwell, proprietor and campaign director. Ward Leopold, producer; D. M. Fegan, script writer; M. Dye, media; J. Sing, accountant; W. Harris, merchandising. **Sales staff:** G. C. Browning.

Two studios and control room fully equipped for playbacks, auditions, rehearsals, etc. (do not make records).

Transcriptions released for broadcast during 1937: "The Antique Shop by the Grand Canal." "The Fatal Tenth," "The Lamberts," "The Harmoniques," "Comedy Cameos," "The Hawkins Family," etc.

AGENCIES HANDLING RADIO ACCOUNTS

NEW SOUTH WALES.

ADSHEAD ROSE PUBLICITY PTY. LTD., 226a George Street, Sydney.

AERIAL PUBLICITY CO. LTD., Wingello House, Angel Place, Sydney, N.S.W. (See programmes services and transcription producers).

AMALGAMATED WIRELESS (A/SIA) LTD., 47 York Street, Sydney, and interstate offices of A.W.A.

ANIVITTI-SCHEY LTD., 44 Margaret Street, Sydney.

ATHOL TIER RADIO ADVERTISING SERVICE, Assembly Hall, Margaret Street, Sydney.

AUSTRAL PRESS AND ADVERTISING LTD., 1 Bond Street, Sydney.

BARTLETT, L. V. PTY. LTD., 26 O'Connell Street, Sydney, N.S.W. Radio account: Wolseley Sheep Shearing Machine Co. Pty. Ltd. (sheep shearing machines), Bristol-Myers Co. Ltd. (Mum), Major Bros. and Co. Ltd. (paints), David Dawn (mattresses), Stack and Co. Ltd. (Pontiac cars), Wolverine Lubricants (Aust.) (Wolf's Head oil), John Hunter and Son Ltd. (shoes), Paton's Products (sheep lick).

BECKETT THOMSON ADVERTISING PTY. LTD., 181 Clarence Street, Sydney.

BERESFORD, KINGSBURY CO. PTY. LTD., 247 George Street, Sydney.

CANBERRA ADVERTISING PTY. LTD., National Building, 250 Pitt street, Sydney. Executives: H. H. Miscamble (managing director). Radio accounts: Howard Auto Cultivators (rotary hoes), Williamson Croft (wallpaper), Junket Ltd. (junket), City Hatters (men's wear), Reynmor Science Laboratories (medical), Feast Watson Ltd. (paints and varnishes).

CATTS-PATTERSON CO. (N.S.W.) PTY. LTD., City Mutual Building, 60 Hunter Street, Sydney, N.S.W.

CONSOLIDATED ADVERTISING SERVICES, 44 Market Street, Sydney, N.S.W.

FOX ADVERTISING SERVICE PTY. LTD., Dalton House, 115 Pitt Street, Sydney. Executives: Matt. J. Fox (managing director). Radio account executive: Roger Welch. Radio accounts: Toohey's Ltd. (Oatmeal Stout), Fresh Food and Ice Co. Ltd. (Penguin Ice Cream), Lea and Perrins (Aust.) Pty. Ltd. (Lea and Perrins and H.P. Sauce).

GOLDBERG ADVERTISING (AUSTRALIA) PTY. LTD., Warwick Building, 15 Hamilton Street, Sydney, N.S.W. Radio accounts: Ever Ready Battery Co., Widdis Diamond Dry Cells Pty. Ltd., Sydney Cold Stores (ice skating), Australian Broadcasting Health Society (health talks), Potter and Birks (patent medicines), Felt and Textiles of Australia Ltd. (feltex), Sydney Snow Ltd. (department store advertising), Tooth and Co. Ltd. (Sheaf Stout, Resch's Waverley Bitter, Resch's Export Lager), Bear and Co. Ltd. (furniture), Nestle and Anglo-Swiss Condensed Milk Co. (A/sia) Ltd. (food products), Bi-Sodol.

GORDON AND GOTCH (A/sia) LTD., Barrack Street, Sydney. Branches at Melbourne, Adelaide, Perth, Brisbane, Auckland, Wellington, Christchurch, Dunedin and Launceston.

GOTHAM (A/SIA) LTD., Asbestos House, York Street, Sydney.

HANSEN RUBENSOHN CO., Warwick Building, Hamilton Street, Sydney. Radio accounts: Associated Sales Ltd. (Shumann's salts), Australian General Electric Ltd. (ranges, refrigerators, Mazda lamps, Hotpoint appliances, etc.), Bonkora Co. (Bonkora), Biber Furs Pty. Ltd. (Biber furs), Diamond's Pharmacies (Diamond's products), European Laboratories Ltd. (Todd's tooth powder), R. M. Hardy and Co. (Hardy's indigestion remedy), J. R. Love and Co. Ltd. (Kinkara tea, Mother's Choice flour), Samuel Taylor Ltd. (Mortein, Mary Gold essences), Newcastle Electric Supply (electrical ranges, etc.), Paget Manufacturing Co. (Lushus jellies), Frederick Stearns and Co. Ltd. (Nyal family medicines), H. R. Spencer (women's wear), Thom and Smith Ltd. (Tasma radio), Lusteroid Pty. Ltd. (Shu-Milk).

HARRY JULIUS ADVERTISING SERVICE, 16 Barrack Street, Sydney.

HAWKINS ADVERTISING, Underwood House, Hunter Street, Sydney. Executives: Eric R. Hawkins (managing director). Account executives: R. South, P. Hendricks. Radio accounts: Brico (piston rings), P. J. Taylor (engine re-conditioning), Lindsay's Chain Stores (softgoods), Sky Engineering Co. (irrigation equipment).

ILOTT, J. (Aust.) LTD., Turner House, 24 Jamieson Street, Sydney.

JONES, WYLIE B., ADVERTISING AGENCY, Barrack House, Barrack Street, Sydney, N.S.W. Radio accounts: Clinton Williams Products (18), Eichorn's Remedies, Airzone (1931) Ltd. (radio), Eye Culture, Membrosis.

LEN MAURICE ADVERTISING, Challis House, 10 Martin Place, Sydney.
Secretary, G. Smith; Proprietor, Len Maurice.
Recording facilities used: B.A.P., A.W.A., B.S.A., Columbia.
Broadcast Advertising Accounts: Morley Johnsons Ltd. (furniture), The Conklin Pen Co. (pens and pencils), Chas. Blainey (tailor), Matron Walker (health treatment), Anderson and Co. (seeds and plants), R. C. Hagon Ltd. (tailors), Royal Art Furniture Co. (furniture), Hotel Astra (hotel), Sydney Snow Ltd. (general), Richmond Brewing Co. (N.S.W.) Pty., Ltd. (beer), Dowd Corest Co. (corsets), Hordern Bros. (general), Minahan Bros. (boots and shoes).

LEONARD, F. P., 156 Castlereagh Street, Sydney. Executives: J. McCallum (accountant). Account executive: F. P. Leonard. Radio accounts: D. and W. Murray Ltd. (Gripu trousers, Challenge blankets, British Chief and Murralta fabrics, Challenge flannel), Ford Sherington Ltd. (Globite, Regal and Airway cases), R. H. Armstrong and Co. Pty. Ltd. (Steelo, Queen Bees wax), Joyce Biscuits Ltd. (biscuits), Walter Cavill Pty. Ltd. (Cascade ale), Swift and Co. Pty. Ltd. (liquors), Thomson Bros. Pty. Ltd. (Selecta sewing machines).

McCARTHY-MacVEIGH ADVERTISING SERVICE, 310 George Street, Sydney, N.S.W. Radio accounts: Leipzig Trade Fair, Webster Jack and McDonald, Australian School of Radio Engineering.

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Agencies Handling Radio Accounts

(Continued from Page 232).

MARSH LTD., 44 Margaret Street, Sydney.

NATIONAL MERCHANDISERS PTY. LTD., 60 Hunter Street, Sydney.

O'BRIEN PUBLICITY COMPANY, 56 Young Street, Sydney. Executives: Edward H. O'Brien. Radio accounts: C. C. Wakefield and Co. Ltd., Felt and Textiles of Australia Ltd., Foley Bros. Pty. Ltd., British General Electric Co. Pty. Ltd., Lak-Mak (A/sia), W. and A. Gilbey Ltd., Swallow and Ariell Ltd., Zanic Pty. Ltd.

PATON ADVERTISING SERVICE PTY. LTD., THE Stanton House, 133 Pitt Street, Sydney.

PATTERSON, GEORGE PTY. LTD., Turner House, 24 Jamieson Street, Sydney.

PERCIVAL, J. B. PUBLICITY CO., Margaret and York Streets, Sydney.

POWELL, R. K., 58 Margaret Street, Sydney. Radio accounts: Interstate Steamship Owners' Federation, W. H. Gurton Tyre Co. Ltd., Tolley, Scott and Tolley Ltd. (Tolley's T.S.T. Brandy).

PUBLICITY SERVICES, Assembly Hall, Margaret Street, Sydney.

REUTER'S LTD., 66 Pitt Street, Sydney (head office for Australasia). Head office: Thames Embankment, Blackfriars, London. Branches and agencies throughout the world. Interstate branches: 406 Collins Street, Melbourne; Eagle Street, Brisbane; Brandon House, Featherston Street, Wellington.

RICHARD GRAVES PTY. LTD., Woodstock Chambers, 88 Pitt Street, Sydney. Executives: Rodney Evans (media manager and all radio advertising), Nancy Musgrove (copy and feminine appeal), Richard Graves (sales and advertising plans). Recording facilities used: Haele Seal Services. Radio accounts: O. K. Elliott's Pty. Ltd. (furniture), Cerebos Ltd. (Sava Salt and Bisto), The Clyde Engineering Co. (Clyde batteries and Clyde Lawana).

SAMSON CLARK PRICE-BERRY PTY., LTD., 73 Pitt Street, Sydney.

SELLERS, O. P., 30 Grosvenor Street, Sydney.

SHIELD ADVERTISING SERVICE, Royal Exchange, 54a Pitt Street, Sydney.

SMITH, W. E. LTD. (merchandising and sales promotion division), 310 George Street, Sydney. Executives: W. G. Campbell (sales manager), J. G. Woods (manager, merchandising and sales promotion division). Radio account executives: Murray Evans (media manager). Radio accounts: Nettleton Son and Co. (Netsonia mattresses and lounge suites), Lockett Bros. (Amaki sauce), New Feet Ltd. (footwear), Brent-Windeyer and Co. ("Will-Kill" ant destroyer), Russell Pontifex and Co. (dress lengths), G. J. Miller (real estate).

SMYTH, ARTHUR & SONS, London Bank Chambers, 18 Martin Place, Sydney.

SPECIALTY PUBLICATIONS & SALES PROMOTION CO. LTD., A.M.P. Chambers, Hunter Street, Newcastle.

STANDARD ADVERTISING & PRINTING CO., 46 Holt Street, Surry Hills, Sydney.

THOMPSON, J. WALTER (AUST.) PTY. LTD., Asbestos House, 65 York Street, Sydney. 'Phone B7707. Directors: S. Beardsley Dobbs (managing), E. L. Jarvis, W. A. McNair, H. W. Chancellor. Secretary and research manager: W. A. McNair. Radio manager: E. R. Webster. Art director: Reginald Walker. Senior copywriters: A. N. Weekes, E. J. Moloney. Media manager: T. R. Carruthers. Branch: Albany Court, 232 Collins Street, Melbourne. 'Phone, Central 5619 (Manager, E. L. Jarvis), Radio accounts: Bond's Industries Ltd. (athletic singlets, hosiery, etc.), Jantzen (Aust.) Ltd. (swimming suits, etc.), Kellogg (Aust.) Pty. Ltd. (corn flakes, All-bran, etc.), Kraft Walker Cheese Co. Pty. Ltd. (cheese, Bonox, etc.), Pond's Extract Co. (face creams, powder, etc.), Taubman's Ltd. (paints), Wrigley's (A/sia) Pty. Ltd. (chewing sweets), Max Factor (cosmetics).

TRANSRADIO ADVERTISING AND PROGRAM SERVICE, 8th Floor, Asbestos House, 65 York Street, Sydney.

Campaign Director and Proprietor, S. A. Maxwell; Producer, Ward Leopold; Script Writer, D. M. Fegan; Media, M. Dye.

Recording facilities used: Columbia, A.W.A., 2GZ, Featuradio, Shearman.

Broadcast Advertising Accounts: Elliotts and Australian Drug Pty., Ltd. (Clements Tonic), A.C.A. Pty., Ltd. (A.C.A. Lines), R.A.C.A. (R.A.C.A. Service), Independent Oil Industries Pty., Ltd. (Purr-Pull), British General Electric Co. Pty., Ltd. (Genalex), W. H. Lober and Co. Ltd. (Oldsmobile), Cereal Foods Ltd. (Vita-Brits), Purina Grain Foods (Crispies).

UNSTED JACKSON & HAINES LTD., Lisgar House, 30 Carrington Street, Sydney.

WESTON CO. PTY. LTD., THE, Chamber of Commerce Building, 36 Grosvenor Street, Sydney. Executives: W. O. Richards (managing director). Radio account executive : A. D. Hannam. Recording facilities used : Columbia, Featuradio.

Radio accounts : Australian Soaps Ltd. (Early Morn soap), Lewis Berger and Sons Pty. Ltd. ("10-66" Paint products), James Barnes Ltd. (Globex extract), Becker's Ltd. (Bex A.P.C.), Commercial Discounters (Adelaide) Ltd. (loans), Marvel Racing Final (Jack Cooper) (racing service), R. H. Gordon and Co. Ltd. (furniture and cash orders), Hoffnung and Co. Ltd. (Mosely cutlery, Gem razors and blades), David Jones Ltd. (sales, etc.), Inglis Ltd. (Goldenia and Billy tea), Kleener's Ltd. (Kleen-shine, Kleen-bath, Kleen-hands), Lambert Pharmacal Co. Ltd. (Listerine toothpaste), Matthew Thompson and Co. Ltd. (Gold Crown lino. polish), McWilliam's Wines Pty. Ltd. (wines), N.S.W. Monte De Piete D. and I. Co. Ltd. (loans), Parson's Bros. Pty. Ltd. (Saline powder), John Paynter's Ltd. (hardware), Pick-Me-Up Condiment Co. Ltd. (P.M.U. products), Rogers Paint and Varnish Co. Ltd. (paints), Scott and Bowne Ltd. (Scott's emulsion), Washington H. Soul, Pattinson and Co. Ltd. (prescriptions and Carlista salts), Tarzan Grip Manufacturing Co. Ltd. (Tarzan's Grip), Sherwin Williams Ltd. (paints), Tillock and Co. Ltd. (baking powder), Warman's Ltd. (groceries), Wawn's Laboratories Ltd. (Wawn's Wonder Wool), Radio Health Service (services), Jessica Harcourt (beauty preparations), Australia's 150th Anniversary Celebrations Council (Australia's 150th Anniversary Celebrations).

WHITE, A. N. PTY. LTD., A.C.A. Building, King and York Streets, Sydney. Executive: W. A. McDermott (managing director). Radio account executive : M. J. Lynch.

WILLMOTT'S ADVERTISING AGENCY PTY. LTD., Chamber of Commerce Buildings, 36 Grosvenor Street, Sydney. Executives : C. H. Willmott (chairman), E. R. Badgery-Parker (governing director), R. Willmott (director). Radio account: Handled by Broadcast Advertising Pty. Ltd., 60 Hunter Street, Sydney.

VICTORIA.

CATTS-PATTERSON COMPANY (VIC.) PTY. LTD. Saxon House, 450-4 Little Collins Street, Melbourne, Vic.

CUMMINGS-WRIGHT ADVERTISING SERVICE, 239 Collins Street, Melbourne, C.1. Executive : E. Cummings-Wright, F.O.A. Radio accounts: Paton's and Baldwin's Ltd. (knitting wools), Joubert and Joubert Pty. Ltd. (Optrex eye lotion).

GOLDBERG ADVERTISING PTY. LTD., Bank House, Bank Place, Melbourne, C.1., Vic. Radio accounts: Dunlop Perdriau Rubber Co. Ltd., Australian Knitting Mills Ltd., Godfrey Phillips (Aust.) Pty. Ltd., Rhu Pills Ltd., London Baby Carriage Manufacturers.

Agencies Handling Radio Accounts

GORDON AND GOTCH (AUSTRALASIA) LIMITED, 511-515 Little Collins Street, Melbourne. Executives: S. L. Gorham (advertising manager), O. Snellgrove (production), A. Wright (estimates and costs). Radio accounts: Henry Berry and Co. Pty. Ltd. (Glen Valley Tea, Table Talk Tea, Invicta Jellies, Cookwell Flour, Marshall's Herrings), Arnold Bros. (Vat 69 Whisky, A.B. Wine Tonic), Wolff and Son (Divinia Perfumes and Powders, Kaloderma Glycerine and Honey Jelly), Nugget Polish Pty. Ltd. "Min Cream"), Parbury Henty and Co. (J.D.K.Z. gin), J. and H. Marks ("Cyma" watches), Photios and Co. ("Bafra" cigarette papers), Conway-Stewart (Conway-Stewart fountain pens).

HAYSOM, W. JOHN. 108 Queen Street, Melbourne, Vic. Executive: W. John Haysom (principal). Radio accounts: Kill-A-Mite Co. (Killamite), Iona Products (Dr. Jenner's), Midas Cameras (cameras), Alcock and Pierce (sports goods), Jellis Bakeries (bread), Halley and Summers (opticians), Marco Refrigerators (Marco).

MERCANTILE EXCHANGE, 380 Collins Street, C.1., Melbourne.

MITCHELL, WILLIAM, Bank Place, Melbourne, C.1.

MOONEY WEBB PTY. LTD., 349 Collins Street, Melbourne, C.1.

NIXON, N. V. AND CO., 20 Queen Street, Melbourne, C.1. Radio accounts: Alba Petroleum Co., Alexander Rackets, Bon Tailoring, Finlay Bros. Pty. Ltd., Raymond Sankey Fraser, Geo. W. Kelly and Lewis, G. Gramp and Son, Pioneer Tours, Permewan Wright, Pine Lodge Hotel, Royal Show, Geo. Raitt and Co., Rogers' Cutlery, Strachan Bros., Swing Razor Blades, Sennitt's Ice Cream, Victoria (community singing), Wardrop.

PATON ADVERTISING SERVICE PTY. LTD., THE, Capel Court, 375 Collins Street, Melbourne. Executives: Hugh Paton (chairman), John McCahon (managing director). Radio account executive: Gordon Massey (radio manager).

RAPHAEL ADVERTISING CO., 247 Collins Street, Melbourne, C.1.

RICHARDSON-COX PTY. LTD., Poster House, 130 Exhibition Street, Melbourne. Executives: B. R. Richardson (managing director), G. F. Waters. Radio accounts: William Fisher Pty. Ltd. (polishing wax), The Robur Tea Co. (tea), Cox Bros. (Aust.) Ltd. (retail credit).

RICKARDS' ADVERTISING SERVICE, T. and G. Building, 145 Collins Street, Melbourne, C.1. Radio accounts: Ladderix (Aust.) Pty. Ltd., Phoenix Biscuit Co. Pty. Ltd., Qualcast (Aust.) Pty. Ltd., Peter's American Delicacy Co. (Vic.) Ltd., Mignon Hosiery, Rubber Wheels and Products Pty. Ltd.

Agencies Handling Radio Accounts

SAMSON CLARK PRICE-BERRY PTY. LTD. (contd.) (Vickers' gin, Corio special whisky, Cairo cup), G. J. Coles and Co. (Coles stores), State Electricity Commission (briquettes), Cyclone Fence and Gate Co. (Cyclone farm fences), Snow's Men's Stores.

STEVENSON ADVERTISING SERVICE, 175-7 Collins Street, Melbourne, Vic. Radio accounts: T. B. Guest and Co., American Blacking Co., R. J. Byers, Law Somners, F. H. Brunning Pty. Ltd., The Foam Salon, Cenovis Yeast Pty. Ltd., Dorlena Frock Salon, Cellular Clothing Co., Dent Allcroft, Milledge Bros.

VEE BEE ADVERTISING SERVICE, 64 Elizabeth Street, Melbourne, C.1.

WILLIAMS-McFERRAN PTY. LTD., Safe Deposit Building, 90 Queen Street, Melbourne, C.1., Vic. Radio accounts: Rosella Manufacturing Co. Gippsland and Northern Co-op. Co., Hugo Wertheim Pty. Ltd., Martin and Pleasance, A. H. McDonald and Co., Wagstaff and Sons, Jas. A. Munro Pty. Ltd., C. E. Kennett, Beefine Pty. Ltd., Mascot Mills, Gollin and Co. Pty. Ltd., Gifford Bros., Ovo Pty. Ltd.

SOUTH AUSTRALIA.

ALLAN A. MARTIN, 28 Twin Street, Adelaide. Executive: Alan A. Martin (sole proprietor). Account executives: Alan Martin, E. Roberts. Radio accounts: Menz and Co. (biscuits and confectionery), Armstrong Ltd. (players and pianos), F. H. Faulding (soap, perfume, antiseptic), Harris Scarfe Ltd. (paint).

CLEM TAYLOR ADVERTISING SERVICE LTD., Albion House, Waymouth Street, Adelaide, S.A. C3885. Radio accounts: S.A. State Tourist Bureau, Walton's Ltd. (biscuits), Clarkson Ltd. (wallpaper, paints, radio, etc.), R. A. Haines (Maxam cheese), City Motors Pty. Ltd. (Chevrolet cars and trucks, Buick and La Salle cars), United Motors Ltd. (Vauxhall and Pontiac cars), Dalgety's (Ford cars), Ernest Smith and Co. Ltd. (radio and cycles), Onkaparinga Woollen Co. (blankets, etc.).

GELLERT, OWEN L., ADVERTISING SERVICE, Trustee Building, Grenfell Street, Adelaide, S.A. C1520. Radio accounts: Miller Anderson Ltd. (department store), Thompson and Harvey Ltd. (wallpaper, glass, etc.), Zenith Products (paint, varnishes, etc.).

PATON ADVERTISING SERVICE PTY. LTD., THE, C.M.L. Building, King William Street, Adelaide.

WEBB ROBERTS McCLELLAND PTY. LTD., Norwich Union Building, 47 Waymouth Street, Adelaide. Executives: Sidney K. Webb, B. Ainslie Roberts, Maurice P. McClelland (directors). Radio accounts: Mexico Cereal Co. Ltd. (Mex products), Adelaide Brewery Ltd. (Adelaide Bitter); S.A. Cash Orders Pty. Ltd., Martindale Ltd. (Wild Cherry), Kelvinator Aust. Ltd. (Kelvinator refrigeration), Austral Sheet Metal Works Ltd. (aluminium utensils), Cowell Bros. and Co. Ltd. (timber and hardware), Burden Ltd. ("Flumis"), George Adams Pty. Ltd. (cakes).

QUEENSLAND.

CHANDLER, J. B. AND CO., 43 Adelaide Street, Brisbane, Q. B2041. P.O. Box 833L, Brisbane.

COUNTRY PRESS CAMPBELL ADVERTISING, Country Press Chambers, 177 Edward Street, Brisbane. Executives: A. J. Campbell (principal), D. W. Roberts (production department), O. Nielmann (direction), T. Lambert (recording), A. Foulkes (scripts), A. Armstrong (accountant). Recording facilities used: Presto Recording Equipment and audition rooms, studios, etc.

Radio accounts: Bruce Pie and Co. ("Tyne" brand herrings), Owen Gardner and Sons (soft drinks), Rheum-A-Cure (tonic and remedy for rheumatism), G. E. Adams (Better-made Cakes), Bicycle Finance (cycles), Bruce Small Pty. Ltd. (cycles), James Campbell and Sons (Radiant homes and hardware), Fullar's Ltd. (dry cleaning), F. and G. Hooper (groceries), J. M. Hamilton (tents), Independent Oil Industries (petrol-oil), Metro. Milk Supply (pasteurised milk), G. Nolan (casket tickets), Pike Bros. (men's wear), Penney's (departmental store), Paul and Gray Ltd. (sailmakers), Safe Brakes Pty. Ltd. (motor mechanics), State Government Insurance (insurance), Trocadero Pty. Ltd. (dances), Taylor's Elliott's (proprietary lines), E. Tooth (tailors), Farren's Pty. Ltd. (jewellers), T. Tristram (drinks), Burgoyne Burbidges (Q'land) Pty. Ltd. (R.A.C. tonic).

FORSTER ADVERTISING CO., Union Bank Chambers, Queen Street, Brisbane. Executive: Colonel J. Craven (principal). Radio accounts: McWilliam's Wines (wines), Federal Election Campaign, U.A.P. (propaganda), State Election Campaign, U.A.P. (propaganda).

JOHNSTON JONES ADVERTISING, Exton House, Queen Street, Brisbane. Executives: E. A. Johnston, F.O.A., J. H. Jones, M.A. Account executive: A. R. Harris. Radio accounts: Queensland Brewery Ltd. (beer), Foggitt Jones Pty. Ltd. (food products), G. E. Adams Pty. Ltd. (cakes), Union Trustee Co. of Aust. Ltd. (income tax returns), G. J. Price Ltd. (Beale Bijou pianos, radio, refrigerators), Knowles and Sons (jewellery), E. Colin Waldron (optometrist), Buzacott's (Q'land) Ltd. (equipment), Queensland Pastoral Supplies (material), Better Gifts Ltd. (coupons), Ockelford the Chemist (ointments, etc.), Marino Products Pty. Ltd. (outboard motors), J. C. Hutton Pty. Ltd. (P.M.U. special), Golden Casket Art Union (mammoth caskets), Equitable Probate and General Insurance Co. Ltd. (policies), John Hicks and Co. (furniture), Champion Automobiles Pty. Ltd. (cars), Sid Solomon (tailor).

NATIONAL ADVERTISING LTD., 21 Adelaide Street, Brisbane.

NOBLE BARTLETT ADVERTISING, Penney's Building, Adelaide Street, Brisbane. Executives: W. H. Noble, A. T. Bartlett (principals). Account executive: R. A. Wishart, Recording facilities used: Presto.

(Continued on foot of opposite page.)

LIST OF ACCREDITED AGENCIES

At the first meeting of the Australian Federation of Commercial Broadcasting Stations Federal Accreditation Bureau in Sydney during May, 1938, at which applications for accreditation were received from agencies throughout Australia, accreditation was granted to 51 of the applicant agencies for a period of 12 months from June 1, 1938. Further applications were to be considered throughout the year, with the possibility of the list of accredited agents being considerably augmented during 1938.

FEDERAL ACCREDITATION.

Ad-Craft Services, 13 James Street, Perth.
Aerial Publicity Co., Angel Place, Sydney.
Annivitti-Schey Pty., Ltd., 44 Margaret Street, Sydney.
Amalgamated Wireless (A/sia) Ltd., 167 Queen Street, Melbourne.
Bartlett, L. V. and Co., 26 O'Connell Street, Sydney.
Beresford, Kingsbury Co., 247 George Street, Sydney.
Broadcast Services, Cnr. George and Turbott Sts., Brisbane.
Brown, T. B. Ltd., George and Margaret Streets, Sydney.
Becket-Thomson Advertising Pty., Ltd., 485 Bourke Street, Melbourne.
Catts Patterson Co. (N.S.W.), 60 Hunter Street, Sydney.
Catts Patterson (Vic.) Pty., Ltd., 450 Little Collins Street, Melbourne.
Country Press Campbell Advertising, 177 Edward Street, Brisbane.
Fergus Canny Advertising Co., 66 Pitt Street, Sydney.
Fox Advertising Service, 115 Pitt Street, Sydney.
Gotham Limited, 67 York Street, Sydney.
Goldberg Advertising Pty., Ltd., Bank Place, Melbourne.
Goldberg Advertising (Aust.) Ltd., 15 Hamilton Street, Sydney.
Gordon and Gotch Ltd., Barrack Street, Sydney.
Graves, Richard Pty., Ltd., 88 Pitt Street, Sydney.
Griffiths-Huse, 145 Collins Street, Melbourne.
Hansen Rubensohn Co., 15 Hamilton Street, Sydney.
Hyam, George R., Kembla Bldg., Margaret Street, Sydney.
Haysom, W. John, 145 Collins Street, Melbourne.
Hawkins Advertising, 12 Spring Street, Sydney.
Johnston Jones Advertising, Exton House, Queen Street, Brisbane.
Johnson, J. W. Advertising, National Bank Building, Queen Street, Brisbane.
Jones, Wylie B., Advertising, 16 Barrack Street, Sydney.
Julius, Harry Advertising Service, 16 Barrack Street, Sydney.
Le Grand Advertising, National Mutual Building, 293 Queen Street, Brisbane.
Leonard, F. P., 156 Castlereagh Street, Sydney.
Marginson Publicity, Rowes Building, Edward Street, Brisbane.
Marsh Pty., Ltd., 44 Margaret Street, Sydney.
Maurice, Len., 10 Martin Place, Sydney.
Maynard Advertising, R. S., 39 Park Street, Sydney.
Martin, Alan, Advertising Service, 28 Twin Street, Adelaide.
Mooney-Webb Pty., Ltd., 349 Collins Street, Melbourne.
National Advertising, Inns of Court, Adelaide Street, Brisbane.
Nixon, N. V. and Co., 39 Queen Street, Melbourne.
Noble Bartlett Advertising, Ponnys Building, Adelaide Street, Brisbane.
O'Brien Publicity Co., 56 Young Street, Sydney.
Paton Advertising Services, 133 Pitt Street, Sydney.
Perceval, J. B. Pty., Ltd., 44 Margaret Street, Sydney.
Patterson, Geo. and Co., 24 Jamieson Street, Sydney.
Patterson, Geo. and Co., 59 William Street, Melbourne.
R. and K. Powell Advert., The, 58 Margaret Street, Sydney.
Reuters Ltd., 66 Pitt Street, Sydney.
Richard Graves Pty., Ltd., 88 Pitt Street, Sydney.
Richardson Cox Pty., Ltd., 130 Exhibition Street, Melbourne.
Rickards Advertising Service, 145 Collins Street, Melbourne.
Samson Clark, Price Berry, 75-77 Pitt Street, Sydney.
Smyth, Arthur and Sons, 18 Martin Place, Sydney.
Stevenson Advertising Service, 175-177 Collins Street, Melbourne.
Sullivan Advertising Service, T. & G. Building, Adelaide Street, Brisbane.
Thompson and Associates, 66 Pitt Street, Sydney.
Thompson (Aust.) Pty., Ltd., J. Walter, 65 York Street, Sydney.
Trans-Radio Advertising and Programme Service, Asbestos House, York Street, Sydney.
Unsted Jackson and Haines, 30 Carrington Street, Sydney.
White, A. N. Pty., Ltd., King and York Streets, Sydney.
Williams, A. J., St. George's Terrace, Perth.
Willmotts Advertising, Chamber of Commerce Building, Grosvenor Street, Sydney.
Weston Co., The, Grosvenor Street, Sydney.
Webb Roberts McLelland Pty., Ltd., 47 Waymouth Street, Adelaide.
Williams, McFerran Pty., Ltd., 90 Queen Street, Melbourne.

STATE ACCREDITATION.

New South Wales.

Austral Press, 335 Kent Street, Sydney.
Shield Advertising Service, 58 Margaret Street, Sydney.
McCarthy-MacVeigh Advertising, 310 George Street, Sydney.
Smith, W. E. Ltd., 310 George Street, Sydney.

Victoria.

O'Halloran, F. J. and Sons, 59 William Street, Melbourne.

Western Australia.

Crownson, S. Cohen, 87 William Street, Perth.
Green, R. W., Advertising Agency, Goldsborough House, St. George's Terrace, Perth.
Mount, N. C. S., St. George's Terrace, Perth.
Successful Advertising Co., Perth.

Queensland.

Cossey Advertising Service, Estate Chambers, 108 Creek Street, Brisbane.
Forster Advertising Co., Union Bank Chambers, Queen Street, Brisbane.
Vinnicombe Advertising and Art Service, Union Bank Chambers, Queen Street, Brisbane.

Agencies Handling Radio Accounts

R. S. MAYNARD ADVERTISING, A.M.P. Building, Queen Street, Brisbane, and 39 Park Street, Sydney. Executives: Ralph S. Maynard, C. A. McMillan.

SODEN, A. J., 180 Queen Street, Brisbane.

SULLIVAN ADVERTISING SERVICE, T. and G. Building, 135 Queen Street, Brisbane.

VINNICOMBE ADVERTISING, Union Bank Chambers, 324 Queen Street, Brisbane.

WESTERN AUSTRALIA.

ADCRAFT SERVICE, 13 James Street, Perth, W.A.

COHEN, S. CROWNSON, 87 A.M.P. Chambers, William Street, Perth, W.A. Executives: S. Crownson Cohen, K. T. Hamblett, A. F. Collett. Radio accounts: W. J. Lucas Ltd. (cycles and radio service), Carlyle and Co. (Diamond batteries), Musgrove's Ltd (radios, pianos, musical instruments, sewing machines), Mortlock Bros. Ltd. (Hudson-Terraplane cars), Adelaide Tailoring Co. (suitings).

GRAHAM ADVERTISING AGENCY, THE, Colonial Mutual Building, St. George's Terrace, Perth. Executive: George B. Graham (managing director). Recording facilities used: 6PR. Radio accounts: Charlie Carter Ltd. (chain stores), Airzone (W.A.) Ltd. (Airzone radios), C. S. Batyn Co. (Batyphone radios), Maryinup Dairy Produce Co. (Keylock cheese), Nicholson's Ltd. (Radiola radios).

GREEN, R. W., Advertising Agency, Goldsbrough House, Perth, W.A.

MOUNT, N. C. S., Advertising Consultant, 15, First Floor, Surrey Chambers, St. George's Terrace, Perth, W.A.

SUCCESSFUL ADVERTISING COMPANY, No. 7, 2nd Floor, National House, 49 William Street, Perth, W.A. Radio accounts: A. F. Hoare (radiator specialists), Povey's (mattress manufacturers).

WHO'S WHO
In Australian Commercial Broadcasting

The following particulars are supplied by the persons and no responsibility is accepted by the publishers for any errors or omissions. All persons prominent in Commercial Broadcasting are requested to advise the Editor of any alterations required.

A

ANDERSON, George Herbert: Sales manager Macquarie Broadcasting Network. Country vice president Australian Federation of Commercial Broadcasting Stations. Executive committee of the R.I.F. Club. Pre-war, civil engineer railway survey and construction. War, 4½ years service with A.I.F. After war, 4 years orchardist, grazier and farmer (director Derwent Valley Fruitgrowers' Co-op. Ltd.). Two years business agency, 8¾ years assistant general secretary Graziers' Association of N.S.W.; 3 years general manager Country Broadcasting Services Ltd. (2GZ); 2 years director Northern Broadcasters Ltd. (2NZ). Born: 20/3/1897, Hobart, Tas. Private address: "Encantada," Boomerang Street, Turramurra. Club: Tattersall's. Recreations: Tennis, golf, swimming.

APPERLEY, Geo., M.Inst. R.E. (Aust.): Manager of Communications, Amalgamated Wireless (A/sia) Ltd., Melbourne. Early training and experience telegraphy, telephony and wireless with N.Z. Govt. Telegraphs. 1910-1912 Wireless Service of British Colonial Government. 1913 joined A.W.A. 1914-1916 Chief of Marconi Wireless School. 1916-1919 A.W.A. Works Manager. 1919-1923 A.W.A. Technical Superintendent and i/c Patent Dept. 1924, i/c Beam Wireless Service. Visited England and the Continent of Europe in 1924 and again in 1933 on Beam Wireless investigation. 1937 in England. Born 24th March, 1887.

ARMITAGE, John Greenwood: Assistant manager Radio 2UE Sydney Pty., Ltd. (2UE). Following long experience newspaper editorial work, appointed advertising manager Cairns "Daily Times," 1917. Joined Hong Kong "Daily Press," 1923, as night editor and later appointed advertising manager of "The Directory" and "Chronicle" of the Far East. Later associated with a number of Nth. American broadcasting stations. Appointed to 2GB June, 1934. Appointed assistant manager 2UE November, 1937. Author of "Wing Po" and "The Chinese Constitutional System." Member of Millions Club, Institute of Sales and Business Management (Fellow). Recreations: Boating, fishing, chess. Born December 7, 1887, Gippsland, Aust.

ARMSTRONG, D. R.: Assistant manager, 2GB. Educated Ballarat Grammar School, Victoria, and Southport School, Queensland. Previously with Nestle's Milk Queensland, South Australia and Sydney, in charge advertising department. Joined 2UE, 1936, as announcer, became programme manager, and subsequently assistant manager, 1937. Transferred to 2GB at end 1937. Member Millions Club and Masonic Club. Recreations: Golf. Born 1898, Stanthorpe, Queensland.

B

BAIRNSFATHER, Tom Duncan, M.C.: Order of the Crown of Italy. Announcer 2KY Sydney. 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 London, and since arrival in Australia has broadcast from 3LO, 3AR, 3GL, 2FC, 2BL, 2CH, 2UE. Recreations: Swimming, boxing, golf, and motoring.

BARKER, Jacob Harry, Jun.: Managing Director, Diamondpoint Services Pty. Ltd.. 1920-1924, Special Agent, Department of Commerce, Washington, D.C. Chief Investigation section Western Electric Company Inc. New York City, 1925-28. Assistant Export Manager, Electrical Research Products Inc., 1929. Established. Western. Electric Company (New Zealand) Ltd. and later Managing Director of Western Electric Co. in charge operations in Australia, New Zealand, Dutch East Indies and Straits Settlements. In present position since April, 1936. Private address: 16 Ocean Avenue, Edgecliff. Born 26/1/1894 Oakland, California, U.S.A. Clubs: Royal Sydney Yacht Squadron, N.S.W. Aero Club, N.S.W. Lawn Tennis Club, Tattersall's.

BAUME, Sydney Erne: LL.B., M.I.S.B. (Aust.). Advertising Manager, 2UE 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 an announcer and advertising executive late 1933, joined 2UE as Advertising Manager, 1934. Lecturer and author of various treatises on radio advertising and practice. Recreations: Motoring, boxing and swimming.

BEAVER, Herbert Edward: Manager, Station 2KY, Sydney. One of radio's early personalities, joining 2KY at its inception 10 years ago and was responsible for 2KY's first children's radio club, with a membership of over 30,000; conducted the children's party at Marcus Clark's for over 5 years. Wrote and produced the Christmas Pantomimes. Born 23/3/'97, Broken Hill, N.S.W. Member of North Brighton Golf Club and Magicians' Club. Recreations: Golf and magic.

BENNETT, Alfred Lewis, L.D.S.: Studio Manager 2TM Tamworth. Seven years dance band and theatrical experience. With 4BH for seven months, 2UE for 12 months. Private address: 113 Upper Street, Tamworth, N.S.W. Born 20/9/08, Cairns, N.Q. Clubs: Rotary and Microphone. Recreations: Golf, tennis, music, reading.

BENNETT - BREMNER, Ernest: Announcer 2CH. Educated Wesley College, Melbourne; attached to R.A.A.F. wireless division at Point Cook; subsequently sole charge of 3SH. Joined the Australian Broadcasting Commission as announcer in June, 1935. Joined 2CH July, 1937. Born: Brighton, Victoria, 1938. Recreations: Golf, model building. Club: O.W.C.A. (Melbourne).

BERMINGHAM, Raymond: Studio Manager-Producer 2GZ. Studied Economics Adelaide University Vocal work, seven years Elder Conservatorium. Studied accountancy, later teacher of voice in Sydney; considerable experience in musical and dramatic work in early days of radio. Joined 2GZ early 1937 as announcer. Born, Adelaide,

BILLS-THOMPSON, George: Manager Station 7HO Hobart. Interested in radio since 1923. Held experimental licence in 1924. Was guest artist several Tasmanian stations before joining 7LA, and later appointed chief announcer 3AW Melbourne. Joined 2UW, 1935, announcer and surf patrol pilot. Returned to 3AW as chief announcer until 7HO appointment January, 1938. Member Royal Victorian Aero Club, Royal Yacht Club of Tasmania. Recreations: Flying, photography. Born Launceston, Tasmania.

BOWES - KELLY, Darvell: General manager V.O.A. Sound Productions. Gained certificate as wireless operator at London Wireless Institute, and joined mercantile marine. Left the sea, and went to Italy for voice training under Fachini. First visited Australia in 1913 with the Quinlan Grand Opera Co. Next sang at Chicago Grand Opera House, and returned to Australia in 1922. Appeared on concert platform and in musical comedy in all States and New Zealand. Re-entered the wireless field and has written, produced and broadcast scripts from the principal stations of the Commonwealth. Founded V.O.A. Sound Productions early 1938. Born: England, July 22, 1889. Recreations: Experimental wireless (call sign VK2DB).

BRADSHAW, Cliff: Manager, Radio Western 3HA Hamilton. Joined Australian Broadcasting Commission 1929 as announcer, after previous commercial broadcasting experience. With A.B.C., in charge record library and record programmes. Represented A.B.C. in A.P.R.A. arbitration during, 1938. Took office 3HA June 1, 1938.

BREWER, Ernest Hammond: For many years correspondent of Sydney "Sun" in West Australia, and later employed by the United Cable Service in London. First advertising director of "Smith's Weekly"; first advertising director of "The Daily Guardian" (Sydney). Entered business on his own account in 1935, as "Radio Representation" in Assembly Hall, Sydney. Now Sydney sales executive of the Macquarie Broadcasting Network. Hobby: Gardening.

BROADBENT, Jack: 4BC, formerly Studio Manager and Chief Announcer, 7HO Hobart. After the war, secretary to G.O.C. in United Kingdom. In radio for over 12 years, 7ZL, 3LO, 3AR. Has been with 7HO for over five years. Private address: Cnr. Harrington and Davey Streets, Hobart. Born 19/6/1898, Dimboola, Vic. Clubs: R.S.S.I.L.A., Royal Yacht Club of Tasmania, Civic Club, Hobart. Recreations: Swimming, yachting.

BROOKER, Vivian M., M.Inst. R.E.(Aust.), M.Inst.R.E.(U.S.A.) M.I.W.T. (London): Manager Broadcasting Division, Amalgamated Wireless (A/sia) Ltd. Joined Amalgamated Wireless in 1917. During 1926 was Chief Wireless Officer of s.s. "Jervis Bay," and communicated from that ship at Tilbury direct to Sydney, and handled traffic for the Prime Minister, who was attending the Imperial Conference. This was done on short waves, and constituted a record in long distance commercial traffic transmission. Appointed Manager and Chief Engineer of 7LA, Launceston, from 1931 to July, 1933. Transferred to present position July, 1933. Private address: 73 Haig Street, Maroubra. Born 11/2/1899.

BROWN, Andrew F. O.: N.S.W. secretary Australian Federation of Broadcasting Stations, 44 Margaret Street, Sydney. Secretary, Electrical and Radio Association, N.S.W. Assistant secretary, Electrical Association, 1923. Appointed secretary, 1928. Recreations: Tennis, golf. Born 25/6/1903.

BROWN, Sir Harry Percy: K.B., C.M.G., M.B.E., M.I.E.E., Director-General P.M.G.'s Department. Son of George Brown, of Sunderland, Eng. Born December 28, 1878, Tower House, Hlyton, near Sunderland, Eng. Educated Bede College, Sunderland, Durham College, Newcastle-on-Tyne; had 25 years' service in British Post Office, occupied position of staff engineer; visited India 1913-14 in connection with telephone, telegraph, and railway traffic control communication; during Great War was responsible for telephone plant of U.K. and emergency communications for Defence System; to Commonwealth Post Office, January, 1923; came to Australia as technical adviser; app. Director-General Post and Telegraphs December, 1923; as rep. of Commonwealth Government attended International Radio Convention at Washington, 1927, and Imperial Cable and Wireless Convention, London, 1928; rep. Australia at the Telecommunications Convention held in London, 1937. C.M.G., 1934; married September 28, 1904, Emily, d. H. T. Aldour, 2 s., 2 d.. Recreations: Motoring, golf. Address: 20 Charles St., Kew, E.4, Vic.

BUILDER, Geoffrey, B.Sc., Ph.D., F.Inst.P., A.M.I.E. (Aust.) M.Inst.R.E. (Aust.), Officer-in-charge of A.W.A. Research Laboratories, Ashfield. Educated at Guildford Grammar School, W.A., University of W.A., University of London. One time Observer at the Watheroo Observatory of the Carnegie Institution of Washington. There carried out experiments with low power radio equipment and maintained a service route from the Observatory to headquarters in Washington. From there went to London and two years later obtained doctorate for Radio Investigations of the Ionosphere. Then in charge of the British Polar Year expedition work in Norway. Returned to Australia and carried out investigations for the Australian Radio Research Board until joining A.W.A. in 1934. Has published a number of papers on various aspects of radio research. Recreations: Tennis and swimming. Born, 21/6/'06.

BUTTON, Bert C.: Sports commentator and member of sales staff Station 2CH. Educated Westminster City School. Came to Australia April, 1928; joined staff Amalgamated Wireless (A/sia) Ltd. same month; has since been in credit department and later was buyer for that organisation; is the holder of several championships in athletics. Became sports commentator for 2CH in 1934. Recreations: All forms of sport. Born: London, 1907.

C

CALEY, Frank: Chief copywriter 2GZ. Associated with radio since 1929. Featured over both "A" and "B" class stations in plays, sketches and monologues. Writes, produces and acts. One time press man on Sydney "Sun," "Evening News," and "World." Advertising agency experience in Queensland and New South Wales. A bridge player of note. Private address, 139 Macquarie Street. Born 1910. Recreations: Bridge, swimming, tennis.

CARSON, Charles R.: Manager 4BH, Brisbane, since August, 1936, and previously programme manager 4BC, Brisbane. Originally in Queensland Railways service, and first became interested in radio through association with Brisbane Repertory Society, from which he graduated to position as announcer with 4BC. Was also connected with sales staff of J. B. Chandler and Co., Brisbane. Born and educated at Rockhampton, Queensland.

CHAMBERLAIN, Frank S.: Manager, 3TR. Before joining the staff of 3HA, Mr. Chamberlain had held important journalistic positions in metropolitan and country centres. First association with radio was a series of talks on the "World Abroad" through 3HA, to which station he subsequently transferred as continuity writer and news editor. Swan Hill appointment made January, 1938. Keen follower international and home affairs, appreciates good music. Recreations: Reading and motoring.

CHANDLER, John Beals: Born Norfolk, England, in 1887, and arrived in Australia in 1907. In 1913 established the firm of J. B. Chandler & Co., of Brisbane. Prominent Radio and Electrical Wholesaler; chairman of directors 4BH; also interested in several Broadcasting Stations.

CLARKE, Harry Powis: Sales representative, publicity and research Country Broadcasting Services Ltd. (2GZ). Sales pro-

(Continued next page.)

Who's Who - - - - - - - - (contd.)

CLARKE, H. P.—Continued.
motion manager the Provincial Network. Advertising manager "Labor Daily"; two years with Associated Newspapers Ltd.; joined 2GZ 1937; contributor to business journals, etc. Concert baritone. Born 8/3/1904. Private address "Verlaine," Bruce Street, Bexley. Club, Royal Motor Yacht Club. Recreations: Yachting and fishing.

CLUBB, Alex. M.: A. M. Clubb and Co. Ltd., 76 Clarence Street, Sydney. Qualified electrical Engineer, early training with Aberdeen (Scotland) City Council Electricity Dept. Arrived Australia 1922, commenced with Scott and Co. (A/sia) Pty. Ltd. Melbourne, when this Company was formed, representing A.E.G., Berlin, and Telefunken, Berlin. Continued with Scott & Co. until 1929 when own business was formed in Sydney, taking over amongst others N.S.W. Agency for Telefunken Radio. A pioneer of Recording of Acetate Discs in Australia.

COCHRANE, Arthur Stanley: Senior announcer, 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 the company secured the first "A" class broadcasting licence he was the first "A" class announcer in Australia, commencing in 1923.

COLDWELL-SMITH, Charles Edmund: Executive staff, 2CH. Formerly manager 2GF; three and a half years marine operating; eight years merchandising department A.W.A.; Life Governor of Grafton District Hospital; Life Member of the Grafton District Ambulance. Holds 1st Class Washington Certificate. Private address, 20 Hodgson Avenue, Cremorne. Born 21/8/1896, Ballarat, Vic. Club: Masonic. Recreations: Fishing and shooting.

COLMAN, Eric: Chief announcer 2CA. Joined 2GB as Announcer in December, 1932. Chief Announcer, January, 1934. Formerly on staff of Universal Pictures, Sydney. Played part of "Flying Padre" in "Splendid Fellows" (Australian film), and also small part in "Flying Doctor." Appeared in several amateur productions in London and Sydney. Brother to film star, Ronald Colman.

COLVILLE, Sydney: Councilor and Member Inst.R.E.(Aust.) Proprietor Colville Wireless Equipment Co. Pty. Ltd., 8

Small Street, Broadway, Sydcially in 1921. Founder of Queensland Wireless Institute, ney. Entered Radio field experimentally in 1911 and commer- 1914-19. Colville-Moore Wireless Supplies Ltd., 1921. Commissions: Technical Adviser to Siamese Government, 1928. Lieut. Instructor Navy League. Radio Engineer Royal Aero Club of N.S.W. Designer of Broadcast Stations 4AY, 4IP, 4BU. Specialty Aircraft Radio. Conducted numerous tests over past eight years; particularly interested in its development. Recreations: Flying and golf.

CONRY, William Henry, M. Inst.R.E. (Aust.): Radio Inspector, P.M.G.'s Dept., Hobart, 1910, appointed Engineer's Branch, P.M.G.'s Dept. 1915-1918, Wireless Operator R.A.N. Radio Service (Transport). Born, 3/6/1892.

CONWAY, Eric V.: Productions Manager, Legionnaire Sound Productions Pty., Ltd., Melbourne. Educated Worcester Cathedral Collegiate School. Associated theatrical, radio, film enterprises since 1906, when played with famous Fred Karno's Comedy Companies. Came to Australia as vaudeville actor under contract to

Fullers' Theatres, 1922, and since been associated in Australia and N.Z. with J. T. Williamsons, Fullers, Muriel Starr, Allan Wilkie, Seymour Hicks and Pat Hanna Film Productions. First broadcast 2FC 1924, and since with national and commercial network. Was asst. production and programme mgr. 3DB until joining Legionnaire when company was formed. Feature artist Shell Show 1935-6-7. Recreations: Reading, playwriting, gardening. Born London.

COOMBES, T. G.: Sales staff 3HA-TR-SH. Educated St. Peter's College, Adelaide. Worked in advertising agencies. Over 15 years with J. C. Williamson, Musgrove's, J. & N. Tait and costume comedy shows under the management of Cedric Johnson, Hugh Huxham, Sutton Crowe and many others. Gravitated to 3LO, 3AR, 5CL, and from there to commercial radio stations. Continuity, announcing and advertising with 5KA Adelaide, and then joined "The Age" Broadcasting Service, Melbourne. Went to 3HA Hamilton as assistant manager, and from there to present position. Recreations: Motoring, dancing, writing. Borne Adelaide, 1896.

CORR, Kenneth Lindsay: Managing Director. Legionnaire Sound Productions Pty., Ltd., Melbourne. Graduated from sub-editorial staff, Melbourne "Herald" to broadcast advertising. A.I.F. 1916 to 1919. Ten

years in Technical Service, Education Dept. Private address: Hoyt St., Brighton Beach Victoria. Borne 18/8/'97, Cobden, Vic.

COTTRELL, Eric L.: Secretary and Accountant, 3UZ Nilsen's Broadcasting Service Pty. Ltd., Oliver J. Nilsen Pty. Ltd., Nilsen Cromie Pty. Ltd. Private address: Kew, Vic. Born Bulawayo, South Africa. Married. Recreations: Tennis, golf, rowing.

COTTRELL, F. C. Clarke: Publicity and Advertising Manager 2UW Sydney and the C.B.N. For many years associated with Union Theatres engaged in technical and production activities. Script writing and radio production work over the past seven years gave him a thorough grip of the broadcasting business. Hobbies: Music, landscape painting, yachting.

COX, Edmund (Ted). Sydney representative 2KO Newcastle. Educated Trinity Grammar School, actively engaged

radio field since 1927. Attached sales staff Philips Lamps A/sia Ltd., five years. For past five years acted sales manager Amplion, Aust. Ltd. Resigned to take up present position with 2KO 1938. Member United Service Institute. Holds rank lieutenant City of Sydney's Own Regiment. Recreations: Golf, army activities.

COX, Harold Edward: Manager, 4TO Townsville. Has had 26 years uninterrupted wireless, joining English Marconi Co. 1911. Came to Australia, 1914. Served as W/T operator aboard Australian troopship during the Great War. Drafted into R.A.N. Coastal Wireless Service, later A.W.A. Coastal Radio. Entered the Broadcasting Dept. of A.W.A. 1931. Opened 3BO Bendigo; appointed Manager 4TO Townsville. Has had many years experience elocution and acting, and is now producing radio plays regularly at 4TO. Born in England.

CRAWFORD, W. T. S.; Senior Radio Inspector for New South Wales. Councillor and Member Inst.R.E. (Aust.). Appointed O.I.C. Hobart Radio, 1912. O.I.C. V.I.M. Melbourne,

1914. Transferred to Naval Wireless, October, 1915, as Radio Inspector, Melbourne. Appointed Radio Lieutenant and Inspector Sydney, January, 1918. After the war reverted to P.M.G.'s Department as Radio Inspector October, 1920. Classified Senior Radio Inspector May, 1934. Born Bendigo, 14/12/1880.

CROMIE, Charles Thomas: Director Station 3UZ—Nilsen's Broadcasting Service Pty. Ltd., Oliver J. Nilsen Pty. Ltd., Nilsen Cromie Pty. Ltd., Neon Electric Signs Pty. Ltd. Married. Born at Sale. Recreations: Gardening and golf.

CROSSMAN, Kenneth D.: Studio Director and Night Announcer, Station 5DN Adelaide. Educated Prince Alfred College, Adelaide. Entered radio as An-

nouncer and Engineer 5DN in 1925. Qualified commercial radio engineer, joined A.W.A. Marine staff. Joined sales staff Mick Simmons Radio Department, Sydney, and later Manager Sheffield Trading Company's Radio and Electrical Divisions. Was Announcer and Programme Director 5AD. Recreations: Caravanning, swimming. Born 20/1/1908.

CROUCH, E. C.: Chief Engineer Country Broadcasting Services Ltd. Educated Mosman, Neutral Bay and Sydney Technical schools. Joined P.M.G. Department 1924, engaged in installation, operation and maintenance of Common Battery, Magneto and Automatic systems of telephonic communication, short wave work; in 1929 transferred to Wireless Branch and attached to 2BL, engaged in installation, operation and station equipment, and associated with Australian Broadcasting Company. Leaving

(Continued next page.)

P.M.G. Department at end of 1931, joined staff of 2GB, engaged in designing and constructing audio control equipment and complete transmitter. Resigned from 2GB October, 1935, to join present Company. Acted as consultant in the case of several stations and carried out constructional work, including new extensive control equipment for 2GZ's Sydney and Orange studios. Experimented in short and medium wave transmission since 1920. Trained with Royal Australian Naval Reserve, and finished as Petty Officer, First Class P.M.G. Commercial Certificate (Washington Convention). Born Beechworth, Vic., 1908.

D

DAHL, Edward M. L.: General manager 4AY Ayr, director 4AT Atherton. Son of the late Mr. Normal Dahl, founder of 4AY.

DANIELL, Frederick W. H.: Executive Director of Macquarie Broadcasting Services Pty., Ltd., Director of Broadcasting Station 2GB Pty., Ltd., Hunter River Broadcasters Pty., Ltd., Wollongong Broadcasting Pty., Ltd., Broadcasting Service Association, Australian Record Company, Figtree Studios Pty., Ltd., Argosy Films Ltd. Alternative director of Australian and New Zealand Theatres Ltd. Prominent in film and radio

circles, particularly for his position as general manager of National Productions Ltd., which produced "The Flying Doctor." Investigated screen and radio development in Europe for Denison Estates. Has been associated with big radio hook-ups such as the occasion of the outbreak of war in Abyssinia, the King's death, the inauguration of overseas air services, and Southern Seas Broadcast.

DARKE, Harold Stanley: F.O.A., service manager and secretary to managing director, Transcontinental Broadcasting

Corp. Ltd. (2KA). Has had extensive career in advertising, specialising in marketing. Formerly associated with Myer Emporium, Melb., Berlei Ltd., Holeproof Hosiery (advertising and sales promotion manager), Pelaco Ltd. (advertising manager), F. S. Walton (advertising manager) followed by several years advertising agency. Joined 2KA September, 1937, as publicity officer, later acting manager. Resigned April, 1938 to join 2GZ; rejoined 2KA June, 1938. Fellow of A.A.A. Recreations: Golf, ice hockey. Born May 11, 1904, Nottingham, England.

DAVEY, James Henry: Managing Director, 3BA Ballarat. Was one of the founders of 3BA and has always occupied the position of Managing Director. Is a well-known personality in Ballarat and has been prominent in musical and dramatic circles in Victoria for many years. Recreations: Golf, music and horticulture.

DENISON, Reginald Ernest, B.A., L.LB.: Director Macquarie Broadcasting Services Pty., Ltd.; Executive Director Associated Newspapers Ltd., President Australian Newspapers' Conference, Director Australian and New Zealand Theatre Pty., Ltd., and many other public companies. Educated Sydney Grammar School and Sydney University. War service overseas, reaching rank of Captain; after war articled to Sydney solicitor; then became secretary Sun Newspapers Ltd.; on formation of Associated Newspapers Ltd., became secretary and then general manager, now being executive director. Born November 20, 1894 at North Adelaide. Club: Union, Sydney. Recreations: Cricket, golf and tennis.

DEVINE, John S.: Executive staff 7EX; was formerly executive in charge of Transcriptions, 3DB Melbourne. A.I.F., 1915-

1919. Previously had experience in broadcasting, advertising, newspaper work and motion pictures. Recreations: Reading and sport. Born London, 1894.

DICKSON, Noel W.: Sales manager for Australasia, Legionnaire Sound Productions, 68-70 King Street, Melbourne, C.1. Educated Caulfield Grammar School, reporter and sporting writer on the "Herald," Melbourne; special writer and sub-editor the "Star," Melbourne. Toured South Sea Islands in trading and recruiting schooner, 1931, and wrote series article for the "Herald." 1935-36 spent in England, France, Spain, Germany, Austria, Switzerland, Hungary, Czechoslo-

Who's Who - - - - - - - - (contd.)

vakia and Belgium. 1937 joined Legionnaire. Recreations: Ski-

ing (vice-president of Ski Club of Victoria), squash rackets, tennis, golf.

DIXON, Neville: Advertising manager Victorian Broadcasting Network. Experience in commercial and advertising field spread over a number of years.

DODDS, John S.: Assistant Engineer, Commercial Broadcasters Pty. Ltd. (7HO). Formerly with United Distributors Ltd. and Service Engineer for Findlays Pty. Ltd. Private address: 14 Augusta Road, Hobart. Born 9/1/06, Hobart. Recreation: Rowing.

DONNER, W. A.: Managing Director Columbia Graphophone (Aust.) Pty., Ltd., Homebush, N.S.W. Following the amalgamation overseas of Columbia, H.M.V. and Marconiphone was also appointed general manager

in Australia for "His Master's Voice," and manager in Australia for the Parlophone Co. Ltd. Prior to coming to Australia in 1929 was export manager Columbia Graphophone Co. Ltd., London. Private address, Olphert Ave., Vaucluse. FU 7113.

DOYLE, Stuart Frank: Leading figure in amusement world of Australia. Was responsible for organisation of largest circuit of metropolitan picture theatres in Commonwealth; established first permanent production company for production Australian motion pictures and established distribution of British films. As chairman of Australian Broadcasting Co., actively worked on organisation of national broadcasting network for Commonwealth Govt. under contract and subsequently acted as chairman of the company when it purchased 2UW. Is chairman of directors Commonwealth Broadcasting Corp. Pty., Ltd., Fidelity Radio Pty., Ltd., Commonwealth Broadcasting Corp. (Q'land) Ltd., and is chairman several other commercial organisations in Australia. Managing director London Theatre Centre and is well known in U.S.A. as well as England for interests in theatrical, broadcasting and aviation; chairman of directors Aircraft Development Pty., Ltd., which represents several groups important aircraft manufacturers in England. Born 1/12/'87. Clubs: New South Wales Club, R.A.C.A., and R.M.Y.C. Hobby: Yachting.

DRAFFIN, James Charles, M. Inst. R.E. Aust.: Engineer, Broadcasting Department, Amalgamated Wireless A/sia Ltd., Sydney. Commenced in radio as Telegraphist with the Australian Forces in New Guinea 1916-21. 1922-25, Officer in Charge, Bitapapa Radio, New Guinea. 1927-35, Engineer in Charge, Beam Station, Fiskville, Victoria. 1935, transferred to head office, A.W.A., Sydney. Born 23/5/1893.

DUDMAN, Victor H.: M.Inst. R.E. (Aust.), Manager Transmission Department, Philips Lamps (A/sia) Ltd., 69-73 Clar-

ence Street, Sydney, N.S.W. 1919-28 Royal Navy and Royal Australian Navy. 1928 to date, Philips Lamps. Private address: 31 Bunyula Road, Bellevue Hill, Sydney. Born London, 2/7/'03.

DU MAURIER, Dr. Northey: Managing director, Du Maurier Productions Pty., Ltd.; qualified doctor of electro therapeutics,

gave up practice to give full time to producing; first health lecturer on the air in Australia in 1925. Recreations: Fishing and yachting. Born: London, April, 1884.

DUNNE, John S.: Studio Manager, Broadcasting Station 2SM. Twelve years with J. C. Williamsons in musical comedy and dramatic productions. Six years at N.S.W. Conservatorium of Music. Had broadcast with

(Continued next page.)

Who's Who - - - - - - - - (contd.)

DUNNE, John S.—Continued.
every National station in Australia and New Zealand for five

years before joining 2SM. Toured the world in 1935 for 2SM in search of programme features. Born Sydney, N.S.W.

DYBALL, Harold Frederick, L.I.C.A.: Manager and Secretary, 2TM Tamworth. Nine years with Australian General Electric Co. Ltd. Joined 2TM as Secretary 1/5/35. Appointed present position May, 1937. Private address: 51 Fitzroy Street, Tamworth, N.S.W. Born 19/11/11, Croydon, Surrey, England. Clubs: Tamworth Apex and Tamworth Golf. Recreations: Swimming, golf and tennis.

E

EDWARDS, George: Producer 2UW, Sydney. 30 Years as playwriter, producer vaudeville, musical comedy, drama. Private

address: "Darjoa," Longworth Avenue, Point Piper, N.S.W. Born Adelaide, S.A., 11/3/1886. Club: Tattersall's. Recreations: Golf, racing.

EDWARDS, James Roy, M. Inst.R.E. (Aust.), Technical Editor and Director Australian

Radio Publications Pty., Ltd., 30 Carrington Street, Sydney. Editor Proceedings Inst.R.E. Member Sydney Committee Inst. R.E. Entered radio as amateur experimenter 1919. General experience in radio, sound and broadcasting fields in South Australia until transferring to Sydney during 1930. Took over Factory Management of Custom Built Radio. Transferred to Kriesler Radio Company as Chief Engineer, and has held similar positions at Paramount, Radio and Crown Radio. Joined Australian Radio Publications Ltd. in July, 1935. Experience covers practically every phase of radio and sound equipment design and production, and special attention has been paid to the design and construction of testing and measuring equipment for laboratory, production and service work. Private address: "Brantwood Hall," Edgecliff, N.S.W. Born, 11/12/1907.

ERRINGTON, Miss Betty: Chief lady announcer 3BO Bendigo. Commenced broadcasting career with 3HA Hamilton.

Joined 3BO March, 1936, organised 3BO Women's Club, also conducts the children's sessions. Member Bendigo Repertory Society, Bendigo Shakespearean Society. Recreations: Tennis, dramatic acting. Born October, 1916, at Moonta, South Australia.

EXON, Frank C.: Managing Director, Fiji Broadcasting Co. Ltd., and Superintendent, A.W.A. Fijian Radio Service. Joined Royal Australian Naval Service 1915. Appointed A.W.A. marine staff 1920 in 1923, transferred to Coastal Radio Service. 1926, A.W.A. Engineering Dept., and in following year appointed to Beam Transmitting Station, Fiskville. Member Fiji Club. Born 6/4/'96, England.

F

FAIRHALL, Allen: Managing Director, Newcastle Broadcasting Co. Ltd. Five years elec-

trical trade. Six years present position. Private address: "Segjahoe" Flats, Wolfe Street, Newcastle. Born 24/11/'09, Morpeth, N.S.W. Club: Newcastle Rotary. Recreations: Golf, tennis, experimental radio.

FINDLAY, A. P.: Director Findlay's Pty., Ltd., Tasmania. Has spent 31 years in musical instrument business, with experience in England and Germany. In radio merchandising since 1924. Director and super-

visor 7LA Launceston. Managing director 7BU Burnie and 7DY Derby. Director Wills and Co. Pty., Ltd., Findlays' and Wills (Devonport) Pty., Ltd., Columbia Supplies Pty., Ltd., Tasmania. Educated Scotch College, Launceston. Member Northern Club, Launceston, C.T.A. Launceston, A.B.C. Bowling Club, Rotary Club, Launceston, president East Launceston Cricket Club. Born 1892, Launceston, Tasmania.

FINDLAY, Selwyn H.: Commercial Broadcasters Pty., Ltd., 80-82 Elizabeth Street, Hobart, Tasmania. Managing director 7HO. Manager Findlay's Pty., Ltd., musical instrument im-

porters, Hobart and Launceston. Member Kingston Reach Golf Club, Athanaeum Club, Royal Yacht Club. Recreations: Golf, tennis, yachting. Born Feb. 14, 1897. Launceston, Tasmania.

FISK, Sir Ernest Thomas, K.B.: F.R.S.A., F.Inst.R.E. (Aust.), Fel. I.R.E.(U.S.A.), A.M.I.E.(Aust.). Chairman and Managing Director, Amalgamated Wireless (A/sia) Ltd., 47 York Street, Sydney. Born at Sunbury-on-Thames, near London, 1886, joined Marconi Co. 1905. Trained and worked in all branches wireless engineering operation in England, America and other countries. 1909 went to Arctic icefields, demonstrated possibilities of wireless with Newfoundland sealing fleet. 1910 on board s.s. "Otranto" exchanged messages with H.M.S. "Powerful" in Sydney Harbour when "Otranto" was 200 miles north-west of Fremantle, a distance of 1,800 miles—a record in those days. Came to Australia 1911, as representative of Marconi Wireless Telegraph Co. Amalgamated Wireless incorporated 1913, appointed general manager with a seat on the Board; three years later became managing director. In September, 1918, received first direct wireless telegraphic mes-

sages transmitted from England at his station at Wahroonga, N.S.W. August, 1919, gave first public demonstration of broadcasting at Royal Society of N.S.W., Sydney. The establishment of the Beam Wireless Service between Australia and England was largely due to his experimental work and his consistent advocacy with both British and Australian Governments for the adoption of his plans for the service. Wireless Telephone Service between Australia and Homeland mainly due to his experimental work. The prestige of Amalgamated Wireless as one of the foremost wireless companies of the world is due to the broad vision and high executive ability of Sir Ernest Fisk, who, during the past 20 years, has developed wireless in Australia and in the Pacific from a national point of view. He is considered the foremost wireless authority in Australia. Visited England, U.S.A., and the Continent of Europe in 1933 investigating latest developments in wireless. Made a Chevalier of the Order of the Crown of Italy by the King of Italy. President, Institution of Radio Engineers (Aust.) since 1932. Created Knight Bachelor in Coronation Honours, 1937.

FITTS, Rupert A. M.I.R.E. (Aust.). General manager of the Victorian Broadcasting Network (3HA, 3TR, 3SH) has devoted his life to radio. For 10

years was with the Royal Australian Navy, followed by seven years on the technical staff of 3LO, 3AR. Radio Western 3HA's transmitter and studio were installed under Mr. Fitts' supervision, and he then carried on as chief engineer of the station until his appointment as manager some three years ago. Outstanding executive

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FITTS, R. A.—Continued.
ability and a knowledge of all departments of commercial radio have gained for Mr. Fitts the general managership of the Network. Recreations: Rifle shooting, motoring. Private address, 41 Rix St., Hawthorn.

FLEMMING, Claude: Actor and producer in charge of studio presentations at 2CH; first appeared on the stage at the Theatre Royal, Perth, W.A. in 1900; first appearance in

England with Beebohm Tree in "Trilby"; appeared at Covent Garden. Left Australia in 1926 to produce series of travelogue films, and appeared in Hollywood films. Returned to Australia to produce for the late E. W. Thring; produced the "March to Nationhood" pageant for Australia's 150th Anniversary Celebrations; considerable broadcasting work in America and in Australia. Joined 2CH May, 1938. Born Sydney. Recreation: Golf. Club: Savage Club.

FLETCHER, Charles A.: Advertising manager, Broadcasting Station 2GB Pty., Ltd. (2GB). Has had long advertising career. After several years in advertising dept., Chivers and Sons Ltd. (one of largest jam mftrs. in England), came to Australia 1912, and soon afterwards joined David Jones

Ltd., where he was later in charge of the firm's press publicity department. Subsequently had a deal of agency experience and then acted as advertising manager of Overland (Sydney) Ltd. Acquired an interest in Motor Life Publications Ltd., director-manager for seven years. Joined 2GB March, 1931. Recreations: Motoring, photography, golf. Born September 28, 1890, Appledore, Devon, England.

FOX, A. E. R.: Manager 2GF Grafton. Entered Telegraphs and Wireless branch Postmaster General's Dept., 1926. Qualified 1st Class Commercial Wireless Operator's Certificate, 1929. Technical staff National Broadcasting Service 3LO-3AR Melbourne, 1930. Victorian Police Radio Division, 1933. Manager Store Publicity Co., 1933. Founded Fox Displays Co. (Melbourne) 1934. Joined Amalgamated Wireless (A/sia) Ltd., Marine Dept., 1935. Transferred Broadcasting Dept., 1936. Attached A.W.A. recording studios and Stations 2CH Sydney, 2GN Goulburn, 2AY Albury, 4WK Warwick and World Experimental Station VK2ME Sydney. Appointed present position 1937. Sub-lieutenant R.A.N.R. A.M. InstR.E.(Aust.). Born September 28, 1910.

FRANCIS, Maurice: Dramatist, George Edwards Productions. Has been journalist, commercial traveller in Melbourne and New Zealand. Edu-

cated Wesley College, Melbourne and Melbourne University. Private address: 112 Roseville Ave., Roseville, N.S.W. Borne 1904 Durban, South Africa. Clubs: C.T.A., Old Wesley Collegians. Recreations: Motoring, golf and bridge.

G

GAINFORD, Rodway Clive: Chief Announcer 2UE. Opened first miniature golf course in Australia; commenced stage career with J.C.W. over 12 years ago; toured Australia and New Zealand under Fuller's management; entered radio 1931 with 4BC to become chief announcer; one year with 3AW; deputy manager and chief announcer 4BK-AK; toured America for one year; joined 2UE 1937. Born: Parramatta, November 28, 1895. Clubs: Microphone. Recreations: Reading, walking and motoring.

GARDEN, Harcourt M.: Educated at Fort Street High School and Newington College, Sydney. Joined 2KY as announcer in July, 1929; graduated to Assistant Manager and Programme Director, which positions he now holds. Recreations: Golf, motoring and riding.

GEEVES, Philip: Announcer 2CH. Educated Canterbury High School, specialising in languages for which he secured his diploma. Entered radio in 1936, when he joined Amalgamated Wireless (A/sia) Ltd. as announcer at 2CH; was appointed announcer for the A.W.A. world-range station, VK2ME April, 1937. Recreations: Shooting, swimming.

GENDLE, Charles Henry: Managing Director Australian Record Company, formerly Featuradio Sound Productions (N.S.W.) Pty., Ltd. Previously general manager Vocalion Gramophone Co. Ltd. (Aust.), 1926-33. Secretary and general manager of Vocalion Gramo-

phone Co. Ltd. in London 1921-26, and prior to that a director of World Record Co. Ltd. Arrived in Australia 1926 to establish Vocalion factory for recording and production of records. Established Sound Recording Division of Featuradio Sound Productions Pty., Ltd., Melbourne, Victoria. Born London, 1893. Private address, 12 Boronia Road, Belevue Hill, N.S.W. FM 5355.

GIBSON, Miss Grace: Manager, American Radio Transcription Agencies, 29 Bligh Street, Sydney. Came to Australia from America four years ago representing 16 leading

American transcription companies. Since then has been in charge of sales for above company in Australia and New Zealand. Before coming to Australia was associated with Radio Transcription Co. of America and KFWB broadcasting station, Hollywood. Recreations: Riding, yachting, surfing. Born El Paso, Texas, U.S.A.

GILMOUR, Norman Stanley: Managing director Lekmek (Australasia) Ltd., 75 William Street, Sydney. M.Inst.R.E. (Aust.) and President of the Institution 1938-9. Millions Club. Amateur Experimenting 1910. Telegraph Branch P.M.G.'s Dept., till 1915, Engineer Postmaster-General's Department (N.S.W.) 1915-1922. 1922-1927

Director L. P. R. Bean & Co. Ltd.; 1927-31, Director Stromberg-Carlson (A/sia) Ltd.; 1931, founded Lekmek Radio Laboratories. Born 25/9/1890. Recreations: Swimming and tennis.

GOLD, Edward: M.Inst.R.E. (Aust.), Managing Director Gold Radio Service Pty. Ltd., 4GR and Chairman of Directors 4ZR Roma, Superintendent C.B.N. Queensland country units. Consulting Engineer to Empire Theatre (electrics and sound), 1912, electrical mechanic and fitter; 1916 theatre operator-

electrician. 1920 entered experimental radio. 1925 designed, operated and owned Queensland's Pioneer Commercial Broadcasting Station, 4GR. 1925 designed and constructed the new ½ k.w. 4GR installed in Drayton. Designed and now supervising (in 4GR workshops) the new station for 4ZR, Roma. Designed and supervised all lighting and power equipment, including modernistic lighting) in Queensland's best and largest provincial theatre (Empire, Toowoomba). Clubs: President R.A.C.Q. and M.C.C. Tennis Clubs, Vice-president City Golf Club. Member Rotary Club. Recreations: Tennis and golf.

GOODY, Herbert: Aust., Record Co. former. Technical Manager, Featuradio Sound Productions Pty. Ltd., 32 Market Street, Melbourne, C.1. Has spent the past 20 years with various record manufacturers in all departments. Born London. Recreations: Golf, riding and wrestling.

Who's Who - - - - - - - - (contd.)

GOUGH, John T.: General Manager 7LA Launceston. Native of Melbourne. Educated at Hawthorn, Victoria. Ex-commercial traveller and Association member of the C.T.A. Pro-

minent in Tasmanian competitions (literary) and winner of the Grand Champion for Elocution on five occasions. Stage-managed many theatrical productions. Adopted radio as a profession at the inception of 7LA in 1930 in the capacity of advertising manager, copywriter and announcer. Recreation: Gardening.

GREENHALGH, Kenneth Neal, A.M.Inst.R.E. (Aust.): Chief Engineer Commercial Station 2KO (Newcastle Broadcasting Co. Ltd.), 1927-29, final two years of apprenticeship in Electrical Branch Government Tramways. 1929 operator experimental Station 2KG. 1932 appointed Chief Engineer Station 2KO. Born 27/2/1909.

H

HAINES, Frank Benson: Sales representative 2GZ; born Chicago, U.S.A., travelled in Canada and came to Australia at early age. Accountant in Perth, W.A. Sales promotion in Sydney; joined 2GZ at its establishment. Private address 10 Boyle Street, Mosman. Recreations: Motoring, tennis, golf.

HALLSWORTH, Norman Frederick Deaves: Programme director 2HR; formerly manager 3YB Warrnambool. On West Coast of Africa with trading firm. Travelling representative in the Far East, covering Ceylon, Straits Settlements, Java, Sumatra, Siam, Indo China, China, Japan and East Russia. Born 31/7/1898, Rock Ferry, Cheshire, England. Clubs: Life member Singapore Cricket Club and Royal Singapore Yacht Club.

HARNETT, Dominic: Chief Announcer 2SM, Sydney. Born Sydney 1905. Educated Patrician Brothers, Sydney and Ryde. Graduated from amateur theatricals to stage and picture work. Taught singing by Professor Bindley, Melbourne and Francis Halls, Sydney. Joined Station 2SM Sydney as announcer August, 1934. Recreations: Golf, tennis.

HARPER, John: Announcer, 2KY, Sydney. Ten years with J. C. Williamson and Fullers. Two years Paymaster on Government Silos, Temora, 1920-1922. With 11th Battalion, A.I.F. Born Mosman, N.S.W., 4/6/'01. Member of Automobile and Microphone Clubs and Y.M.C.A.

HARRIS, Hector McDonald: Secretary, 3AW Broadcasting Co. Pty. Ltd., Melbourne. Joined 3AW at inception, February, 1932, and was appointed secretary October, 1932. Born 22/12/1901. Recreations: Golf and tennis.

HARRIS, Robert Keith: Manager radio advertising dept., Amalgamated Wireless (A/sia) Ltd., Sydney. Joined A.W.A. May, 1927, and successively held responsible positions in the sales dept. (Radiolas), accounts section, purchasing dept. until present appointment, 1933. Member Fed. Inst. Accountants. Recreations: Shooting, photography, reading. Born Jan. 20 1911, Sydney, N.S.W.

HARRISON, Eric: General Manager 2LM Lismore, North Eastern N.S.W. Past experience: Director of Publicity, Palais Royal, Sydney, 7 years.

Publicity Manager, Union Theatres, St. James, Sydney, etc. General Manager Broadcasters Aust. Pty. Ltd. (4BH, Brisbane). Born Nottingham, England, 17/2/'93. Clubs: R.A.C., Lismore Golf. Recreations: Motoring, fishing, golfing.

HARTY, Frank Sturge: 2KY Sydney. Conducts "Let's Talk It Over" session. Educated Jamaica College, B.W.I. Served

with Imperial Forces (1914-1919), France, Greece, Serbia, Egypt, Palestine. Lecturer in industrial organisation, New Zealand, United States, Great Britain, Australia. Edited a weekly journal 1930-33. With 2UE 1934-1938, joined 2KY April, 1938. Recreations: Tennis and walking.

HARVEY, William James: Chairman of Directors, 4BU, Bundaberg Broadcasters Pty. Ltd., Bourbong Street, Bun-

daberg, Queensland. Arrived in Queensland, 1908. Manager, Bundaberg Hardware Co. Ltd., 1909-1917. Joined Wyper Bros. Ltd., Hardware Merchants and Manufacturers, October, 1917, appointed Managing Director, 1929. Clubs: Rotary, Burnett, Bowling. Born 13/6/1877, Banff, Scotland.

HEATH, L. Roy: Sydney sales executive of the Macquarie Broadcasting Network. Trained as civil engineer; entered commercial world and was in turn sales manager, manager and proprietor of car firms. Joined Melbourne "Age" advertising staff. Transferred to 3HA as Melbourne sales manager. Acting Melbourne manager Vic-

torian network during part of 1937, and later manager of 3HA. Became N.S.W. representative Victorian Network February, 1938. Commenced present position 1/7/'38. Recreations: Swimming, motoring, amateur dramatics.

HIGGINBOTHAM, E.: Chairman of Directors and Managing

Director, 2TM. Arrived Australia 1930, 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 14/2/'35 to open up Station 2TM.

HOAD, Arthur E.: Engineer and Programme Producer, Broadcasting Station 2GF Grafton. Appointed February 1, 1938. Previously held same position station 4CA Cairns from September 3, 1936. Engineer-announcer Station 3BO Bendigo nearly two years. Earlier experience at 4TO Townsville and Sydney. A.M.Inst.R.E.(Aust.). Born March 24, 1911, Greenwich England.

HOOKE, Lionel Alfred: General Manager, Amalgamated Wireless (A/sia) Ltd., 47 York Street, Sydney, N.S.W. M.I.R.E. (America), Councillor and M. Inst.R.E. (Aust.). Joined Amal-

gamated Wireless 1913, and in 1914 joined Shackleton's Polar Expedition. During war commissioned in New Zealand Royal Naval Volunteer Reserve, served as commissioned officer in submarine chasers. Transferred as pilot to Air Force, subsequently commanding Air Station at Bude. On return to Australia appointed Melbourne office A.W.A., and later became Melbourne Manager. Transferred to Sydney as Assistant Manager and became Deputy-General Manager 1925. Appointed to present position 1936. Travelled Europe and America for A.W.A. in 1930-32 investigating world's development in radio. Councillor Institution Radio Engineers, Australia. Born 31/12/1894.

HOOPER, Edgar M., A.M.Inst. R.E.Aust., Assoc.I.R.E.(U.S.A.): Engineer in Charge 3DB, Melbourne. Experienced in marine operating, A class broadcasting, equipment design, construction and maintenance. Recreations: Amateur radio, tennis and motoring.

HORNER, H. G.: General manager of Broadcasting Service Association Pty., Ltd., and Broadcasting Station 2GB Pty., Ltd.; director, Macquarie Broadcasting Services. Educated King's College, Canterbury. Took up farming in New Zealand at 18 years of age; studied accountancy. Appointed accountant and assistant secretary to Sun Newspapers in 1923. Commissioned by the board to investigate 2BL, and after re-organisation of the station remained as acting manager until 2FC and 2BL amalgamated; returned to Sun Newspapers as general secretary, and manager of New

(Continued next page.)

Who's Who - - - - - - - - (contd.)

HORNER, H. G.—Continued.

South Wales Australian Broadcasting Co. Ltd. When the Australian Broadcasting Commission was formed, was appointed New South Wales manager in control of 2FC, 2BL and country relay stations. In 1937 accepted position of general manager Broadcasting Ser-

vices Association Pty., Ltd., and Broadcasting Station 2GB Pty., Ltd. Later appointed Director of Broadcasting of the Macquarie Network of Macquarie Broadcasting Services Pty., Ltd. on the formation of the company. Has been actively associated with some notable broadcasts, including initial flight of the "Southern Cross," "The Southern Seas Broadcast" in 1933, and many prominent orchestral concerts and recitals. Was instrumental in the formation of Australian Broadcasting Commission Symphony Orchestra, and initiated many features of the Commission, such as first Grand Opera seasons and the importation of celebrity artists and conductors. Born Beckenham, Kent. Recreations: Golf. Clubs: Lakes Golf Club.

HUME, Ernest J.: Chief Engineer, 5DN Adelaide. Actively engaged in broadcasting since 1923, and associated with 5DN since its inception. Has had experience in designing several complete installations. Educated at Scotch College, Adelaide.

J

JOHNSON, William John: Secretary and Advertising Manager, Station 4IP, Ipswich. Saw service with A.I.F. at Gallipoli and in France. Partner in F. W. Johnson and Sons, motor traders, Ipswich. Born at Ipswich 10/11/'33. Member of Rotary and Legacy Clubs. Ardent bowler.

JOHNSTON, William W.: Secretary 2HD, Newcastle. Has travelled in Africa, U.S.A., and Canada. Came to Australia in 1918. Broke into radio at Newcastle with 2HD, where he is well-known and popular. Born 26/10/1873. Recreation: Hiking.

JOYCE, Donovan: Continuity manager 3KZ Melbourne. Educated Scotch College, Melbourne, followed with several years journalistic and advertising experience. Nine years in radio, seven of which have been in commercial radio. Wide experience country broadcasting with 3HS (now 3LK), 3MA, 2PH, and 5DN Adelaide, from where he was appointed to present position at 3KZ in 1935. Conducted station's Sunday morning broadcasts for 2½ years and is author of many successful scripts and productions. Originator "Radio Cinema" in Australia. Hobbies: Collecting curiosities.

JOYCE, James: Production Liason Officer, Macquarie Broadcasting Services Pty., Ltd., formerly Sales Promotion Manager, Featuradio Sound Productions (N.S.W.) Pty., Ltd. Joined original Featuradio Melbourne Company 1934, later becoming Manager for Victoria. Transferred to Sydney in 1936 to

take chage of sales and production. Spent nine years in the professional theatre and nine years broadcasting and recording. Produced the first Australian electrical transcriptions and recorded announcements when operating the old Decca studios. Station Manager for 3YB for two years, later with 3DB and 3AW. Also writes many radio scripts. Transferred to present position early in 1938.

K

KAUPER, Henry Alexis, M. Inst.R.E.(Aust.), Technical Supervisor 3DB. 1918-19 Research

Branch, Royal Air Force. 1919-22 Aircraft Engineer. 1922-35 various radio activities, including 3 years Chief Engineer of 5CL. Born 12/3/1888.

KEMP, Sydney Joseph Albert: Manager, Station 3YB. Educated St. Peter's Grammar School, Sussex, England. Served during war with Royal Naval Volunteer Reserve. Five years with Marconi International Marine Communication Co. (London). Private wireless operator to the late Viscount Leverhulme on his yachting business expedition to West Africa in 1924. Associated with The Argus past ten years on the Advertising Staff, and from 1932-6 as Sales Promotion Manager. Born 6/11/1900, Bexhill-on-Sea, England. Clubs: Shepparton Golf. Recreation: Golf.

KEMSLEY, A. N.: General Manager, Station 3UZ, Nilsen's Broadcasting Service Pty. Ltd. Born South Australia. Married. Private address: Elwood. Past

President of Legacy Club and Past Vice-President of Australian Federation of Broadcasting Stations. Member of the State War Council of Victoria and member of the Advisory Committee of the Toc H. for Victoria.

KENNEDY, T. St. J.: Manager 6PR Perth. Appointed February, 1938. Formerly for six years secretary of Nicholson's Ltd., owners of 6PR with which firm has been employed for 14 years. Recreations: Cricket, hockey. Delegate to West Australia Cricket Assn., playing member and delegate East Perth Cricket Club, vice-pres. W.A. Hockey Assn., member interstate hockey team 1932-33. Covered last interstate hockey carnival for national station 6WV, also covered cricket tests 1936 for 6PR.

KERR, Alfred Dixon: Engineer, 3BA Ballarat. Has held experimental transmitting licence since 1926. Was one of the founders of 3BA and a Director until the original company sold out to "The Courier." Is member of Wireless Institute of Australia and member R.A.F. Wireless Reserve.

KING, Robert Arthur, M.L.C.: Secretary, 2KY, Sydney. Four years organising secretary and 3 years as Secretary of the Labour Council of N.S.W. A member of the Legislative Council for 3 years and on the reconstruction of the Council was elected for 12 years. Born 10/4/'86 in Launceston, Tas. Recreations: Swimming, football and athletics.

L

LANE, Reginald E., Sales Manager 2CH, Sydney. Branch Manager, Cooper Engineering Co. Ltd., Melbourne, 1923-8. Advertising Manager Ford Motor Co. of Aust. Pty. Ltd., 1928-31. Toured the world to write articles on overseas conditions for Australian newspapers in 1931. Publisher and Editor 1932-4. Entered broadcasting

at 2CH August, 1934. Educated at Newington College, Stanmore, N.S.W. Began commercial career in accountancy and qualified in that profession but gradually worked into sales and advertising management. Former Rugby International and prominent in other sports in Sydney and Melbourne. Born Tenterfield, N.S.W., 1898.

LARKIN, J. S.: Advertising and Sales Manager, Station 3UZ —Nilsen's Broadcasting Ser-

vice Pty., Ltd. Born Melbourne. Recreations: All sport.

LARKINS, Frederick William: Publicity Manager, Amalgamated Wireless (A/sia) Ltd., 47 York Street, Sydney. Associate of Commonwealth Institute of

Accountants. Associate of the Chartered Institute of Secretaries, Holder of Diploma in

(Continued next page.)

Who's Who - - - - - - - - (contd.)

LARKINS, F. W.—Continued. Economics and Commerce (Sydney University). Joined Australasian Wireless Co. Ltd., as Accountant July, 1912, appointed Accountant to Amalgamated Wireless (A/sia) Ltd., on formation, July, 1913, until 1923, when he took over duties of Publicity and Advertising Manager on the creation of that section of A.W.A. activities. Private address: 61 Wolseley Road, Mosman.

LAWRENCE, Arnold Egerton: Station Manager, Warwick Broadcasting Co. Pty. Ltd., Station 4WK, Warwick, Southern Queensland. Entered radio in Marine Service A.W.A. 1919. After 6 years sea service transferred to engineering staff A.W.A. Melbourne, and appointed to studio of 3LO in 1925. Associated with phenomenal growth of radio in Victoria and divided time between studio and station, including A.W.A. short wave transmitter VK3ME. Then appointed Manager of 3BO Bendigo, transferred to A.W.A. station 2AY, Albury, in 1931 as Station Manager. 1935 installed 50 watt transmitter of 4WK Warwick, was appointed Manager and organised the station. Holder of Washington-Madrid Convention Certificate of Proficiency in Radio Telephony and Telegraphy, 1st Class.

LAYTON, Kenneth George: Chief night announcer at 2CH. Only articled tobacco-growing pupil of Cambridge College in England; came to Australia in 1913; took up station work; 3 years war service. Entered real estate work after the war; entered broadcasting in March, 1934, and joined 2CH March, 1937. Born Fulbourne, England, 18/12/1898. Recreations: Tennis, swimming, gardening. Clubs: Masonic and Microphone Clubs.

LEOPOLD, Ward: First appeared on stage at age of three. Experience of musical comedy and drama since 1915. Took up writing and producing for the stage. Entered radio, writing own songs and productions.

Combined journalism and radio, 1925-1935. Joined Trans-Radio News October, 1935, as Producer of Woman's Magazine of the Air. Born, Sydney, 1904. Recreations: Swimming, literature, fishing, gardening.

LEVY, Francis Edward: Sales Manager 2UW, Sydney. Educated Wellington College and Victoria University, N.Z. Studied law in Wellington 1918-20; joined Goldbergs' Wellington office 1920, Manager Auckland office Jan., 1924. Assistant Manager

Wellington, October, 1924; returned to Auckland, 1925; appointed a director 1926; Director of Australian Company with headquarters in Sydney 1930-34; joined 2UW September, 1934, as service manager, and was appointed Sales Manager July, 1935; President Auckland Advertising Club, 1929. Born 5/2/'02 in Wellington, N.Z.

LEWIS, Edwin James: Manager Station 3UL Warragul. Joined 3LO, 1924, in Charge Programme Department, 1925-9. Went to 3DB until April,

1930, then became Manager 7ZL Hobart. Transferred Brisbane as Manager for Queensland in January, 1934. Born 1/10/1891, Ystradygynlais, Wales. Recreations: Fishing, motoring, gardening.

LEWIS, Herbert James: Manager and Chief Engineer, Station 2GN, Goulburn Broadcasting Company. Was electrical

engineer and joined Amalgamated Wireless 1925 as draftsman at Radio Electric Works; became works buyer and then buyer for the Company. Transferred to Broadcasting Department, January, 1936.

LINCOLN, Reginald: General Manager, Sport Radio Broadcasting Co. Ltd., 5KA, Adelaide, since June, 1932. Associated intermittently with radio since 1923. Born in London, England, 29/6/'93. Recreation: Golf.

LIPPMANN, L.: News editor "Broadcasting Business." Former newspaper journalist, N.S.W. Victoria and Queensland. Editor Bundaberg "Daily Times." Joined Australian Radio Publications Pty., Ltd., March, 1937. Clubs: Microphone. Recreation: Fishing.

LYONS, Norman: Station Manager 2UW. Educated Greenwood. Entered radio 1927. Conducted boys' sessions for 2FC and 2BL under the nom-de-plume of "Mr. Norman." Created Australian wide interest in Model Aeroplanes. Joined the Australian Broadcasting Company when they controlled the National Stations as Officer-in-charge of Outside Broadcasts, and Talks Editor. Transferred from National Stations to 2UW as Studio Manager when it came under control of the Commonwealth Broadcasting Corporation. Appointed present position January, 1937. Hobbies: Radio, aviation and golf.

M

McCAULEY, George Edward: Managing director Transcontinental Broadcasting Corporation Ltd. Director 2KA Ltd.

and Radio Kempsey Ltd. Partner McCauley and McCauley, public accountants, since 1926. Born Clifton, Qld. Married. Private address: 358 Edgecliff Road, Woollahra. Recreation: Golf.

McDONALD, Arthur Stephen: Chief Engineer and Assistant

Manager, Amalgamated Wireless (A/sia) Ltd., 47 York St., Sydney. M.I.R.E. (America) and M.Inst.R.E. (Aust.). Councillor of Inst.R.E.(Aust.). Born Castle Donnington, now Swan Hill, Vic. Educated at public school and Melbourne Technical College.

McGUIRE, Wm. S.: Construction Engineer, Colville Wireless Equipment Co. Pty. Ltd.

Technical training with Marconi School. Eleven years with Colvilles. Born 1911, Sydney. Hobbies, tennis and motoring.

McNAIR, William Allan, M. Com., Dip.Soc.Sc., A.A.I.S., A.R.A.N.Z., Director, Secretary and Research Manager, J. Walter Thompson (Aust.) Pty. Ltd., since 1932. Educated Auckland Grammar School and Auckland University College. Ten years business, legal and teaching experience in New Zealand before entering advertising. In 1927 wrote extensive study of New Zealand's trade with the East. Joined J. Walter Thompson organisation in 1930, as Accountant and Research Manager, Wellington office. Since specialising in advertising, has conducted numerous market and media surveys, and in April, 1937, published a comprehensive text book on advertising and broadcasting, entitled, "Radio Advertising in Australia."

McNEIL, Thomas A. E.: Commenced radio March, 1918, with Marconi Company as marine operator. Broadcast experience dated from 1926. Joined 2BL as Technician in 1927, and was made supervisor when P.M.G.

took over the engineering side of "A" class stations in 1929. Left P.M.G.'s Department October, 1921, to take position as Chief Engineer of 2CH, which station opened in February, 1932. Continued in this position until August, 1936, when transferred to A.W.A. Transmitter Installation work. Joined Station 2UW as Chief Engineer in December, 1936. Born London, February, 1901.

Who's Who - - - - - - - - (contd.)

McQUILLAN, Cecil John: Chief Radio Systems Engineer, Standard Telephones and Cables (A/sia) Ltd., 258 Botany Rd., Alexandria, N.S.W. B.Sc. (Engineering) Honors London University, D.I.C. (Diploma of the Imperial College, London), Whitworth Exhition, M.I.R.E. (America). Private address: "Cheddington," Elizabeth Bay Road, Sydney. 1923, joined Standard Telephones & Cables Ltd., London. 1933, visited England and the Continent to study latest technique and returned to Australia to carry out contract with Postmaster General's Department for the manufacture, supply and installation of seven new Regional Stations to be erected at Launceston, Townsville, Grafton, Sale, Dubbo Murtoa and Katanning.

MALONE, James J.: M.Inst. R.E.(Aust.) Chief Inspector Wireless Postmaster-General's Department, Treasury Gardens,

Melbourne, Chairman Melbourne Division, Institution Radio Engineers Australia, 1935-6-7. Served as Wireless Officer R.A.A.F. in France. Recreation: Golf.

MARDEN, Charles Frank: General Manager Australian Broadcasting Co. Pty. Ltd., and Commonwealth Broadcasting

Corporation Pty. Ltd. Director and General Manager Commonwealth Broadcasting Corporation (Q'land) Pty. Ltd. Was General Manager for Australian Broadcasting Company when it controlled the National Stations, was responsible for co-ordinating all services and the formation of the National Network, and at present General Manager of Station 2UW Sydney. Private address: 41 Chamberlain Avenue, Rose Bay, N.S.W.

MARSH, Gordon W.: Director and General Manager, Station 5DN Adelaide since June, 1935. Prior to that was Assistant Manager 4BK Brisbane, and before that Manager 3HA Hamil-

ton. As a newspaper man was associated with "Daily Guardian," "Daily Telegraph," "World," "Motor in Australia," and "Flying." Held executive positions in four States. Travelled abroad. Clubs: Amateur sports, Naval and Military, United Services (Q.). Recreations: Squash racquets and golf.

MASSEY, Gordon Frederick: Radio Manager, The Paton Advertising Service Pty. Ltd., Capel Court, 375 Collins Street, Melbourne, C.1. Graduated to Queensland Managership of Commercial Investment Trust by way of Vacuum Oil and

General Motors Acceptance Corporations. Obtained experience in England, Europe and the Far East. On return to Australia entered 3KZ Melbourne for first commercial radio experience. Joined 3AW in same capacity, and in turn became Feature Announcer, Continuity Chief, Studio Manager, Programme Manager, and finally, Production Manager. After four years intensive experience with 3AW in every branch of commercial broadcasting, resigned November, 1936, to establish Radio Division for The Paton Advertising Service Pty., Ltd. Born Melbourne, 1907.

MATHER, Lezlie Garnet: Melbourne sales executive Macquarie Broadcasting Services Pty., Ltd. Educated Gilford Grammar School, Perth, and Melbourne University. Four years A.I.F. Australian factory representative for English and French manufacturers: company manager and sales manager 1920-24. General storekeeper 1926-28, sales manager 3DB Melbourne 1928-34. Business visit overseas 1934-5, sales manager Stokes and Sons, Melbourne, 1935-6, and Melbourne representative stations 1936 onwards. Recreations: Golf.

MATHERS, Arthur Joseph: Advertising Manager 3AK. Past radio experience, chief announcer and sporting commentator 3KZ, 1930-31. Studio and advertising manager 3BA 1932, radio department Nekay Advertising Agency, 1933. Continuity writer and advertising rep. 3HA

1934; later manager 3HA. Free lanced sporting broadcasts and travel talks 3DB, 3UZ, 3KZ, 1935, then joined 3TR as continuity writer and transferred to 3HA as assistant manager. Appointed manager 3SH April, 1937. Commenced duties as manager of Radio Western, January, 1938. Born October 26, 1910, Hawthorn, Vic. Member Old Xavierians. Recreations: Tennis, golf, riding, play writing.

MAXWELL, Sidney Aubert: Director and Founder, Trans-Radio News and Sales Service. Was Officer of Commonwealth Bank for over 9 years. Prominent in Automotive circles holding Sales Executive positions. Chairman of the Commercial Vehicle Division of the Motor Traders' Association. Member of the Executive of the M.T.A., 1931. Sales Executive experience in Grocery and Chemical

Industries. Prominent sportsman Captain of Leichhardt Rowing Club for some years; Hon. Secretary of the N.S.W. Rowing Association. Regarded as an able organiser with a natural flair for entertainment. Born 22/10/1900, Waverley, N.S.W. Club: Royal Automobile Club of Australia, Recreations: Rowing, tennis, swimming, surfing and physical culture.

MEANY, Right Rev. Monsignor James: Managing Director Station 2SM Sydney. Parish

Priest, Archdiocese of Sydney. Domestic Prelate to His Holiness Pope Pius XI.

MEREDITH, Si.: Announcer 2UE, Sydney. Born and educated in N.S.W. Originally intended to become an accountant, but relinquished lucrative position to take up stage career. Has toured Australia and N.Z. extensively. Entered radio 10 years ago, and for past 7 years with 2UE as announcer. President of the N.S.W. Microphone Club for 1936-37. Fond of all sports, especially fishing and motoring.

MILLAR, Christopher Kenneth. Secretary and accountant 2GZ Central N.S.W.—associate member Federal Institute of Accountants and Australasian Institute of Secretaries; A.I.F. 1914-1919, rank of captain, M.C.; member Imperial Service Club, Sydney. Hobby, vegetable gardening.

MILLAR, George: Chartered Accountant (Aust.), Secretary Macquarie Broadcasting Services Pty., Ltd., and Director of Broadcasting Service Association Pty., Ltd., formerly secretary of 2GB; general secretary to the Surf Life Saving Association of Australia. Clubs: Manly Golf Club, North Steyne Surf Club. Recreations: Golf and tennis.

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.

Who's Who - - - - - - - - (contd.)

MINGAY, Oswald Francis: M.Inst.R.E. (Aust.), M.I.R.E. (U.S.A.), Managing Director Australian Radio Publications Pty., Ltd., Managing Editor and Proprietor "Radio Retailer of Australia," "Radio Trade An-

nual," "Broadcasting Business," 30 Carrington Street, Sydney. Hon. Gen. Secretary Institution of Radio Engineers Australia, since its inception in 1932; Hon. Secretary, RIF (Radio Industry Functions) Club of Sydney. Served in Signals A.I.F. 1915-1919. Member Millions Club, Imperial Service Club, Sydney Legacy Club. Founded Australian Radio College 1930-33. Founded Australian Radio Publications 1930. Private address: 4 Woodside Avenue, Lindfield, N.S.W. Born 1/7/'95.

MITCHELL, V. F.: General sales manager J. B. Chandler and Co., 43 Adelaide Street, Brisbane. Managing director 4BH Brisbane. Clubs R.A.C.Q., Royal Aero Club. Born Bendigo, Victoria.

MORELL, Musette: Member of Fellowship of Australian writers. Adapts musical comedies for radio presentation, writes original radio musical comedies and plays for A.B.C. Stations. Has written verse, short stories, lyrics, etc. Written additional verses and choruses for Ella Shields, Gladys Moncrieff, Cecil Kellaway, Hetty King, Marie Burke, etc. Also written three full length plays and produced them at the Sydney Savoy and the Suburbs. Born Sydney, N.S.W. Recreations: Play-going and reading.

MONKS, Cuthbert A.: Sydney representative for 2HD,

2PK, 2MO, 2MG, 3AK, 5KA, 5AU, 7UV. Became associated with radio eight years ago through 2HD. Born in the Riverina district. Recreations: Tennis and motoring.

MORGAN, Sydney: Managing Director 3KZ Broadcasting Co. Pty. Ltd., 64 Elizabeth Street, Melbourne. Member Victorian

Institute of Advertising. Principal in firm of Val Morgan and Sons Pty. Ltd. Associated with advertising activities in Melbourne since 1917. December, 1930, one of the founders and Director of Station 3KZ. Appointed Managing Director, June, 1932. Clubs: Yarra Golf and C.T.A.

MUIR, Ron: Announcer, sporting commentator, continuity writer 6GE Geraldton. Educated Scotch College, study-

ing for journalism. Two years reporter "Wireless News," Perth. Original announcer 6GE. Successful short story writer, and now devoting time to radio play writing. Born: Perth, 22/8/1916. Clubs: Old Scotch Collegians, Utakarra Golf Club. Recreations: Golf, swimming and writing.

MURRAY, Archibald James: Sales Manager 3KZ Advertising Service Pty. Ltd. since July, 1936. Served with A.I.F. for 3½ years, attaining the rank of Captain; the Military Cross, and was mentioned in Despatches. Has had considerable experience in the commercial world, including a long connection with the Texas Oil Co. Whilst in America made an extensive survey of modern merchandising methods, and is a keen student of scientific selling.

MURRAY, John William: Director, Fidel-a-Tone Sound Productions. Formerly Hoyts Theatres Sound Technician: Recording Engineer Efftee Films 1931-36; Recording Engineer Efftee Broadcasters (3XY). Recorded first radio dramas on film for 3XY. Born 29/12/'05. Married. Club: Old Scotch Collegians. Recreations: Tennis, boxing.

N

NICHOLAS, William R.: Engineer-in-Charge, Commercial Broadcasters Pty. Ltd. (7HO). Previously assistant engineer 7HO and private experimental work. Recreation: Motoring. Born 16/11/'13 at Hobart, Tas.

NICHOLSON, Russell Malcolm, B.O.C.P., A.M.Inst.R.E. (Aust.): Managing Director, Central Western Broadcasting Co. Pty., Ltd., Eagle Street, Longreach, Q. Born 9/8/'09. Recreations: Swimming, tennis.

NILSEN, Oliver J.: Governing Director, Station 3UZ—Nilsen's Broadcasting Service Pty. Ltd., Oliver J. Nilsen Pty. Ltd.,

Melbourne and Adelaide. Neon Electric Signs Pty. Ltd., Nilsen Cromie Pty. Ltd. Private address: Elsternwick. Born Melbourne. Married. Melbourne City Councillor, Member Electric Supply Committee, Public Works Committee, Traffic and Building Regulations Committee Properties Special Committee. City Council's representative on Victorian Civil Ambulance Service. Club: Rotary.

NILSEN, Oliver Victor: Manager of Construction Department of Oliver J. Nilsen Pty. Ltd., also Director of Oliver J. Nilsen Pty. Ltd., Nilsen's Broadcasting Service Pty. Ltd., and Nilsen, Cromie Pty. Ltd. Private address: Kew, Vic. Born Melbourne. Club: Councillor Old Scotch Collegian Club. Recreations: Keen follower of all sport.

O

OGILVY, Clive: General sales manager Macquarie Broadcasting Services Pty., Ltd., Programme Division. Also Director

Canberra Broadcasters Ltd.; alternate Director Hunter River Broadcasters Pty., Ltd., and Wollongong Broadcasting Pty., Ltd. Director Figtree Studios Ltd., and Argosy Films Ltd. Commenced radio career with 2GB, then joined Australian Broadcasting Federation as political officer. Arranged the purchase of 2CA Canberra for Denison Estates Pty., Ltd. Became attached to the latter company in a radio advisory capacity until the formation of Macquarie Broadcasting Services Pty., Ltd. Born Sydney 7/11/'08. Recreations: Golf, tennis, swimming, riding.

P

PALMER, Benjamin: Sales manager, Hunter River Broadcasters Pty., Ltd. (2HR). Spent two years abroad 1922-24, England, Ireland, South Africa. Formerly sales superintendent machinery manufacturers (8 years). Entered broadcasting with 2GB Sydney and appointed present position soon after 2HR started operations. Recreation: Golf. Born December 12, 1904, Newcastle, N.S.W.

PEASTON, Hugh H.: Engineer-announcer. Station 2GF Grafton. Appointed present position 4/10/'37. Previously spent two years at 4WK Warwick in same capacity. Joined A.W.A. 1931. Recreation: Tennis. Born November 24, 1917, Kilmamock, Scotland.

PFEIL, Ronald William: Melbourne representative Australian Radio Publications Pty., Ltd., and Mingay Publishing Co., publishers of "Broadcasting Business, "Radio Retailer," etc. Secretary, Melb. R.I.F. Club. Past experience: Sales manager, studio manager and announcer at 7HT Hobart, advertising manager and an-

nouncer, 5RM Murray Heights from station's inception until joining 3MA Mildura. Hon. secretary of the R.I.F. Club of Melbourne, also hon. secretary Victorian Microphone Club, hon. organiser Victorian Microphone Ball, and president of the Amateur Photographic Society of Victoria. Born Adelaide, S.A.

PICKHOVER, Harold: Production Manager, Station 2KO. Starting in the motor industry, in which he worked up to Sales Manager, joined up with a radio selling organisation. Six years ago went into commercial broadcasting, where he has had experience in all branches of work. Born 3/11/1909, Lancs., England. Recreations: Swimming and golf.

PINKERTON, Harold Richard: Managing Director Saverys Pianos Ltd., Managing Director Radio Wholesalers Ltd. Director Hume Broadcasters Ltd. (5DN). Music and radio business twenty-seven years.

Q

QUIRK, Lancelot Paul: Advertising Manager 2SM since October, 1933. Prior to that,

with Weston Advertising Company for 12 years (Manager for last 5 years). Born 1902.

R

RADFORD, J. A.: General Manager, Hunter River Broadcasters Pty., Ltd. (2HR). Served with Imperial Forces during Great War; awarded Military Cross. Entered broadcasting in 1927, associated with 3DB Melbourne, 2GB Sydney and 4BC Brisbane (sales manager). Held present position since inception of 2HR. Recreations: Cricket, golf. Born April 24, 1898, Epsom, Surrey, England.

RICHARDSON, Daniel L.: manager and chief of staff, Station 7LA Launceston (Find-

lay and Wills Broadcasters Pty., Ltd.). Fourteen years in newspaper advertising field with the Launceston "Examiner." Holder of London Diploma Complete Advertising (Gold Seal). Past Foundation Secretary Tasmanian Advertising Club and Mowbray Golf Club. Member C.T.A. and Mowbray Golf Club. Recreations: Golf and fishing.

RIDLEY, Alan: Country manager 2GZ. International winger,

played abroad with 1929-30 touring Kangaroos and Australian team in 1933. Played against England in Australia. All round sportsman and a popular country personality. Born 1912. Private address: Orange. Recreations: Football, golf.

RIDLEY, John Edward: General manager, Country Broadcasting Services Ltd., Director Northern Broadcasters Ltd.

(2GZ and 2NZ). Commenced business as accountant. Entered radio commercially in 1929 as manager of wholesale radio house in Melbourne. Joined "The Age" Broadcasting Service 3HA Hamilton October, 1931 as manager and secretary; joined 2GZ August, 1935, as advertising manager; assistant manager, July, 1936. General manager 2GZ May, 1938. Private address 58 Nilsen Road, Killara. Born Sydney 4/9/1902.

ROBERTS, Russell F.: Manager 4BC Brisbane. Musical training at Trinity College of Music, London, and Matthay

Pianoforte School, London. Business training London Stock Exchange. After responsible positions theatrical world and Sales Manager, W. J. Paling & Co., appointed present position 1930 on opening of 4BC, Brisbane's first commercial broadcasting station. Holds record for commercial stations for regular hourly lectures Sunday nights for over six years. Organised some of Queensland's largest radio stunts, charity picnics, etc. Clubs: Tattersall's, Royal Queensland Aero Club Committee, Oxley Golf Club. Hobbies: Golf and fishing.

ROBERTSON, Alec.: Manager, "The Courier-Mail" Stations (Brisbane Broadcasting Pty. Ltd.). Began industrial career as reporter on "Brisbane Courier," and later served with Brisbane "Daily Mail" and "Daily Standard," rising with the last named journal from sub-editor to Managing-Editor. Resigned this

position 1931, and appointed to editorial position on "Brisbane Courier." Following amalgamation of "Courier" and "Daily Mail" in 1933, and acquisition by "Courier-Mail" of Station 4BK, was appointed Manager.

ROWE, E. W.: Programme Director and Studio Manager, 2HD, Newcastle; known as "Uncle Pete" and very popular. Native of London and received musical education at Bournemouth.

RUBENSTEIN, Samuel J.: M.Inst.R.E.(Aust.), Assoc.I.R.E. (U.S.A.), M.R.I.(N.Z.). Engineer, Transmission Depart-

ment, Philips Lamps (A/sia) Pty., Ltd., 69-73 Clarence St., Sydney. Eleven years N.Z. Posts and Telegraph Department; general engineering, specialising in radio communication systems, including radiophone development work, two years Radio Corporation of N.Z. Ltd., chief engineer, supervising technical manufacture of receivers, components, sound systems, inter-communication systems, etc. Joined Philips as engineer, August, 1937. Recreations: Tennis, golf, music. Born, London, England, 17/10/1907.

RUSSELL, R. McCowan, A.O.A.: Assistant Manager 3DB Melbourne; A.I.F. 1916-19. Joined E. A. Price Advertising 1920—merged with Paton Advertising Service—foundation member and senior executive of Price-Berry Pty. Ltd., and Samson Clark, Price-Berry until joining 3DB 7 years ago. Private address: 135 Riversdale Road, East Camberwell, Vic. Member Naval and Military Club (Melb.) and Emerald Country Club. Recreation: Golf. Born Coburg, Vic., 2/1/1898,

RYAN, Albert John, M.Inst. R.E.(Aust.), A.M.I.R.E.(U.S.A.) Director and chief engineer

Canberra Broadcasters Ltd. (2CA) Canberra. For 7 years was with electrical engineer's branch P.M.G.'s Dept.; 5 years municipal power supply management; 8 years radio retailing and broadcasting. Private address: Teuch Street, Kingston, Canberra. Born: Chiltern, Victoria, 1897. Clubs: Royal Aero, Royal Canberra Golf Club, Rotary, Royal Automobile Club.

RYAN, John: M.Inst.R.E. (Aust.). Chief Engineer 3AW, Melbourne. Served with R.A.N. and at the age of 16 was attached to H.M.A.S. "Sydney," and took part in action on November 9, 1914, with "Emden" at Cocos Island. Was mentioned in despatches. Also served on the "Sydney" when that vessel escorted the first Australian contingent to Colombo. In January, 1924, was attached to the engineering staff of 3AR, and 1927 transferred to 5CL, Adelaide. In 1929 joined 7ZL, Hobart as Chief Engineer, and in 1932 joined 3AW in that capacity.

RYCROFT, James Lumley: Advertising Manager, 7HO Hobart. Master Mariner and Naval Officer. Holds rank of Lieut.-Commander R.A.N.V.R. Hon. Aide-de-Camp to His Excellency the Governor of Tasmania. Connected with radio since 1928. Radio playwright, actor and speaker. Advertising representative Tasmanian and Victorian Stations. Born Grimsby, England, 15/4/'94. Married. Clubs: Old Stamfordians, Royal Yacht Club of Tasmania, United Services. Recreations: Yachting, motoring, and philately.

S

SAMUEL, Bryn: Station Manager, W.A. Broadcasters Ltd., Perth, W.A. Originally member of commercial staff "West Australian" Newspapers Ltd., joined Musgrove's Ltd., in 1924; appointed Station Manager 6ML 1930; on foundation of W.A. Broadcasters Ltd. March, 1933, appointed Station Manager for Company, which operates Stations 6ML, 6IX, and 6WB. Born Monmouthshire, 30/6/'01,

Who's Who - - - - - - - - (contd.)

SCHULTZ, L. N.: Chief Engineer 2GB. Broadcast Consultant. 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.

SELLERS, Oswald Powell: Company director; Australian agent for Columbia recordings of George Edwards' Radio Productions. Principal of The Sellers Company. Born 1900. Clubs: Manly Golf Club, Tattersall's and C.T.A.

SERVICE, C. Don: Director of Macquarie Broadcasting Services Pty. Ltd.; educated at Fort Street High School; practices as solicitor at 14 Martin Place, Sydney. Born, Sydney, September 30, 1897. Clubs: Royal Australian Golf and Tattersall's. Recreations: Golf and surfing.

SHARP, Chris S.: General Manager Canberra Broadcasters Ltd. (2CA). B.A. and expert anthropologist. Commenced career as school teacher, served with the 40th Batt. A.I.F. and after the War joined the British Colonial Service, stationed Fiji 12 years. Founded first native golf club in the world at Kandava, Fiji, all members of which are Fijian chiefs. Entered broadcasting when joined staff 2GB prior to present appointment. Member R.A.C.A., R.S.S.I.L.A. (past president), Imperial Service Club. Recreations: Golf, tennis, fishing. Born April 7, 1893, Newcastle.

SHAW, Reginald Albert (Rex): Founder Radio Associated Services and musical director. Wrote original theme music for the Australian talkies "Mystery Island" and "Phantom Gold." Practised as an architect (Fellow of Institute of Architects) for 22 years. Musical Director Radio 2UE for 7 years. For same period Assistant Secretary N.S.W. branch British Astronomical Association and corresponding secretary to the B.A.A. Journal, London. Born Rockhampton, Q., 1885. Recreation: Motoring.

SHEPPARD, Alexander William, Bachelor of Commerce (Sydney Uni.) Exhibition in Economics. General Secretary-Treasurer, Professional Radio Employees' Institute of Australasia. Commenced career in journalism. Was with A.W.A. as a clerk, and afterwards became an announcer on Station VK3ME. Born 2/6/1910, Welbeck, England. Recreations: Riding, motoring, study of languages.

SOMMERLAD, The Hon. Ernest Christian, C.B.E., M.L.C.: Managing director of Gotham (Australasia) Pty., Ltd. and Country Press Ltd., Sydney. Past president N.S.W. Country Press Association; member executive Australian Provincial Press Association. Director Australian United Press; chairman publicity committee, Australia's 150th Anniversary Celebrations; member Government Tourist Advisory Committee; Trustee N.S.W. Public Library and Mitchell Library. Member of Legislative Council for six years. Born Tenterfield, N.S.W. Recreations: Gardening and motoring. Clubs: National and Millions.

SMYTH, Walter J.: Sydney representative 4BH Brisbane, Chandler's Broadcasting Services, Australia House, Carrington Street, Sydney; 17 years with J. Ilot, advt. agency N.Z. (15 years manager Christchurch branch), later branch manager P. N. Barrett, Johannesburg. Appointed present position May, 1938. Author of several novels. Born Norwich, England 17/6/1891.

SPENCER, Thomas: Manager 2CH, Sydney. Joined Amalgamated Wireless (A/sia) Ltd., in Melbourne in 1927, and held position of Traffic Accountant to Beam Wireless and Coastal Radio Service. Received present appointment in November, 1936. War record includes service at Gallipoli, Egypt and France. Born Ayrshire, Scotland, 1/5/1893. Recreation: Golf.

STANLEY, Charles William: Announcer 2CH. Appeared in many productions on legitimate stage before entering broadcasting in which he has had considerable experience both on "A" and "B" class stations Joined Amalgamated Wireless (A/sia) Ltd. as announcer for 2CH in 1936, conducting the early morning session. Recreations: Golf, tennis, swimming. Born: Sydney, 1910.

SPROULE, Cyril Thomas: Manager, Broadcasting Department, A.W.A., Melbourne. Ten years A.W.A. Beam Dept., publicity and broadcasting; two years A.I.F.; ten years P.M.G.'s Department. Born 18/5/1898. Recreations: Golf, fishing, gardening.

STAPLETON, Bernard B.: Assistant Advertising Manager 2SM. Following warehouse experience joined 2SM as advertising rep. 1933; appointed assistant advertising manager 1938. Born: Mudgee, July 10, 1901. Recreations: Golf and swimming.

STELLING, Leslie Wilhelm: Melbourne sales executive Macquarie Broadcasting Service Pty., Ltd. From 1913 to 1931 with the Music House—Aeolian Company. December 1931 joined sales division 3DB. 1937 became a partner of Mather and Stelling, Melbourne. Recreations: Golf and gardening. Born 1893, Ballarat, Vic.

STEVENS, Frederick Sylvester: Chief engineer 2CH. Marine operator Naval Transport Service, 1916; served during the Great War at Fanning Island Naval Station. In charge of all studio equipment at 3LO in 1924. Visited England in 1934 for A.W.A.; in 1937 went to 2CH in charge of all studio technical equipment. Born Bonnie Doone, Victoria. Private address, 11 Princess Street, Vaucluse. Recreations: Gardening and swimming.

STEVENSON, Cecil Vincent: Founder and managing director Radio 2UE Sydney Pty., Ltd. Director of Broadcasters, Sydney Ltd. in 1923. Was one of the first to take out a "B" Class licence and started an independent station in 1924. Prior to this had an experimental licence under the call sign of 2IY. Opened the first all radio store (Electrical Utilities Ltd., Radio House) now carried on by his sons; was one of the co-founders of the first Australian station (2BS, now 2BL) the transmitter for which was built by staff under his supervision. Married Ella Mildred Pieremont 2/9/1902. Born Sydney 16/8/1878. Club: Millions Club. Recreations: Fishing, motor boating.

STEVENSON, Murray H.: Chief Engineer, 2UE, Sydney. M.Inst.R.E. (Aust.). Educated Sydney Technical High School. Construction and maintenance of original 2UE. Appointed present position 1/1/'32. Visited U.S.A. 1938. Born 17/5/'05.

STEVENSON, Norman: Service Supervisor for 2UE. Born and educated N.S.W. Entered commercial life in 1928 on joining 2UE in association with his father and brother. Has been through every phase of broadcasting as Assistant to Advertising Manager, Programme arranger, Control Monitor, etc.

Who's Who - - - - - - - - (contd.)

SUTTON, Frederick George: Managing Director and Founder of Featuradio Sound Productions Pty. Ltd., 32 Market Street, Melbourne. Director, Suttons Pty. Ltd.; Director, Carbon Adjuster Systems Pty. Ltd., Australian Representative Hutchinson & Co. (Publishers) Ltd., and associated companies, London. Born 28/3/1894, Melbourne, Vic. Clubs: Athanaeum, Racu, Sandringham. Recreations: Dogs, cricket, tennis, theatres, all outdoor.

SYME, David F.: Managing Director Victorian Broadcasting Network (3HA, 3TR, 3SH). Grandson late David Syme, founder and prop. Melbourne "Age." Educated Geelong Grammar School and Melbourne University. Managing director 3HA since inception; took over 3TR Sale May, 1936, and 3SH Swan Hill April, 1937. Studied commercial broadcasting overseas. Private address: Sunnyside, Toorak Rd., Kooyong.

T

TALBOT-LEHMANN, H. M.: Managing Director, Radiovision Proprietary Ltd., Sydney. Educated Clifton College and Royal Military College, Sandhurst, England. Retired Captain Imperial Regular Army and Royal Air Force. Served in Royal Flying Corps, Manager with British American Tobacco Co. Ltd. in England, European countries and Far East—Aeronautical Adviser to late Marshall Chang Tso Lin, Dictator of China. Sales Manager National Flying Service Ltd., England. Foreign Rep.: Westland Aircraft Works, England. Broadcasting experience Canada, America, Australia, New Zealand since 1933. Born London 3/11/'97. Club: Imperial Service, Sydney. Recreations: Flying, sailing, fishing.

TATHAM, Sydney Ernest: Manager Sound Recording Studios Ltd., 160 Castlereagh Street, Sydney. Started radio experimenting 1910. Joined A.W.A. 1914. Served five years Mercantile Marine, thence transferred head office, Sydney. Opened Marconi School of Wireless, Melbourne, 1919. Organised first British Newspaper Service on Pacific ships for A.W.A., 1923. Resigned 1924 and commenced own business representing American and Continental manufacturers. 1927 designed and built theatre talking picture equipment. Travelled extensively overseas, studying latest radio and broadcasting practice. April, 1935, established Sound Recording Studios Ltd., Sydney. Born 4/4/1896. Recreations: Golf, swimming and motoring.

TAYLOR, Charles E.: Programme Director 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. Born at Mount Barker, S.A. Sports: Golf, tennis.

TAYLOR, John T.: General Manager, 3AW Broadcasting Co. Pty. Ltd., Melbourne. Joined 2CH (Feb., 1932), as Advertising Manager, appointed General Manager October, 1932. Resigned May, 1936, to accept present position. Born 1904. Recreations: Golf and surfing.

THOMAS, Richard Charles: Manager and Chief Announcer 7HT, Hobart. Past experience Senior Announcer with Australian Broadcasting Co. Ltd., and Australian Broadcasting Commission Ltd., 7ZL, Hobart, and in charge of Regional Station 7NT. Conductor of Children's Sessions and Assistant Producer of Plays and Studio Presentations. Prior to joining broadcasting was for many years associated with picture theatres in Australia and N.Z.

THORN, Arthur: Announcer, 5KA, Adelaide. A native of Windsor, England, came to Australia in 1922, and after a varied career made advent into radio in Queensland during 1929. Then became announcer on a N.S.W. commercial station. After 12 months, commenced with 5KA.

TOZER, Jack: Sales Manager, 6AM Broadcasters Ltd. Private address: Thomas Street, Nedlands, W.A. Club: Member C.T.A. Recreation: Sport.

TUPPER, Frederick Cyril: Sporting Commentator, 3AW, Melbourne. Has done several outstanding broadcasts in Victoria, including visit of Duke of Gloucester, finish of Centenary Air Race, Henley Regatta, Junior Cycling Championships. Racing commentator for 5 years. Visited India 1917, N.Z. 1922, Straits Settlement 1923, America 1924. Joined 3AW 22/2/'32. Recreations: Golf and motoring. Born 11/3/'03

TURNBULL, Iris, A.C.M.M. (Conservatorium of Music Diploma): Women's Session Controller, 3DB, Melbourne. Conservatorium library experience. Taught singing. Member Lyceum Club and Glen Waverley Golf Club. Born 8/4/'01.

TRENAM, Harold C.: Managing Director, Standard Telephones and Cables (A/sia) Ltd., 258 Botany Road, Alexandria, N.S.W. Educated Manchester Technical College, M.Inst.R.E. (Aust.). Qualified City and Guilds, London. Up to 1906, Engineer British Post Office. To 1926 Superintendent of Installations Western Electric Co. Ltd. 1928-30, Deputy Manager, Standard Telephones and Cables Ltd., London. To 1932, managing director, Creed and Co. Ltd., London. Director, Standard Telephones and Cables Ltd., London. Director International Telephone and Telegraph Co. Ltd., 1933; came to Australia in present position.

TYLER, C. F.: Record sales manager Columbia Graphophone Australia Pty., Ltd. Educated preparatory school of England and H.M.S.S. "Conway." Served apprenticeship British Merchant Marine, and training in Royal Navy. Joined Columbia Gramophone Co. in London 1926. Came to Australia to Sydney branch of that company in December, 1929, and transferred to present company on amalgamation of Columbia Gramophone Co. and H.M.V. Gramophone Co. Ltd. Born Derbyshire, England, 1906. Recreations: Golf, tennis.

W

WALLS, June, L.A.B.: Secretary, Western Province Radio Pty. Ltd., Broadcast Entertainments Pty. Ltd., Central Murray Broadcasters Pty., Ltd. Born 15/9/'15, Coleraine. Recreations: Tennis, skating, music, swimming.

WALPOLE, Frank S.: Manager Western Broadcasters Pty., Ltd. (2DU) Dubbo. Educated Church of England Grammar School, Melbourne. Went on the land in N.S.W. and Queensland until Great War. Enlisted 4th Aust. Light Horse Regiment. Invalided home 1918. Joined Studebaker sales organisation as country sales rep. and later joined Atlantic Union Oil Co. as western re-

(Continued next page.)

Who's Who - - - - - - - - (contd.)

WALPOLE, F. S.—Continued presentative until resigned to take over management of 2DU. Recreations: Swimming, gar-

dening, and reading. Member Tattersall's Club, Sydney. Born July 29, 1895, St. Kilda, Melbourne.

WALTERS, Mona: Programme Directress, Station 4IP, Ipswich. Brilliant pianiste, playing classical and jazz compositions and accompaniments equally well. Gained her A.Mus.A. degree in 1933. Studied under Sisters of Mercy, Ipswich, and Miss Nancy White, L.A.B., F.T.C.L.

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.

WELLS, Harold R.: Programme Manager, 6AM Broadcasters Ltd. Private address: 92 Herbert Road, Shenton Park, W.A. Married. Was for 5½ years with 6WF, being original announcer (1924) in W.A., also 5 years programme director; 2 years Manager of High Flyers' Concert Party, London; 18 months editor "Wireless News," Perth. Interested in D.X. work.

WHITE, David: Secretary 6AM Broadcasters Ltd. Private address: 60 Cambridge Street, Leederville, W.A. Single. Recreations: Swimming, tennis.

WHITE, Randal M., M.A. (T.C.D.): Assistant Manager Station 5DN, Adelaide. Prior

to entering the radio field was Sales Manager for South Australia General Motors (Aust.) Pty. Ltd. World tour, 1928, U.S.A., Great Britain, Europe, studying merchandising and sales promotion methods. Hobby: Philately.

WHITCOMB, T.: Director and Chief Engineer, 2TM, Tamworth. 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 A.G.E. as Country Representative. During the last four years with that Company was in Technical Department, resigning to construct 2TM's transmitter.

WHITFORD, Frank Roy: Managing director 6AM Broadcasters Ltd. Recreations: Gardening, fishing, golf.

WHYKES, Ernest J. W.: Secretary and advertising manager 3BA Ballarat. Has been Secretary since inception of 3BA. Is a Public Accountant in Ballarat and a member of the Commonwealth Institute of Accountants and A/sian Institure of Secretaries, and Licensed Companies Auditor. In August, 1935, was also appointed Advertising Manager 3BA. Born 6/4/03. Recreation: Bowls.

WILSON, Harper: Programme Director, 3UZ—Nilsen's Broadcasting Service. Born Melbourne. Recreations: Tennis and playwriting.

WILSON, Warne A.: M.Inst. R.E.(Aust.); M. Wireless Inst. Aust. Marconi Diploma. Manager and Station Engineer 3BA Ballarat. Served apprenticeship as electrical winder and fitter engaged in radio work and experiments from 1920 to date. Well-known amateur transmitter since 1922—A3RY and VK 3WA. Manager and Engineer 3BA Ballarat since inception in 1930 to 1935. At that time sold holding of founder's shares to Ballarat Courier. Born 12/12/1900 at Auburn, Vic. Hobby: Amateur movies.

WORRALL, David: President Australian Federation of Broadcasting stations, General Man-

ager and Secretary, 3DB. Melbourne. 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 to survey broadcasting in America England and the Continent. Private address: 73 Amerway, Camberwell, Vic. Born Parramatta, N.S.W., 1894. Member Eastern Golf Club. Recreations: Golf and squash rackets.

Y

YELDON, Russell Arthur: Director and general manager Wollongong Broadcasting Pty., Ltd. (2WL). An electrical engineer by training and qualification, having been associated with municipal electrical undertakings. Conducted progressive electrical engineering business 1925-31. Entered broadcasting with granting of licence for 2WL. Member R.A.C.A. and N.S.W.M.C., Recreations: Motor boating, fishing, golf.

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Index and List of Advertisers

Memoranda

Printed by Radio Printing Press Pty., Ltd., 53-55 George Street, Sydney, for Australian Radio Publications Pty., Ltd., 30-32 Carrington Street, Sydney.

AUSTRALIAN radio publications are planned and executed by an experienced staff to serve those professionally engaged in radio and broadcasting. The regular publications as illustrated herewith consist of:—

RADIO RETAILER OF AUSTRALIA — published weekly (every Friday), of primary interest to those engaged in all phases of merchandising radio receivers and associated apparatus. It is the only national radio trade newspaper and circulates throughout the Commonwealth and overseas. Contains trade news of interest, plus technical service material. Subscription 15/- per annum, post free, in Australia (25/- overseas).

RADIO TRADE ANNUAL OF AUSTRALIA — published every year about May or June. Is a most comprehensive reference book on the technical and commercial aspects. Generally contains over 300 pages and is included in the annual subscription to the weekly paper RADIO RETAILER. Individual copies 10/- each.

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BROADCASTING BUSINESS — A weekly trade newspaper designed for all persons interested in advertising over commercial broadcasting stations in Australia. Circulating among advertising agents, national advertisers and commercial stations. Subscription 15/- per annum, post free in Australia (25/- overseas).

BROADCASTING BUSINESS YEAR BOOK — published once a year about May or June and containing all reference data required by those interested in commercial broadcasting. Each subscriber to BROADCASTING BUSINESS receives a copy of the year book. Individual copies 10/- each.

All the above are published by

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The Story of

AUSTRALIAN RADIO PUBLICATIONS PTY. LTD.

EARLY in 1930 Australian Radio Publications Ltd. was founded by Oswald F. Mingay for the purpose of supplying the radio trade of Australia with a reliable and informative trade paper circulating throughout the Commonwealth. Having been associated with radio since 1922 in the fields of manufacturing and merchandising. Mr. Mingay's experience and knowledge enabled him to produce a very acceptable medium for the dissemination of trade news. Results proved this, because in less than four years this monthly publication, "RADIO RETAILER OF AUSTRALIA", had become a weekly issue, despite an early prediction that it would take ten years.

"RADIO RETAILER" possesses more radio trade advertising support than any other radio paper in Australia and it is recognised as the most reliable trade paper.

Appreciating the need for an authoritative technical publication "RADIO REVIEW" was commenced as a technical monthly in 1932, and continued until June, 1938, when it was incorporated in the technical section of the "RADIO RETAILER".

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