# SECTION XVII.

# **ROADS AND RAILWAYS.**

# § 1. Roads and Bridges.

1. Introduction.—In Year Books No. 1 (pages 541 to 551) and No. 2 (pages 675 to 685), a brief historical account was given of the construction and development of roads in Australia. It is not proposed to repeat that account in the present issue of the Year Book.

2. Expenditure on Roads and Bridges.—Figures shewing the total expenditure on roads and bridges in the States are not available. The subjoined statement, however, gives the amounts of total loan expenditures by the State Governments up to the 30th June, 1917 :—

# ROADS AND BRIDGES.—TOTAL GOVERNMENT LOAN EXPENDITURE TO THE 30th JUNE, 1917.

State	N.S.W.*	Victoria.	Q'land.†	S. Aust.	W. Aust.	Tasmania.‡	All States.
Expenditure	£1,820,546	£1.217,159	£931,775	£1,677,649	£369,401	£4,737,258	£10.753,788

• Including punts. † Including amounts from surplus revenue on which no interest is payable. ‡ Including harbours, rivers, and lighthouses.

The following table shews the annual expenditure from loans on roads and bridges by the central Governments in each State during the year 1901-2, and from 1912 to 1917:—

ROADS AND BRIDGES.—LOAN EXPENDITURE BY STATE GOVERNMENTS, 1901-2 and 1912-17.

	N.S.W.	Victoria. Q'land		S. Aust.	W. Aust.	Tasmania.	All States.	
	£	£	£	£	£	£	£	
	150,777	47,104	•••	185	740	77,536*	276,342	
	53,263				37,037	183,625†	273,925	
	23,553		· ···	17,838		191,428†	232,819	
	8,609	274,362		37,910	31,974	208,584	561,439	
	421	495,062		102,226	18,450	165,701	781,860	
	5,428	252,836	•••	54,939	5,878	148,698†	467,779	
	  	£            150,777            53,263            23,553            8,609            5,428	£         £            150,777         47,104            23,553             8,609         274,362            421         495,062            5,428         252,836	R.S.W.         Victoria.         Q'land.            2         £         £            150,777         47,104             23,553              8,609         274,862             421         495,062             5,428         252,836	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	k $k$	

\* For the calendar year 1902. † See note ‡ to previous table.

The two tables given above shew only a small proportion of the actual expenditure upon roads and bridges in the different States, for the reason that (a) there have been large expenditures from revenue, both by the central Governments and by local authorities, and (b) the State Governments have in many cases voted grants and subsidies on the amount of rates collected, and have issued loans to local authorities either for the express purpose of the construction of roads and bridges or for the general purpose of public works construction. Returns of expenditure, where available, are given below for each State. Although no revenue is now derived directly from roads and bridges, they are indirectly of great value to the community, forming, next to railways and public lands, the most considerable item of national property.

3. New South Wales.-The control of all roads, bridges, and ferries in New South Wales is now regulated by the Local Government Act 1906, which came into force on the 1st January, 1907, and its subsequent amendments in 1908 and 1915. Under the provisions of this Act, the eastern and central divisions of the State are divided into shires and municipalities for the general purposes of local government, for the endowment of which a sum of not less than £150,000 is payable annually out of the consolidated revenue on the basis of a percentage subsidy on the proceeds of the general rates received by the local governing bodies concerned. The control of all roads, bridges, and ferries (except those proclaimed "National" and those in the unincorporated areas of the Western Division) has been transferred from the Roads Department to the respective shires and municipal councils, who are now responsible for their construction and maintenance. Up to December, 1915, 31 miles of roads, 275 bridges, 55 wharves, 99 jetties, and 16 ferries have been proclaimed as "National" works. Power is given to construct new roads, to widen or close existing roads, to make by-laws for the regulation of traffic, etc.; and in the case of the acquisition of land for the purpose of constructing new roads or of widening existing roads, the provisions of the Roads Act 1902 are incorporated. The Minister for Works is empowered to pay subsidies to the local authorities to maintain the roads. The roads leading to and within areas of lands which are made available for closer settlement will be constructed by the Government prior to transfer to the shires, as also will roads required mainly for tourists in districts not likely to produce revenue in rates to the local authorities.

(i.) Principal Main Roads. The four principal main roads in New South Wales run in the same direction as, and are roughly contiguous to, the four State-owned main railway lines. (a) The Southern Road, 385 miles in length, runs from Sydney to Albury, and before the days of railway construction formed part of the highway over which the interstate traffic between Melbourne and Sydney used to flow. (b) The South Coast Road, 250 miles long, runs from Campbelltown along the top of the coast range and across the Illawarra district as far as Bega, from which place it extends as a minor road to the southern limits of the State. (c) The Western Road, 513 miles long, runs through Bathurst, Orange, and many other important towns as far as Bourke, on the Darling River. (d) The Northern Road, 405 miles in length, runs from Morpeth, near Maitland, as far as Maryland, on the Queensland border.

(ii.) Length and Classification of Roads and Bridges. The length of roads in the State (exclusive of 31 miles proclaimed as "National" works) in 1915 was approximately 97,811 miles, of which 10,261 miles were controlled by municipalities, 81,075 by shires, and 6475 miles were in the unincorporated areas of the Western Division. The following table gives particulars for the year 1915 (the latest year for which figures are available), of roads classified according to whether metalled, etc., formed only, cleared only, or natural surface :—

Classification.	Metalled. Ballasted, Gravelled etc.	Formed only.	Cleared only.	Natural surface.	Total.
Metropolitan Country municipalities Shires Western Division (unincorporated)	Miles. . 1,400 . 2,676 . 14,342 . 100	Miles. 330 1,638 10,404 196	Miles. 246 1,897 24,731 2,752	Miles. 196 1,878 31,598 3,427	Miles. 2,172 8,089 81,075 6,475
Total	. 18,518	12,568	29,626	37,099	97,811

NEW	SOUTH	WALES	-APPROXIMAT	E LENGTH	OF	ROADS.	1915.
-----	-------	-------	-------------	----------	----	--------	-------

(iii.) Bridges, Culverts, and Ferries. The more important bridges have been proclaimed under the provisions of the Local Government Act as "National" works (see above), and these, together with the bridges, etc., in the Western Division, remain under the control of, and are maintained by, the Public Works Department. Particulars of bridges, culverts, and ferries in the State in 1915, the latest year for which figures are available, are given in the following table:—

		Brid	lges.	Culv	Ferries.	
Particulars.	-	No.	Length.	No.	Length.	No.
"National" works Metropolitan Country municipalities Shires Western Division (unincorporated)	····	275 130 636 3,523 93	ft. 105,330 6,133 34,493 211,770 12,530	844 3,541 34,668 153	ft.  78,117 99,183 317,189 1,709	16 3 11 96 
Total		4,657	370,256	39,206	496,198	126

# NEW SOUTH WALES .- BRIDGES, CULVERTS, AND FERRIES, 1915.

(iv.) Expenditure on Roads and Bridges. Since the year 1857 the total expenditure by the Roads Department and Road Trusts on roads and bridges is £25,286,664. In this expenditure is included the cost of administering the Department, services for other Departments, and payments on account of punt approaches and similar works incidental to the road traffic of the country. The amount expended from 1857 to the 30th June, 1900, for the next decennium, and for each succeeding financial year up to 1917, is given below. Until recent years, the expenditure on these works increased at a much faster rate than the population.

# NEW SOUTH WALES .- EXPENDITURE BY ROADS DEPARTMENT AND ROAD

# TRUSTS, 1857 to 1917.

	Period.			Expenditure by Roads Department.	Expenditure by Trustees.	Total.
				£	£	£
1857 to 3	Oth June,	1900		18,714,078	1,258,027	19,972,105
1900-09				4,605,766	30,664	4,636,430
1910-11		•••		125,326	]	125,326
1911-12				126,111		126,111
1912-13		•••	•••	120,719		120,719
1913-14		•••		73,192	)	73,192
1914-15		•••		92,729		92,729
1915-16				65,928		65,928
1916-17		•••		74,124		74,124
	Total	•••		23,997,973	1,288,691	25,286,664

 $\odot$ 

The expenditure by the Department is now limited to the construction of roads in closer settlement areas and to the construction and maintenance of national bridges and ferries, and of works in the unincorporated areas of the Western Division.

4. Victoria.—Under the Local Government Act 1915, the control, construction, and maintenance of all roads, streets, and bridges are in the hands of Municipal Councils, which are empowered to open new roads, and to close, divert, or increase the width of any existing street or road, provided that no new road less than one chain in width may be opened without the consent of the Minister. The councils are also authorised to make and repair streets, lanes, or passages on private property, or to form means of back access to private property, and may compel the owners of such property to pay the cost of so doing. Footways in front of houses or grounds may be kerbed, flagged, paved, or asphalted, and the owners of such houses or grounds must bear half the cost of so doing. The revenue of the councils is derived from rates, which may be either ordinary or special. The councils are empowered to raise loans for the purpose of making or opening new streets and roads, and for diverting, altering, or increasing the width of streets and roads, provided that the amount of such loan must not exceed ten times the average income of the council during the three years immediately preceding from general rates not exceeding 1s. 6d. in the pound of annual value.

(i.) Country Roads Board. With the object of improving the main roads of the State, an Act (No. 2415) was passed on 23rd December, 1912, which empowers the Governor-in-Council to appoint a board, to consist of three members.

The duties of the board are to ascertain by survey and investigation what roads are main roads; the nature and extent of the resources of Victoria in metals, minerals, and materials suitable for the purposes of road-making and maintenance, and the most effective and economical methods for dealing with the same, and for supplying and utilising the material in any part of Victoria; the most effective methods of road construction and maintenance; what deviations (if any) in existing roads or what new roads should be made so as to facilitate communication and improve the conditions of traffic; and to record, publish, and make available for general information the results of all such surveys and investigations. The duty of furnishing information that may be required is imposed on the municipal authorities.

The construction of permanent works and the maintenance of main roads are likewise to be carried out by the municipalities to the satisfaction of the board. The total cost of the works, in the first instance, is to be paid by the Treasury, but subsequently half the amount expended on permanent works and maintenance is to be refunded by the municipalities affected.

For the purpose of making permanent works, power is given to the Governor-in-Gouncil to issue stock or debentures to the amount of £400,000 a year for five years, and the principal and interest are a charge upon the Consolidated Revenue of the State. The money so raised is to be placed to the credit of an account to be called "the Country Roads Board Loan Account," which will be debited with all payments made by the Treasurer towards the cost of permanent works. A sinking fund of 1 per cent. per annum on half the amount borrowed is redeemed. An annual payment to the Treasurer of 6 per cent. on the amount due by each municipality in respect of permanent works is provided for, and the cost of maintenance allocated to each municipality must be paid before the 1st July in each year. A special rate, not to exceed 6d. in the £1 on the net annual value of ratable property, to meet the cost of permanent works and maintenance, may be levied in any ward or riding of a municipality as the council may direct. In the

Ċ.

event of default of payment by a municipality, the board may levy a rate to meet the amount owing. All fees and fines paid under the Motor Car Act, all moneys standing to the credit of the Municipal Fees and Fines Trust Fund, all fees paid on the registration or renewal of the registration of traction engines, and all fees received by the Crown after the 30th June, 1912, under the Unused Roads and Water Frontages Act 1903, are to be credited to the Country Roads Board Fund.

Up to the 30th June, 1917, there were 6500 miles of declared main roads, agreed to by the councils, and gazetted. The total amount expended during 1916-17 for permanent works was £226,603, and for maintenance work £130,537, a total of £357,140, affecting 147 municipalities. The net receipts for the year were £96,707, of which amount the chief items were motor registration fees, £44,746, unused roads and water frontages license fees, £24,358, and contributions by municipalities for permanent works, £23,527.

(ii.) General and Local Government Expenditure. The gross amount expended directly by the State Government of Victoria on roads and bridges was £8,766,192 up to the end of June, 1917. The annual expenditure from ordinary revenue by municipalities is not returned separately, but is included in Public Works Construction and Maintenance (see Section xxvi., Local Government). The subjoined table shews the cost from general revenue of municipalities of private streets, roads, etc., and also shews the amounts of municipal loan expenditure in 1901 and from 1913 to 1917 :--

			Annual Ex-	Municipal Loar	n Expenditure.	Formation of Private Road Streets, Lanes, etc. <sup>†</sup>			
Fine	Financial Year.		State Govern- ment.	Cities, Towns, and Boroughs.	Shires.	Cities, Towns, and Boroughs.	Shires.		
			£	£	£	£	£		
1901			72,890	16,844	12,928	18,829	4,521		
1913		•••	73,374	49,743	30,758	51,034	5,566		
1914			56,649	57,411	23,749	59,093	11,372		
1915			47,898	103,124	40,129	53,365	8,647		
1916		•••	25,651	92,198	44,945	64,481	3,543		
1917	•••	•••	16,514		<b>`</b> ‡	ţ.	‡		

VICTORIA.-EXPENDITURE ON ROADS AND BRIDGES, 1901 and 1913 to 1917.

\* The financial years of Melbourne and Geelong end on the 31st December and the 31st August respectively; those of all other municipalities on the 30th September. † Including the cost of flagging, asphalting footpaths, etc., but exclusive of loan expenditure.

‡ Not available.

5. **Oucensland.**—In Queensland the construction and maintenance of public roads are controlled under a system of local self-government, for the purposes of which the whole State is divided into (a) cities, (b) towns and (c) shires. The duties, rights, and responsibilities of the local authorities with regard to roads, streets, and bridges are regulated by the Local Authorities Act of 1902 and subsequent amendments. The councils are invested with full powers to open, close, divert, or widen streets, roads, and bridges, and to make by-laws for the regulation of traffic, etc. The members of the councils are elected by the ratepayers, and with the aid of executive officers they undertake the supervision and control of all necessary constructions and improvements of roads and bridges within their district. The rates which the councils are empowered to levy are supplemented by Government grants. Separate returns as to the expenditure by towns and shires on roads and bridges are not available, the amounts being included in the returns of expenditure on public works, particulars as to which expenditure may be found in Section xxvi. Local Government, hereinafter.

6. South Australia.—Of the several Australian States, South Australia has by far the largest unincorporated area, no less than 88 per cent. of the whole area of the State being in this condition. This area is, however, very sparsely populated and much of it is entirely unoccupied. The remainder of the State is for purposes of local government under the control of Municipal Corporations and District Councils. Under the provisions of the District Councils Act 1914, the Municipal Corporations Acts 1890 to 1915, and of the Roads Acts 1884 to 1915, the councils are invested with full powers as to the opening and making of new streets and roads, and the diverting, altering, or increasing the width of existing roads; as to raising, lowering, or altering the ground or soil of any street or road; and as to the construction, purchase, and management of bridges, culverts, ferries, and jetties.

(i.) Main Roads and District Roads. All the roads in each district are classified either as main roads or as district roads. Both classes of roads are under the direct control either of Municipal Corporations or of District Councils, but in the case of main roads the expenditure on construction and maintenance is chiefly provided for by Government grants, which are paid into a Government grants account, while the expenditure on district roads is paid for out of general rates, and out of subsidies on the amount of such rates granted by the central Government. Under the Main Roads Act 1915, a number of roads were declared to be main roads.

The total estimated length of streets and roads in South Australia up to the 30th June, 1917, was as follows:—

# SOUTH AUSTRALIA. - ESTIMATED LENGTH OF ROADS AND STREETS, 1917.

	Particul	ars.		Woodblocked.	Macadamised.	Other.	Total.
Miles	•••	10		10	10,465	33,261	43,736

(ii.) Expenditure by Corporations on Main and District Roads. The following table shews the expenditure by municipal corporations on both main and district roads during 1901, and each year from 1912 to 1917 inclusive:—

# SOUTH AUSTRALIA.—EXPENDITURE BY CORPORATIONS ON STREETS, ROADS AND BRIDGES, 1901 and 1912 to 1917.

			District	Roads.	Main Roads Fund.						
	Year.*		Expend	liture.	Rece	ipts.	Expen	diture.			
			Con- struction.	Main- tenance.	From Main RoadGrants.	Total.	Con- struction.	Main- tenance.			
			£	£	£	£	£	£			
1901	•••		4.906	50,628	7,403	8,738	159	7.745			
1912	•••		10,907	59,609	11,477	11,865	322	12,590			
1913	•••		31,797	89,830	11,817	13,128	463	13.142			
1914			8,909	95,970	12,573	13,516	361	11,949			
1915	•••		31,732	74.887	12,084	12,820	26	11.502			
1916	•••		25,483	73,118	9,669	12,098	88	13,679			
1917	•••		15,952	80,106	14,299	15,787	619	13,073			

<sup>\*</sup> Up to and including the year 1903 the financial year ended on the 31st December, but after that date ends on the 30th November.

(iii.) Expenditure of District Councils on Main and District Roads. The following table gives similar information with respect to main and district roads under the control of District Councils :--

			District	Roads.	Main Roads Fund.						
Y a	ear end 0th Jun	ed ie.	Expend	liture.	Rece	ipts.	Expenditure.				
			Con- struction.	Main- tenance.	From Main Road Grants Total		Con- struction.	Main- tenance			
			£	£	£	£	£	£			
1901	•••		18,026	47,379	72,980	100,077	11,861	67,487			
1912	•••		54,342	68,108	119,331	123, 154	20,414	102,759			
1913	•••		56,128	76,880	106,482	108,489	14,915	96,673			
1914	•••		48,133	80,181	124,528	130,299	18,538	97,599			
1915	•••		51,625	85,119	114,722	114,781	15,571	102,679			
1916	•••		41,283	79,515	83,264	84,738	12,493	61,172			
1917	•••		47,337	79,377	109,044	111,567	18,809	72,644			

# SOUTH AUSTRALIA.—EXPENDITURE BY DISTRICT COUNCILS ON STREETS, ROADS AND BRIDGES, 1901 and 1912 to 1917.

7. Western Australia.—In Western Australia the construction, maintenance, and management of roads and bridges throughout the State are under the control of Municipalities, constituted by the Municipal Corporation Acts 1906-1915, and District Road Boards, constituted by the Roads Acts 1911-1915.

(i.) District Roads and Bridges. Under the provisions of the Roads Acts any part of the State, not within a municipality, may be constituted by the Governor-in-Council into a Road District, under the control of a board of not less than five nor more than eleven members elected by the ratepayers. The board is invested with full powers for controlling and managing all roads and bridges within the district, and is empowered to make by-laws for the general regulation of traffic, to control the weight of engines and machines permitted to cross any bridge or culvert, to regulate the speed limits of vehicles, lights to be carried by vehicles, the lighting of streets and roads, and the licensing of bicycles and motor cars. A District Road Board may not, however, construct any road or street less than sixty-six feet wide, nor any bridge or culvert at a greater cost than £100, without the consent of the Minister. The construction of the more important bridges and culverts is generally carried out by the Government, the work, after completion, being handed over to the Road Board for maintenance. In case of land being required for the purpose of constructing a new street or road, or for widening an existing street or road, the provisions of the Public Works Act of 1902 are incorporated in the Roads Act. A board may levy general rates within its district not exceeding two shillings and sixpence nor less than ninepence in the £ on the annual ratable value, and. if valued on the basis of unimproved values of lands, the general rate must not be over threepence nor under one penny in the £ on the capital unimproved value. Boards are also empowered to raise loans for works or undertakings or to liquidate existing loans, but the amount of such loans must not be greater than seven times the average ordinary revenue of the board. In the case, however, of boards already indebted, borrowing power to the extent of ten times the said average is given, less the amount of existing loan indebtedness at time of borrowing. For the purpose of paying the interest on money borrowed a board may levy a special rate. District Road Boards may also exercise the powers of Drainage Boards under the provisions of the Land Drainage Act of 1900.

(ii.) Municipal Streets, Roads, and Bridges. As regards roads, streets, and bridges within municipalities, these are under the control of local authorities elected under the provisions of the Municipal Corporations Acts 1906-15. The municipal councils are invested with full powers for making, maintaining, and managing all streets, roads, and bridges within the municipal area, and may request the Governor to declare any such land reserved, used, or by purchase or exchange acquired for a street or way, to be a public highway, and on such request the Governor may, by notice in the Gasette, proclaim such highway absolutely dedicated to the public.

(iii.) Length of Roads, Number of Bridges, and Expenditure on Roads and Bridges. The following table gives particulars of the operations of the Road Boards since the 1st January, 1912 :--

# WESTERN AUSTRALIA.—PARTICULARS OF ROADS UNDER CONTROL OF DISTRICT ROAD BOARDS, 1912 to 1916.

the		}	Reve	nue.		re.	Length of Cleared Roads.				No. of Bridges and Culverts.	
Year ended t 30th June	Area.	From Rates.	From Grants and Subsidies.	From other Sources.	Total.	Expenditu	Cleared only.	Cleared and Formed.	Metalled or otherwise Constructed.	Total.	Bridges.	Culverts.
1912	Sq. m. 975.809	£ 70,397	£ 64.774	£ 36,497	£ 171.668	£ 196.576	Miles. 16.484	Miles. 4.555	Miles. 3.432	Miles. 24.471†	No. 719†	No. 5.808†
1913	975,815	80,551	60,687	29,770	171,008	184,587	19,236	4,429	3,651	27,3161	721§	6,157\$
1914	975,815	93,700	63,668	46,031	203,399	187,800	19,921	4,626	3,804	28,3511	731*	6,450°
1915	975,815	88,569	27,753	47,571	163,893	193,033	19,641	4,674	4,039	28,3541	761	6,649
1 <u>916</u>	975,827	104,345	24,397	38,820	167,562	166,340	19,258	5,363	4.216	28,837	760	6,907

 Exclusive of two Boards which have not supplied the information. † Exclusive of five Boards. ‡ Exclusive of four Boards. § Exclusive of three Boards.
 || Approximate only.

The following table gives similar information with reference to roads controlled by municipalities under the Municipal Institutions Act 1900 and the Municipal Corporations Act 1906:—

WESTERN AUSTRALIA.—PARTICULARS OF STREETS, ROADS, AND BRIDGES UNDER THE CONTROL OF MUNICIPALITIES, 1901 and 1912 to 1916.

	Year ended the		of alit's.	Lei	ngth of f	Streets a	nd Road	is.†	Revenue.		Expenditure.	
Year ended the 31st October.		10	No. Municip	Paved, M't'll'd or Gr'v'lld	Form'd only.	Clear'd only.	Not Clear'd	Total.	From Rates.	From Grants.	Works and Impr'v- ments.	Street Light'g and Wat'r'g
				Miles.	Miles.	Miles.	Miles.	Miles.	£	£	£	£
1901	•••		42	195	30	149	137	511	78,021	66,850	111,256	15,969
1912	•••		38*	528	103	278	312	1,221	148,538	25,902	78,576	27,322
1913	•••		33	544	95	267	299	1,205	153,966	19,382	159,445	26,089
1914	•••		33	550	95	258	290	1,193	153,686	13.142	223.098	19,056
1915			31	570	92	254	279	1,195	170.675	10,309	190,739	24,959
1916			30	559	88	253	238	1,138	166,617	9,462	120,411	24,952

• Including also particulars of four municipalities which were dissolved during the year. † Approximate only.

8. Tasmania.—In 1906 all the existing Road Trusts and Main Road Boards were abolished by the Local Government Act, which provided that the councils of all municipalities constituted under the Act should exercise all powers conferred upon, and should be liable to all the obligations imposed upon Road District Trusts and Main Road Boards by the Roads Act of 1884. The whole State is divided into municipal districts, 49 rural and 2 city, each rural district being under the control of a warden and councillors.

(i.) Mileage of Roads and Number of Bridges. The following table gives particulars for the year 1916 as to length of roads and number of bridges and culverts under the control of the municipalities :---

	Roads.			
Macadamised or Gravelled.	Other,	Total.	Bridges.	Culverts.
Miles. 5,670	Miles. 5,508	Miles. 11,178	No. 1,120*	No. 19,702*

# TASMANIA .- ROADS AND BRIDGES IN MUNICIPALITIES, 1916.

\* Last available figures.

(ii.) Revenue and Expenditure. The following table gives particulars for the year 1916 of the revenue and expenditure of municipal councils in respect of roads and bridges:—

#### TASMANIA.—ROADS AND BRIDGES, REVENUE AND EXPENDITURE, 1916.

	Rev	enue.		E-non literes
· From Government.	Rates.	All other.*	Total.	- Expenditure. t
£ 12,753	£ 56,676	£ 210,163	£ 279,592	£ ‡342,873

\* Including current receipts from loans. + Municipal "Works and Services." ‡ Including £60,607 on trams.

# § 2. Railways.

# (A) General.

1. Introduction.—In the issues of the Commonwealth Year Book, Nos. 1-7, the statistics of all Government railway systems were treated under the head of Government Railways. In the following issues, Nos. 8, 9 and 10, the greater part of those statistics relating to State-owned lines was dealt with separately from those under the control of the Commonwealth Government. This arrangement is continued in the present issue. The State railways are referred to throughout as "State" and the Commonwealth railways as "Federal" railways. There is, however, a summary of the working of the Federal and States' railways in part (E) of the present section.

2. Railway Statistics.—In some of the earlier issues of the Year Book will be found a condensation of the report issued in 1909 by the Commonwealth Statistician to the Minister for Home Affairs on the subject of *The Desirability of Improved Statistics of Government Railways in Australia* (see Year Book No. 7, page 598).

3. Railway Communication in the Commonwealth.—An account of the progress in railway construction in Australia since the opening of the first line in 1854 will be found in Year Book No. 6, p. 681. In the eastern, south-eastern, and southern parts of Australia there now exists a considerable network of railway lines converging from the various agricultural, pastoral and mining districts towards the principal ports, which are themselves connected by systems of lines roughly running parallel to the coast. These are shewn on the map on page 653. In the east, lines radiating from Townsville, Rockhampton, Brisbane, and Sydney extend inland in various directions for distances ranging up to over 600 miles; in the south-east there are numerous lines, those in Victoria converging towards Melbourne, while others in New South Wales have their terminus in Sydney; in the south there are four main lines.

with numerous branches, running from Melbourne, while from Adelaide one main line, with several branches to the coastal towns, runs inland in a northerly direction for a distance of nearly 700 miles, and another line runs in a south-easterly direction to various ports, meeting the main line from Melbourne on the border of South Australia and Victoria near Serviceton. The South Australian and Victorian railway systems also meet on the border at two other points, one near Pinnaroo, and the other at Rennick near Mount Gambier. By the opening, in 1917, of the Trans-Australian railway from Port Augusta to Kalgoorlie, through communication by rail has been established between the eastern States and the Western Australian railway system. The main interstate line (indicated by a heavier line in the map), which permits of direct communication between the five capital cities-Brisbane, Sydney, Melbourne, Adelaide, and Perth-covers a distance from end to end of 3471.25 miles, or 3476.27 miles via Newcastle. This journey occupies six days, three hours and forty minutes. In the opposite direction the journey occupies five days, twenty-three hours and forty minutes. Both of these are the times taken over all.

In the following tables particulars are given of the gauges of lines, changing stations and duration of stops thereat, arrival and departure times, distances and average speeds on the journey from Brisbane to Perth, and vice versa :—

Gauge	Terminal or Changing	Tin	nes.	Day on	Act	ual	tion of DS at	nging tions.	nediate ance	ul Dis- e from ibane.	Aver-
Line.	Stations.	arr.	dep.	Journey.			Dura	Cha.	Intern Dist	Tota tanc Bris	Speed.
ft. in. 3 6 4 8 5 3 5 3 5 3 5 3 5 3 5 3 6 4 8 3 6 4 8 5 3 5 3 5 3 6 4 8 5 3 5 3 6 6 6 6 6 6 6 6 6 6 6 6 6	Brisbane Wallangarra Sydney Albury Melbourne Adelaide Terowie Port Augusta Kalgoorlie Perth	5.55 p.m. 11.25 a.m. 7.23 a.m. 12.51 p.m. 9.55 a.m. 9.55 p.m. 10.20 a.m? 9.45 a.m.	8.5 a.m. 6.17 p.m. 7.25 p.m. 7.47 a.m. 4.30 p.m. 10.45 a.m. 10.30 p.m. 5.40 p.m.	Monday Tuesday Wednesday Thursday Saturday Sunday Total	h. 9 17 11 5 17 4 5 37 16	m. 50 8 58 4 55 51 55 20 5 6	h. 0 8 0 0 0 7 - 21	m. 22 00 24 39 50 24 35 20 34	miles. 223.46 †497.38 398.11 190.50 483.05 139.75 119.50 1051.30 373.22 3476.27	miles. 223.46 720.84 1118.95 1309.45 1792.50 1932.25 2051.75 3103.05 3476.27	m.p.h. 22.72 29.03 33.27 37.60 26.96 28.81 20.20 28.16 23.21 27.57

# BRISBANE TO PERTH.

PERTH TO BRISBANE.

Gauge of	Terminal or Changing	Tin	)es.	Day on	Act	ual	ttion pps at	nging ions.	nediate ance.	l Dis- from rth.	Aver-
Line.	Stations.	arr.	dep.	Journey.	Tir	ne.	Dure of ste	Cha	Intern Dist	Tots tance Pe	speed.
ft. in. 3 6 4 8 5 3 5 3 5 3 4 8 4 8 5 5 3 4 8 5 5 3 4 8 5 5 3 6 5 3 5 3 5 3 6 5 3 5 3 6 5 3 5 3 5 4 6 5 3 5 3 5 4 6 5 3 5 3 5 3 6 5 3 5 3 6 5 3 5 4 6 5 3 5 3 6 6 5 3 5 3 6 6 6 7 7 8 8 9 7 8 8 9 7 8 8 9 8 8 8 8 8 8 8 8 8 8 8 8 8	Perth Kalgoorlie Port Augusta Terowie Adelaide Melbourne Sydney Wallangarra Brisbane	9.15 a.m. 1.0 a.m. 10.50 a.m. 3.37 p.m. 9.59 p.m. 10.21 p.m. 10.45 a.m. 9.5 a.m. 6.40 p.m.	5.0 p.m. 10.0 a.m. 4.55 a.m. 11.15 a.m. 4.30 p.m. 5.0 p.m. 10.40 p.m. 3.30 p.m. 9.30 a.m.	Monday Tuesday Thursday Friday Saturday 	h. 16 37 5 4 16 5 12 17 9	m. 15 30 55 22 59 21 5 35 10	h. 0 3 0 7 0 4 0	m. 45 55 25 53 1 19 45 25	miles. 373.22 1,051.30 119.50 139.75 483.05 190.50 398.11 +497.38 223.46	miles. 373.22 1424.52 1544.02 1683.77 2166.82 2357.32 2755.43 3252.81 3476.27	m.p.h. 22.97 28.03 20.20 32.00 28.44 35.61 32.95 28.29 24.38
				Total	125	12	18	28	3,476.27	-	27.77

• Inclusive of stops between changing stations. † Runs via Newcastle. ! The days here given are for the purposes of time table interpretation. They are not the only days on which the service is provided.

The average speed inclusive of all stops is 23.54 miles per hour on the journey from Brisbane to Perth, and 24.20 miles per hour on the return journey.

The longest railway journey which can be undertaken in Australia, on one continuous line of railway, is from Longreach in Queensland to Meekatharra in Western Australia, a total distance of 4756.76 miles.

In Western Australia there is a connected system of main or trunk lines between the ports of the State and the agricultural, pastoral, and mining districts, while there are also two short lines, one on the north-west, the other on the south coast, which are unconnected with the main system. In the northern parts of Queensland and in the Northern Territory there are also several disconnected lines running inland from the more important ports. In Tasmania the principal towns are connected by a system of lines, and there are also, more especially in the western districts, several lines which have been constructed for the purpose of opening up mining districts.

4. Non-conformity of Gauge.--With but few exceptions, all the railway lines in the Commonwealth open for general traffic are now owned and managed by the respective States in whose territory they run, or by the Commonwealth Government, but, unfortunately for the purpose of interstate traffic, the construction of the various systems in different parts of Australia has proceeded without uniformity of gauge. In 1846 Mr. Gladstone, then Colonial Secretary, recommended in a despatch to the Governor of New South Wales that the 4-ft. 81-in. gauge should be adopted. In 1850, however, the engineer to the Sydney Railroad and Tramway Company strongly advocated the adoption of the 5-ft. 3-in. gauge, and in 1852 an Act was passed making it compulsory that all railways in New South Wales should be constructed to the wider gauge, the Governors of Victoria and South Australia being duly advised of the step that had been taken. In 1852, however, the company mentioned having changed its engineer, also changed its views as to the gauge question, and in the following year succeeded in obtaining the repeal of the Act of 1852 and in securing the passing of another, under the provisions of which the narrower gauge was made imperative. This step was taken without the concurrence of the other States concerned, and a considerable amount of illfeeling arose, especially in Victoria, where two private companies had already placed large orders for rolling stock to be constructed to the broad gauge originally chosen. The result was that it was decided in Victoria to adhere to the 5-ft. 3-in. gauge as the standard gauge for the State, while the Sydney Railroad and Tramway Company proceeded with the construction of its lines to the 4-ft. 812-in. gauge, and these two gauges have since been adhered to as the standard gauges of the respective States. The Queensland Government had, at the outset, adopted a gauge of 3-ft. 6-in. as being best suited to the requirements of the colony, and has since adhered to that gauge throughout the State, so that all goods requiring conveyance into New South Wales or vice versa have to be transhipped at the boundary between the two States. In June, 1914, however, the Queensland Government purchased two short lengths of line laid on a 2-ft. gauge. In South Australia the broad gauge of Victoria was at first adopted, and the part of the interstate line between Adelaide and the Victorian boundary was constructed to that gauge, so that the line from Melbourne to Adelaide has a uniform gauge throughout. In 1870, however, on the grounds of economy, the 3-ft. 6-in. gauge was introduced and many of the lines in South Australia have been constructed with that gauge. At the 30th June, 1917, of the 2220.66 miles of State Government railways in that State 1209.59 miles were of 3-ft. 6-in. gauge, exclusive of 477.96 miles of the same gauge from Port Augusta to Oodnadatta belonging to the Federal Government. In the Northern Territory the line from Darwin to Katherine, 199.56 miles in length, is of 3-ft. 6-in. gauge. In Western Australia and Tasmania the 3-ft. 6-in. gauge was also adopted. It was recognised in both these States that the construction of railways was essential to their proper development, but as their financial resources would not bear a heavy initial

expenditure in connection with the establishment of railway lines, it was decided to adopt the narrow gauge. In Victoria, short lengths of light railways have been constructed in recent years to a gauge of 2-ft. 6-in., whilst in Tasmania short lengths have been laid down to a 2-ft. gauge.

5. Interstate Communication.—Until the railway systems of the eastern states were connected at the common boundaries, the inconvenience of non-conformity of gauge was not felt. Since then, however, the necessary transhipments of both passengers and goods have been a source of trouble, delay, and expense. On the 14th June, 1883, arailway bridge over the River Murray at Wodonga was opened for traffic, and railway communication was then established between Melbourne and Sydney. On the 19th January, 1887, the last section of the Victorian line to Serviceton, on the South Australian border, was completed, and a junction was thus effected with the South Australian ine to Adelaide. On the 16th January, 1888, a junction was effected between the New South Wales and Queensland lines at Wallangarra, but there was still a break in the line from Sydney at the Hawkesbury River, thirty-six miles from Sydney. This last link was, however, completed on the 1st May, 1889, by the opening of the Hawkesbury River bridge, 2900 feet in length, and railway communication was thus established between the four capital cities, Brisbane, Sydney, Melbourne, and Adelaide.

By the opening of the Trans-Australian railway, to which reference has already been made, Western Australia is now linked to the other States, and an unbroken line of communication established from one side of the continent to the other. The construction, moreover, of lines recently decided upon, connecting Victoria with the Riverina district in New South Wales and with the wheat-growing districts of South Australia, will undoubtedly facilitate interstate exchange and will allow the produce of inland areas to find its natural outlet at the nearest port.

6. Unification of Gauge.—The development of the railway systems of the Commonwealth has shewn that the adoption of different gauges on the main lines in the several States was a serious error. As already mentioned, the extra cost, delay, and inconvenience incurred by the necessity of transferring through-passengers and goods at places where there are breaks of gauge, are becoming more serious as the volume of business increases. As an indication of the extra cost thus involved, the junction charges on interstate traffic between New South Wales and Victoria range from 1s. 6d. to 2s. 6d. per ton.

Although the cost of alteration to a uniform gauge would be great, many propositions have from time to time been put forward with the object of securing such a gauge, and attention has been drawn to the importance of the unification of gauges before further expenditure on railway construction is incurred by the States. The problem is, however, one which is by no means easy of solution, and the difficulties are increased by the introduction of what may be called questions of local or State policy.

The first question that naturally arises in considering the problem is as to which gauge should be adopted as the universal gauge of the Commonwealth. As regards State Government railways, the 4-ft.  $8\frac{1}{2}$ -in. gauge has a mileage of 4397, all in New South Wales; Victoria and South Australia have a combined mileage of 5012 of 5-ft. 3-in. gauge; while New South Wales, Queensland, South Australia, Western Australia have 'together 9859 miles of 3-ft. 6-in. gauge. In addition, the Commonwealth Government has (i.) of 4-ft.  $8\frac{1}{2}$ -in. gauge 5 miles in New South Wales, 597 $\frac{3}{4}$  miles in South Australia, and 454 miles in Western Australia, and (ii.) of 3-ft. 6-in. gauge 478 miles in South Australia, and 199 $\frac{1}{2}$  miles in the Northern Territory. By far the greater part of the mile-age of private railways open for general traffic has also been constructed to the 3-ft. 6-in. gauge. The mere question of preponderance of mileage, therefore, indicates the 3-ft. 6-in. gauge for adoption. But this question is obviously subordinate to those involving engineering and economic considerations. Thus, the relative efficiency from the widest



# THE GOVERNMENT RAILWAY SYSTEMS OF THE COMMONWEALTH AS AT 30TH JUNE, 1917.\*

EXPLANATION OF MAP.—The continuous lines denote the existing railway lines of Australia.

# LIST OF PRINCIPAL SECTIONS OF RAILWAYS.

Miles. Townsville to Winton 368 Townsville to Selwyn 552 Rockhampton to Longreach 428 Brisbane to Cunnamulla 604 Brisbane to Sydney (27§ brs.)715 Newcastle to Inverell 410 Sydney to Bourke 511 Hay 466	Miles. Sydney to Nimmitabel 291 Melb'rne (172 hrs.) 5583 Adelaide to Broken Hill Melbourne to Melb. (17 hrs.) 4527 Melbourne to Merbein 3584 Swan Hill 2144 , S. Aust. border via Murrayville 3693	Miles. 334 688 586 600 341 133
--	--	--

\* To 17th October, 1917, in the case of the Trans-Australian Railway from Port Augusta to Kalgoorlie.

8	<b>}</b>						·		<del></del>	, <u>, , , , ,</u> ,	<del>.</del>										·			_				-+		· .	-
	<u> </u>	-+-				+-+-		i -	++-			++-	-+	++		┿	++	-+-		┝╍┡╍┡	+		++				+		- -	++	-1
	F	÷	÷		÷	÷÷		+	+	++-+-	1-1	+	-1			+		-+-			1		-	t				+		++	1
	L	(E	.000.	000	or	Total	Capital	Cost	•	-					17		1							-			_				1
70	×	1	400	200	••	Gross	Revenu	e, Wo	orking Mile e	Етрен	ies. a	nd Ne	t R.	evenu	•	+	_				+	- 1 1	++	+	-		-+				4
·		1		200		Miles	re onen	per 1	une o	pen.					H	1÷	++		• - +	++	+	++	+	-+-				+-		++	-
	-	-+-		4-+	-+-	++-	in i_+	+-1-	1	H-h-	++	+-;	-				_	- 1 -					11	_		_					1
	F	4	+	÷	-÷-	r	++-+-	<u> </u>		H	<b>↓</b> →	÷	-+	÷	+	+	-				+		-+	÷.			<u> </u>	1	14	-++	4
70		+	t÷	+	1	<del> </del>		+÷		++	++	·· /-	-+	+	+	+	+		+	+++	+	-++	++	+-					1	++	+
				11		-			1.		IT			++					_			-+-+	1-1						51	-1-1-	1
	H	- +-	++-	┼╾┾	-1-	+	+ + +	+ +-	₩-	4+	++	++-	1		1.					ĻЦ	11	44	-1-1		Щ			-+	14-		-
		-+-	<u></u>	+++	-i-	+ +	++	+ + •	+	1++	- ÷ ·	÷÷-	÷+	-+-+	-+ -÷-	++	+-+			+++	+	-+-+	++	+					1/	- +-+	-
60		1	1 1	1.	-	+		h.t.	11			1.1	1		1.	ti					ti	. i i	++	1						11	1
	F	-	- <u> </u>	++		4	111		44.	$  \downarrow \downarrow$	14	+-+	7 F	41	-11-	11	+-	_	-	H			+	-		_		//		4	
	ł~	-	- <del>1</del> <del>1</del> -	<b>†</b> →	7	4	+ +	+ +-	+.+-	++-r-	++	÷-+ -	+ ŧ	· + ‡	- <del> </del> - <del> </del> - <del> </del> -	++	++		-+	++		++	-+-+	+-	++-			-#		++	-
		÷	Τ.	17	Ť	11	TT.		$^{++}$	+-+-	+	$\pm 2$	+ †	1 1	++	11		+				++	+	+	H		+	1	1-1-1	++	٦.
				<b>I</b> +						-+		+ + -	1	+ +		Ŧ,				4	1	- <u> </u>	+1	-				7	$\square$	1	-
	ŀ1	+	++	+ +	+	+ + -		+-+-	++		++	++-	-+	÷+	÷ *	+-+	-+ +			++	++	· + +	-+ +	+			+	4-	+		-
		1	1	1.7	Ť	* +			1.1	++	++	+-+- •	11	11		11	+-	- i			1	+		+-	H	H	- 1/1		t-t/	$\rightarrow$	-1
55			+ +	1		1					Ľ	+ + +	1	+ +	1.	1.	-+					++					31		$\Gamma$		_
	Н	-+-	++-	++	÷-	+ +	-+	++-	┥┝	┝┥╾╁╺	+ +	<del>1</del>	⊦∔	- + +	+-+	+ +	44	+ +	- +	-++		-+		+-			11	A	/ <u> </u> -	-++	-
	H	+	<b>4</b> -4-	ŧ *	+	· ·	<u>├</u>	****		-+	-	+ +	-+	-+-+		++				-+	+	-+-+	+	+		-1	1	1	¥⊢		-
	_		4	17	4.	+-+	+	+ i -	T		- i-	+ -	1	-+ +			1		_		Г	11	11			1		1			1
50		÷	÷	≁⊷	+-	<u> </u>	1. <del>.</del> .	4-			₹÷-	<del></del>	H	÷	+ +-	++				iii	+ 1	<u> </u>		+	<u> </u>	-1/		$\mu$	11.		4
	-	+	11	+	+	÷ +		<u></u>			+ +-	-+ - +	• +	-+ +		ł÷	-++		-	+++ ++		- +	++	+-	ĿΗ	X	-//	t t	-+-	-++	-
		-1.		1.1		+ +		•••••••			11	<u>†</u>	11	-		11	- ++						-	1	έZ		1				1
	-+	+	++	+ +	+	+		+ - +	H	++	++	÷÷-	4		·	+	-+ +			<b>→</b> +	++	· • • •	÷.	4	1		A	H-	H	-i-i	-
-45		+-	÷	+	+	1					++		4			++	÷			+-+	+-+		11	+	[]		<u> </u>				-
		- + -	+-+-	1:	1	<u>+ -  </u>	+-+-	1		+-+	t 1.	+- +		-++	+++	11			+ •	• • •	11	- 7	$\mathbb{Z}^{1}$	t							
	+	-4	+ +	1.	÷.,	+-+ -	+ +-	$\square$		+ +-	- +-	1	4	-+-+	1	-H-i	+-		+	+++	1.	4	+	+	$\vdash$	1		i i-	1-i/		_
i	4	~+	+	+ +	+	÷ • •	- +- <del> </del>	+	+ +	+++	++-	÷+•	-+	-+-+	÷÷÷	ł÷	-÷ •	• • •	+ -	+ + +	Y	-+ +	-+-+		+ +-	⊢∦-	·	+	++	• • + • +	-
40				<b>_</b>		1					1.1.			11	1.					12								÷	7	<u> </u>	1
		_		11	÷.	ī. i			17-		1.		T			11	-+ -	1	1	$Z_{\pm}$	F	44	- 1	-+··		71-			1	+	_
		-	+ +-	+ +-		++		i	H		+ +	++-	+	++	++	++	-+- +		1	+++	+-+	· ++	-i-f	÷	+ + ;	/ <del> </del> -		rt-	++-+	• • • • •	
	-	-+-	++-	17	-+-	* *	++-	++		+++	1-1-	4-+-	-	++	~+_+-	++	÷-	1	F +	<u>}</u> +	+-	-+-+	-+ +	+	1/1	Ft ·	++	1/1-	t t	+	
35	_			1.		+ +-		*** ***			Γ.						Z	1				- + +		- 7			+	7			_
	-	1	+ +		+	+-+	-+ +-		l i i		f-+	÷	-1	-+	-1-+	11	4				+-	- + - 1	-+-	-+	r i i	-+-	/			+-+	1
	1	+.	+-+-	f•+	-+		++-			+++	<del>1-1</del>	<u>+</u> +-	+	-++	++	VY	4-4	-+	- + -	• •		++		1.	<u>⊨ +_</u> i	⊢-†-	-+-	÷			-
30		+	1							_					-+ -+	1	1						_	Ľ.			7		<u> </u>		
	L÷	4-	↓+	Į		<u>↓</u> ∔_		11	+++	44	}- ∔-	+-+-	4-4	7;	- 1	4 +	-+			+++	+	-44	→Ă	- <b>i</b> -	+-+		·/	}_÷_		:- <del>   </del>	4
	1	٠ŧ	<u>+</u>	<del>1</del> † †	-+	+ +				+++	+-	+	-+	* †	-fj	f t	-+ 4	- i+ i		· · · ·	17	~	1	+ -	+ +- ·	ŧŧ.	f	÷ .+ -	+ • •	-++	-
		+		t <u>t</u>	+-							tt.	11		11	11	11	+	+		1/	ΞŶ	<u>~1</u>	1	t E		11	r		$\Box$	_
25	_			1.	4						11	4.4.	4		/		4				1	·		+	L.	i V		<u> </u>	+	4	-
	-		<u>+-i</u> -	+-+	+	i i -		<u>+-</u> +-			++	++-	++	–+ <i>f</i> r	-++-	++	-+ +	+ -+		<u></u>	4	+	-+ +	+	t - t - i	A-	÷	t-t-	+		-
1		+		$^{+\pm}$	+	11	++			+ + +-	+-+-	++-		K+	-+- +	1±	+ +	+ - + -	-+ -	2		+ +	11	+	+-+	71			11		1
		1	4-4-	1-4-		11-	++			-+-+	11	+.+ .	1	/+ +		A	7		1.	+-+ +	41	1 + -	44	4-	1	ì .		÷	1-i-	i-	4
20	H		<u>.</u>	╆┿	-[	++		÷			+	- <del> </del>	А	-+-+	+	₩.		$\leftarrow$	1		$+\epsilon$	5	+		<u> </u>	-		<u></u>	++	++	H.
	H	-+	<u>†</u>	++	-	t	+++	+ + -	1+	• • <del>• • •</del>	† +-	13/	۶t	-+-+	17	1 t		<u> </u>	11	• + +	<u>†</u> 1	$\sim$		~	+ + - 	11	• •	+	1		
1		А	Li		Τ.			11	$\Box$	- ++-	1	17.	: T		7.	14	1.1			+ + <del>-</del>	Ŧ/	11	-1.1		11	4		1 A			-
1	1	(1)	ė-į-	ł÷		+	+ + - + -	<u> </u>	++	++-	t a	£	· +	+	4.,	++	• •		·	<u>+</u> +-	£⊣	- + -+		-+-	÷	-V		≁+{	-ł→ ·	i-1-1	-
15	/		X	++		1		1			-\$/	· · ·	t	1			_				4,		-	17		h	+ +			11	
		1		t:		+ +		+ + -	1 -	+ +	Y.!	- 51	1	1 -	-+ +	V.				Ζ.	1:	1	- 1	1			+ -+	11	1-	$\square$	4
	+	-+-	+	1	+	÷ + -	+ +	+·+··	<u></u>	1 + 1	s; .	÷/	۰ł	+ +	Nº1	1.	+ +	1	1	+	-+ °	•	-+	4	-+-	÷ 🕂 .	+ +	+	+ ÷-	i-j-l	H
		-+-	<del>   </del> -	+	~	<b>≺</b> —		<u>+-+</u> -	A	¥.	1.	/ -	٠ŧ	+ +	v/	++	+ +	+ + -	+	+ + +	- † -	+ -+	-+/	<u>_+</u> _		+ + -	+	<u>+</u> +	+	<u>-i-</u>	
10	1	1-	<u>t.</u>	F.		1	aver	380		N. S. S.	\$/		ne	2		1			1	1	卞	5	7		÷ - 1	1	i i	Π	1		
	_+	1.		1+		i		$\sim$	K.	·/,	χĻ	+ Nor	4	11	++	Ţţ	10	5	μZ		1	$\Sigma$	4	4	+ +-	1	<u>}_</u>	i -	++-	++-+	Н
		-+-		++		1	مرا	<u> </u>	÷,	Ŀ.	£+	-A-			DUG	14		-	+	++	+	i	-+-		+ +		+-+	++-	+-+	÷.	
	~†	-f	<b>†~</b> +	+ +	÷	1/1	-+-	÷ +	12	-	Ť¥	Mile	4	Rev	ope	1 -	++	1	+-	<u>-</u>	11		+	1	+ · + - 1	+ + -	<u></u>	++	17		
5		1		D	Ż	a i i a		11		1	5.	2		11		T									+ + -			TΤ	T-	11-	Д
j	-	F	·	T.	+	+	17	71-		->	f +	1-+-	H	-i-T	++	+			+	++-+	-+ +		$\rightarrow$	÷	нi-	–	+-}-	i+	++-	++-+	H.
4	×	4	سليط	1=	÷	Ē	متسلسا	-	FF-		++	++-	H	-1-1	-+-+	++		H	H-	+++	+-	++1		+	$^{++}$	++-	++	++	++-	H-1	Ъľ
6	-		7	TT	Ŧ	1	T	11-			Ħ	1-1-	H	-++	1	1	+				1				1L			Ц	TL		
18	50	-	15	165		18	70	18	75	15	ເສດ		188	15	1	890		18	95		900		19	05		1910		ĩ	915		192

#### GRAPH SHEWING THE FINANCIAL POSITION OF THE GOVERNMENT RAILWAYS OF THE COMMONWEALTH, 1860 TO 1917.

#### (See page 699.)

EXPLANATION OF GRAPH.—In the above diagram the base of each small square represents throughout one year. The significance of the vertical height of each square varies, however. according to the nature of the several curves. In the heavy curve denoting the total capital cost of the railways of the Commonwealth, the vertical side of each square denotes £3,000,000. In the three lighter curves, representing (i.) gross revenue, (ii.) working expenses, and (iii.) net revenue, the vertical height of each small square denotes £400,000. For the curve of average cost per mile open, the vertical side of the small square denotes £400,000. The mileage open is shewn by a dotted curve, the vertical side of each square representing 300 miles. For the curves shewing the percentage of working expenses to gross revenue, and the per-centage of net revenue to capital cost, see graphs on pages 655 and 656 respectively.





#### (See page 684.)

EXPLANATION OF GRAPH.—In the above diagram the base of each small square represents throughout one year. The vertical side of a small square denotes throughout 10 per cent., the heavy zero lines being different for each State and the Commonwealth, with, however, one exception, viz., that the zero line for South Australia and Western Australia is identical.

The curve for Victoria commences in 1859; that for Queensland in 1865; that for Tasmania in 1872; and that for Western Australia in 1879, these being the years in which the Government Railway systems of the several States were inaugurated.

#### GRAPH SHEWING PERCENTAGES OF NET REVENUE TO CAPITAL COST OF GOVERN-MENT RAILWAYS FOR STATES AND COMMONWEALTH, 1855 to 1917.



#### (See page 686.)

EXPLANATION OF GRAPH.—In the above diagram the base of each small square represents throughout one year. The vertical side of a small square denotes 1 per cent., the thick zero lines, however, for each State and for the Commonwealth being different. This was necessary to avoid confusion of the curves.

Where the curve for any State (alls below that State's zero line, loss is indicated, the working expenses having exceeded the gross revenue.

The curve for Victoria commences in 1859; that for Queensland in 1865; that for Tasmania in 1872; and that for Western Australia in 1879, these being the years in which the Government railway systems of the several States were inaugurated.

point of view, the relative costs of alterations of the permanent way and rolling stock, of carrying capacity and speed, that is to say, questions of a technical nature about which figures are not available, enter into the grounds for decision. As regards the unification of the New South Wales and Victorian gauges, the advantage of reducing the broad gauge to the 4-ft.  $8\frac{1}{2}$ -in. gauge is that there would be no necessity for the alteration of tunnels, cuttings, bridges, or viaducts.

In 1897 a conference was held between the Railway Commissioners of New South Wales, Victoria, and South Australia to consider and report upon the unification of the railway gauges of the States. In their report the Commissioners estimated the cost of converting all the lines in the three States to a 5-ft. 3-in. gauge at £4,260,000, and to one of 4-ft.  $8\frac{1}{2}$ -in. at £2,360,500. In 1903 the question was again brought up, more particularly with regard to the proposed transcontinental line, and the Engineers-in-Chief reported in favour of a gauge of 4-ft.  $8\frac{1}{2}$ -in. At the Premiers' Conference, held in January, 1912, the subject was again under consideration, but no decision was come to.

In November 1912, another conference of railway engineers, representing the six States and the Federal Government, was held, and the question of unification of gauge was again discussed. The necessity for such a step was emphasised, and a conclusion was come to that the relative advantages of the 5-ft. 3-in. and 4-ft. 81-in. gauges, from the point of view of efficiency and economy of working, were approximately equal, and that the determination of the most suitable gauge should be made on the basis of cost. Owing, however, to the fact that track mileage, ton mileage, and wages, had at the time increased 90, 200, and 50 per cent. respectively since 1897, together with a correspondingly large increase in the cost of material, the Conference estimated the cost of converting all lines to a 5-ft. 3-in. gauge at £51,659,000 and to a 4-ft. 81-in. gauge at £37,164,000. It recommended that the latter gauge should be adopted, and pointed out that the longer the work of conversion was delayed, the greater the cost would become. An alternative scheme by which the main trunk lines and the more important branches should be converted was also proposed, as possibly meeting immediate requirements, and being, from a Federal point of view, perhaps a more attractive proposition than any other which could be suggested at the present time. The estimated cost of this limited The subject was again under discussion at the Premiers' scheme was £12,142,000. Conference, held in Melbourne in April 1914, when it was decided to refer the matter to the Interstate Commission, that the latter body might furnish a report as to the benefits of unification, its cost, and the apportionment of such cost.

In May 1915, another Premiers' Conference took place at Sydney, and the uniform gauge question again received consideration, with the result that the following resolution was carried without dissent:—"That . . . two leading railway experts, preferably from outside Australia, should be forthwith appointed by the Government of the Commonwealth and the mainland States to . . . report on—(1) the need of a uniform gauge, (2) the most suitable gauge, (3) the best method of carrying out uniformity, (4) what benefits would result to the Commonwealth and to the States, and (5) the probable cost."

In May 1916 a Premiers' Conference took place at Adelaide, when the question of the adoption of a third rail was discussed, with the result that a motion was carried in the following terms:—"That this Conference agrees to the appointment of a committee of experts, one from each State and the Commonwealth, to investigate the whole question of the laying of a third rail." A further motion was carried to the effect— "That on the receipt of the report of the committee of experts there should be an early meeting of Commonwealth and State Ministers controlling railways to consider the advisability of an early practical application of the third rail system on some selected section." This subject engaged attention at the Premier's Conference at Sydney in May, 1918, when it was urged that an early test of the third rail system should be arranged for.

Early in August, 1918, a conference took place at Melbourne, at which the engineers of the Commonwealth and States' railways were present. The gauge question was fully discussed and a report was drawn up for presentation to the various Governments. Up to the time of going to press this report had not been published.

7. Loading Gauges.—Allied to the question of the gauges of the railways of Australia is that of the loading gauges which are in use, the loading gauge being the maximum dimensions to which the rolling stock may be constructed. In the following table will be found particulars of the loading gauges at present in use on the Government railways, State and Federal :—

# LOADING GAUGES IN USE ON STATE AND FEDERAL GOVERNMENT RAILWAYS, 1917.

		-				Maxim	um Loa	ding	Gauge	•		
Railway.		Ga of Tı	uge ack.	Wi	dth.	Heigh Rail	tab've Level.	Ler	ngth r all.	י	Fare	•
New South Wales Victoria Queensland South Australia Western Australia Tasmania Federal— Trans-Australian Northern Territory	···· ··· ··· ··· ···	ft. 4 5 2 3 2 5 3 3 3 2 4 3	in. 8 3 6 6 0 3 6 6 6 0 8 2 6 6 0 8 2 6 6 6 0 8 2 6 6 6 6 6 6 6 6 6 6 6 6 6	ft. 9 9 7 9 6 10 9 8 9 8 9 6 10	in. 8 11 4 37 4 4 4 4 4 5 6 6 6 4 2 10 6 6 6 4 2 10 10 10 10 10 10 10 10 10 10	ft. 144 14 14 12 10 14 12 12 12 12 10 14 12 10 14 12 12	in. 0 0 4 4 9 0 1 2 7 5 0 6 9	ft. 74 74 31 53 22 74 62 60 64 30 75 33	$ \begin{array}{c} \text{in.} \\ 4\frac{1}{2} \\ 1\frac{1}{4} \\ 8 \\ 5 \\ 0 \\ 1\frac{1}{4} \\ 6 \\ 9 \\ 0 \\ 2 \\ 0 \\ 6 \\ 0 \\ 6 \\ 0 \\ 6 \\ 0 \\ 0 \\ 6 \\ 0 \\ 0 \\ 6 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	T. 44 46 8 26 37 24 31 30 5 58 11	c. 2 17 11 14 0 11 18 10 0 10	q. 1 2 0 0 0 2 0 0 0 0 1 0 0 0

# PASSENGER ROLLING STOCK.

#### GOODS ROLLING STOCK.

						Maxim	um L	oading	Gau	ge.				
Railway.	of T	uge rack.	Wi	dth.	Heigh Rail	tab've Level.	Lei ove	ngth r all.		Fare	•	Ca Ca	rryi paci	ng ty.
New South Wales Victoria Queensland South Australia Western Australia Tasmania Federal— Trans-Australian North'n Territory Oodnadatta	ft. 4 5 2 3 2 5 3 3 2 4 3 3 2 4 3 3 3 2 4 3 3 3 3 3 3 3 3 3 3 3 3 3	in. 81 3 6 6 0 3 6 6 6 0 81 6 6 6 6 6 6 6 6 6 6 6 6 6	ft. 9 9 6 8 6 10 8 8 8 6 10 9 10	in. 8 $7\frac{1}{5}$ 0 6 $0\frac{1}{4}$ 6 8 6 0 6 4 2	ft.         13           13         9           12         9           12         12           12         12           12         12           12         12           12         12           12         12           12         12           12         12           12         12           12         12	in. 6 5 7 4 0 0 10 4 6 0 6 9 4	ft.         60         55         27         45         22         43         38         44         40         27         45         32         18	in. 11 4 <sup>1</sup> / <sub>2</sub> 3 <sup>2</sup> / <sub>4</sub> 5 0 6 9 9 9 10 0 0 6 0 6 0	T. 20 20 7 11 4 16 11 17 12 5 15 6 5	c. 10 6 12 10 10 15 15 15 15 0 0 0	q. 3 0 2 <sup>1</sup> / <sub>2</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	T. 40 30 10 21 16 30 25 25 30 20 40 12 12	c. 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0	q. 000000000000000000000000000000000000

In the above tables the dimensions given are not necessarily those of one particular vehicle, but are the greatest employed on any vehicle.

8. Mileage Open for Traffic.—In all the States of the Commonwealth the principle that the control, construction, and maintenance of the railways should be in the hands of the Government has long been adhered to, excepting in cases presenting unusual circumstances. In various parts of the Commonwealth, lines have been constructed and managed by private companies, but at the present time nearly the whole of the railway traffic in the Commonwealth is in the hands of the various State Governments. A large proportion of the private lines which are at present running have been laid down for the purpose of opening up forest lands, mining districts or sugar areas, and are not generally used for the conveyance of passengers or the public conveyance of goods. (See F. Private Railways, hereinafter.)

Mileage of Government and Private Lines, 1855 to 1917. The subjoined table shews the mileage of Commonwealth Government, State Government, and private lines open for traffic (exclusive of sidings and cross-overs) in each State at different periods since the inauguration of railways in Australia in 1854 up to the year 1917. The railway mileage given for each State includes both Commonwealth and State Government railways in that State, and in this table and in those on the following page, is estimated from the geographic point of view and not from that of ownership. The figures from 1855 to 1881 are given to the end of the calendar year; later figures are to the end of the financial year ended on the 30th June, unless otherwise stated, excepting the mileages for private lines, which are in most cases taken for the calendar year:—

	Year.		N.S.W.	Vict.	Q'land.	S. Aust.	W. Aust.	Tas.	N. Ter.	C'wlth.
			Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
1855	•••	•••	14	25		<b>₹</b> 6≩				23
1861	•••	••••	73	114		56				243
1871	•••		358	276	218	133	12	45		1,042
1881	•••		1,040	1,247	800	845	92	168		4,192
1890-1	•••		2,263	2,763	2,205	1,666	<b>†656</b>	†425	145	10,123
1900-1	•••	• •••	2,926	3,238	2,904	1,736	1,984	1618	145	13,551
1910-11			4,027	3,574	4,390	1,993	3,208	675	145	18,012
1912-13	•••		4,197	3,698	4,936	2,202	3,827	729	145	19,734 <del>]</del>
1913-14			4,251	3,886	5,213	2,357	3,910	7663	146	20,529
1914-15			4,444	3,936 <del>1</del>	5,4491	2,955	4,553	779	146	$22.263\frac{1}{2}$
1915-16			$4,496^{2}$	$4,152\overline{3}$	$6,452\overline{1}$	3,060 <del>1</del>	4,707	7581	146	23.773
1916-17			$4,786^{2}$	$4,176\frac{1}{2}$	$6,702\frac{1}{4}$	$3,241\frac{3}{4}$	4,878 <del>1</del>	783	199 <del>]</del>	24,769-

GOVERNMENT AND PRIVATE RAILWAYS.-MILEAGE OPEN, 1855 to 1917.

\* The line between Goolwa and Port Elliot was opened in 1854 as a horse tramway, but now forms part of the railway system. † To the 31st December, 1891. ‡ To the 31st December, 1901.

It will be seen from the above table that the rate of construction up to the year 1871 was very slow, the average annual length of lines opened from 1861 to 1871 being only 80 miles for the whole Commonwealth. By the middle of the following decade, however, the principal mountain ranges had been crossed, and the work of construction could be proceeded with at a greater rate, and at a less cost per mile. A great period of activity was from 1881 to 1891, when the average annual length opened for traffic was 593 miles for the whole Commonwealth; the corresponding figures for the following periods from June 1891 to June 1901, and from June 1901 to June 1911, were 343 and 446 miles respectively. Since June, 1911, the average annual length opened for traffic has been 1126 miles.

9. Comparative Mileage of Government and Private Lines, 1917.—The subjoined table shews for each State (a) the length of lines owned by the State Government, and by the Commonwealth Government in that State, all of which lines are open for general use by the public, (b) the length of private lines available for general use by the public, and (c) the length not so available. The mileages specified in the case of Government lines are to the 30th June, 1917; those given for private lines are as nearly as possible to the 31st December, 1916:—

U 2

# GOVERNMENT AND PRIVATE RAILWAYS.—COMPARATIVE MILEAGE OF GOVERN-MENT LINES, OF PRIVATE LINES AVAILABLE FOR GENERAL TRAFFIC, AND OF PRIVATE LINES NOT SO AVAILABLE, 1916-17.

State or Territory.	Government Lines.	Private Lines available for General Traffic.	Total Open for General Traffic.	Private Lines used for Special Purposes only.	Grand Total.
	Miles.	Miles.	Miles.	Miles.	Miles.
New South Wales	*4,442.02	183.08	4,625.10	161.65	4,786.75
Victoria	4,122.64	24.94	4,147.58	28.83	4,176.41
Queensland	5,213.79	529.62	5,743.41	958.91	6,702.32
South Australia	<b>†3,202.82</b>		3,202.82	39.00	3,241.82
Western Australia	13,879.10	277.00	4,156.10	722.31	4,878.41
Tasmania	581.65	162.19	743.84	39.80	783.64
Northern Territory	199.56		199.56		199.56
Total	21,641.58	1,176.83	22,818.41	1,950.50	24,768.91

\* Including the Federal Territory line (4.94 miles)., † Including the Oodnadatta line (477.96 miles). and Trans-Australian line (504.20 miles). (454.00 miles).

10. Comparative Railway Facilities in Different States, and in the Northern Territory, 1917.—The relations to populations and areas respectively of the mileage of line open to the public for general traffic (including both Government and private lines) on the 30th June, 1917, are shewn in the subjoined statement for each State, the Northern Territory, and also for the Commonwealth :—

# GOVERNMENT AND PRIVATE RAILWAYS.—COMPARISON OF RAILWAY FACILITIES IN DIFFERENT STATES AND IN THE NORTHERN TERRITORY, 1917.

			Population		Mileage o	f Railway.
State or Terr	itory.		30th June, 1917.	Area.	Per 1000 of Population.	Per 1000 sq. miles of Territory.
			Number.	Sq. miles.	Miles.	Miles.
New South Wales*			1,871,142	310,372	2.56	15.42
Victoria	•••		1,402,650	87,884	2.98	47.52
Queensland			681,302	670,500	9.84	9.96
South Australia	•••		429,890	380,070	7.54	8.53
Western Australia			308,530	975,920	15.81	5.00
Tasmania	•••		197,337	26,215	3.97	29.89
Northern Territory	•••		5,043	523,620	39.57	0.38
Commonwealt	h		4,895,894	2,974,581	5.06	8.33

\* Including Federal Territory.

11. Classification of Lines according to Gauge, 1916-17.—The subjoined tables give a classification, according to gauge, of the total mileage, exclusive of sidings and crossovers, of (i.) Commonwealth Government railways, given in the State in which situated; (ii.) State Government railways; (iii.) Private railways open to the public for general traffic; and (iv.) Private lines used for special purposes. Particulars of Government railways are up to 30th Ĵune, 1917, of private railways open for general traffic to the 31st December, 1916, and of private railways open for special purposes to the 31st December, 1916, as nearly as possible,

#### Mileage having a Gauge of-State or Territory in which situated. Total. 5 ft. 3 in. 4 ft. 8 in. 3 ft. 6 in. 3 ft. 0 in. 2 ft. 6 in. 2 ft. 0 in. FEDERAL RAILWAYS. Miles. Miles. Miles. Miles. Miles. Miles. Miles. 504.20 South Australia 477.96 982.16 ••• ... ... ... 454.00 454.00 Western Australia ... ... ... ... ... Northern Territory... 199.56 199.56 ... ••• ... ... Federal Territory ... 4.94 4.94 ••• ... ... ... ... Total ... 1,640.66 963.14 677.52••• ... ... STATE RAILWAYS. · · · 4,396.99 4,437.08 New South Wales .. 40.09 ••• ... ....4,000.74 121.90 Victoria ... 4,122.64 • • • ... . . . . Oueensland 29.355,184.44 5,213.79 . . . ... ... South Australia • • 1.011.07 1.209.592,220,66 ... ••• ... ... Western Australia 3.425.103,425.10... ... ••• ... Tasmania ... 558.08 23.57 581.65 ••• ... Total ... 5.011.81 | 4.396.99 | 10.417.30121.90 52.92 20,000,92 ••• PRIVATE RAILWAYS OPEN FOR GENERAL TRAFFIC. 45.00 76.23 New South Wales ... 35.60 26.25 183.08 ... Victoria ... 13.94 11.00 24.94 ••• ... ... Queensland 424.37 105.25 529.62 ... ... • • • ... ... South Australia ... ••• ••• ... ... ... Western Australia .. 277.00 277.00 ... ... ... ... Tasmania... 152.19 10.00 162.19 ... ... · • • • ... ... 58.94 76.23 889.16 Total ... 11.00 141.50 1.176.83 ... ... PRIVATE RAILWAYS OPEN FOR SPECIAL PURPOSES. New South Wales .. 158.153.50 161.65 ... ... ... 28.83 Victoria ... 28.83 •• ... ••• Queensland 160.82 17.00 781.09 958.91 ... ... ... ••• South Australia 34.00 5.00 39.00 •• ... • ... ... • • • Western Australia .. .661.31 \*61.00 722.31 ••• • • • ••• ••• Tasmania... 38.05 1.75 39.80 . . . ... ... . . . . . Total ... 28.83 158.15 897.68 17.00 848.84 1.950.50 ... ALL RAILWAYS. 45.00 4,631.37 79.19 New South Wales .. 26.254,781.81 Victoria ... .... 4,043.51 11.00 121.90 4,176.41 ••• Queensland 5.769.63 17.00 915.69 6,702.32 ... ... 1.011.07 504.20 1,721.55 5.00 South Australia 3,241.82 ••• • • • ... 454.00 4,878.41 Western Australia .. 4,363.41 \*61.00 ... • • • ... Tasmania 748.32 35.32 783.64 ... ... ... ... ... Northern Territory... 199.56 199.56 ... ... • • • ... ... Federal Territory .... 4.94 4.94 ... ... ... GRAND TOTAL ... 5,099.58 5,594.51 12,881.66 138.90 1,043.26 24,768.91 11.00

# GOVERNMENT AND PRIVATE RAILWAYS.—CLASSIFICATION ACCORDING TO GAUGE, 1916-17.

\* Including 27 miles of 1-ft. 8-in. gauge.

# (B) Federal Railways.

1. General.—On the 1st January, 1911, the Commonwealth Government took over the Northern Territory from the South Australian Government, and at the same time the railways from Darwin to Pine Creek, in the Northern Territory, and from Port Augusta to Oodnadatta, in South Australia, came under its control. Subsequently, the construction of a transcontinental line from Port Augusta, in South Australia, to Kalgoorlie, in Western Australia, was undertaken by the Commonwealth Government, while a line has been constructed in the Federal Territory, connecting Canberra with the New South Wales railway system at Queanbeyan. In 1917 an Act was passed by which all the Commonwealth railways are vested in a Commissioner.

2. Northern Territory Railway (Darwin to Katherine).—The line from Darwin to Pine Creek at first came under the jurisdiction of the Department of External Affairs, and was worked under the Administrator of the Northern Territory. As mentioned above, the management of this railway is now vested in the Commissioner.

Particulars as to the working of this line for the year 1901-2 prior to its passing under the control of the Commonwealth Government will be found in sub-section C, State Government Railways.

In the Northern Territory Acceptance Act, the construction of a transcontinental line from South Australia is provided for. The extension of the line from Pine Creek to Katherine River has been completed, and the first train ran through to Katherine on 13th May, 1917.

3. **Oodnadatta Line.**—This line was taken over by the Commonwealth Government from 1st January, 1911, but was held under lease by the South Australian Government until 31st December, 1913. From the 1st January, 1914, the line has been worked by the South Australian Government for and on behalf of the Commonwealth. It is provided in the Northern Territory Acceptance Act that the Commonwealth shall annually reimburse the State with the interest payable on the amount of loans raised by the State for the purpose of constructing the railway, and the agreement for working the line prescribes that the Commonwealth is responsible to the State for any financial loss incurred by the State in the working and management of the railway, but is entitled to receive from the State any profit made in such working and management.

4. Trans-Australian Railway (Kalgoorlie to Port Augusta).--- A Federal Act passed in 1907 provided for the expenditure of a sum of £20,000 for a preliminary survey of a railway line connecting Western Australia with the eastern States. This survey was commenced in 1908, and was completed in March, 1909. The route via Tarcoola was, for several reasons, chosen in preference to that via Gawler Range and Fowler's Bay. The estimated cost of construction and equipment of the line on the basis of a 4-ft. 81-in. gauge. from Port Augusta in South Australia to Kalgoorlie in the Western Australian goldfields, a distance of 1063 miles, was £4,045,000. In September, 1911, a Bill was introduced into the Commonwealth Parliament to authorise the construction of the line, and it became law in December following. In South Australia an Act was passed enabling the Commonwealth to acquire lands for the railway in South Australia not exceeding one-eighth of a mile wide on either side of the line, but no town lands are to be included at any time. In Western Australia, an Act was also passed by which all necessary lands are to be granted to the Commonwealth for railway purposes. A Railway Construction Department was created by the Federal Government to carry out the work, which was commenced at Port Augusta in September, 1912. On 12th September the ceremony of cutting the first sod was performed at Port Augusta by the Governor-General, Lord Denman, in the presence

ζ

of a representative gathering, and on the 12th February, 1913, a like ceremony was performed at Kalgoorlie by the Prime Minister of the Commonwealth (the Right Hon. Andrew Fisher), and the line was thus commenced at both ends.

The country traversed by the new line may be roughly divided into four sections from Kalgoorlie eastward.

The first section comprises the granite plateau extending for 167 miles out from Kalgoorlie. Much of the country on this section is fairly well timbered with salmon gums and other eucalypts, running up to 50 or 60 feet in height. Kurrajong and sandalwood are also fairly abundant. Throughout there is a luxuriant growth of wild flowers.

The second section is "the limestone plain," which runs for 450 miles to the east from the edge of the granite country. In this section the eucalypts suddenly disappear, and are not seen again until the mallee gums of the bolder sandhills on the eastern edge of the plain are reached. The open plain comes into view 207 miles out, and thence forward the only signs of growth to be observed are the saltbush and blue bush.

About 290 miles out the line runs on to the Nullarbor Plain. One feature of this part of the line should be mentioned, viz., that it runs straight for no less than 309 miles. This is believed to be the longest section of straight-line railway in the world.

Near Loongana, 336 miles out, certain caves are situated, the principal of which is Lynch's.

The South Australian border is reached at a point 453.94 miles out, a small stone cairn marking the boundary. At 605 miles trees are again met with, but they are small and do not grow more than ten to twelve feet high. The limestone plain is left at about 624 miles out.

The third section is the belt of sandhills on the eastern edge of the limestone region, through which the line runs for about 50 miles. In a state of nature, there are no shifting sandhills about this part of the line, as there is a fairly thick growth of small trees, Mallee gums and others, but when the surface is cleared, the soil is easily removed by the wind, and the bigger cuttings for the line have had to be faced with stone.

The fourth section comprises the stretch of country extending for nearly 400 miles from the eastern edge of the sandhills to Port Augusta. For about 100 miles the line runs over red soil plains and undulating country, which give promise of pastoral and possibly agricultural uses.

At Wynbring, 730 miles out, the granite again comes to the surface. One of the most important places on this section is Tarcoola, at which gold mining has been carried on for some time past. East of Tarcoola the "Lake" country is entered. The lakes in this district are merely vast shallow pans, which are beds of salt in dry seasons and contain water only after rains. It may be mentioned that the line does not cross a single permanent stream of water at any part of its length of 1051.73 miles.

At first preparatory work at each end of the line had to be done, and it was not until March, 1913, that any platelaying had been carried out.

By 30th June, 1913,  $3\frac{1}{2}$  miles of line on the 3-ft. 6-in. gauge, and 1 mile on the 4-ft.  $8\frac{1}{2}$ -in. gauge, had been laid in the depôt at Kalgoorlie, the corresponding lengths at Port Augusta being  $4\frac{1}{2}$  and  $2\frac{1}{2}$  miles respectively.

Platelaying on the main line was commenced on the eastern division on April, 1913, and on the western division in May, 1913.

The rate of progress in the construction of both ends of the line will be seen on reference to the following table :---

			Posi	ition of	Rail Head		Total T	andth
Date			EX Kalgo	orlie.	Ex Port	Augusta.	Constr	ucted.
1913—Sept. 1 Oct. 8			Mls. C *8 { *8 {	bs. 33 33	Mls 9 25	. Chs. 40 00	Mls. 15 30	Chs. 33 73
Nov. 1			*8 8	33	36	74	42	67
,, 18 1914—Feb. 1	•••		12 4 39 4	10 10	63	00	102	40
April 1 June 1	•••		82 4 82 4	10 10	69 84	56 68 <del>1</del>	152 167	16 281
Dec. 1		}	135 6	50	137	64	273	44
1915—Mar. 1 June 1			190 8 254 2	32 23	200	68 73	391 520	20 16
Sept. 1	•••		320 6	58	304	25	625	13
Dec. 1 1916Mar. 1	•••		383 2 411 8	27 30	330	72 73	714 750	19 23
June 30			411 8	80	361	64	773	14
Aug. 28 Sept. 29	•••		454 7 478 7	15	395	58	 874	53
1917-Jan. 31	•••		535 3	37	406	9	941	<b>46</b>
Oct. 17	 		621 5	58 58	411 430	00	958 1051	20 58

# RATE OF CONSTRUCTION OF LINE.

\* Exclusive of 24 miles from Kalgoorlie to the Depôt, which was completed in November, 1913.

In the above table it will be seen that between 1st September, 1913, and 17th October, 1917, the date on which the eastern and western divisions met at 621 miles 58 chains ex Kalgoorlie, a total mileage of 1036 miles 35 chains was completed. Including Sundays and holidays this gave an average of 0.69 mile of line per day; omitting Sundays the average was 0.8 mile of line per day. As there was in the course of the work a certain amount of broken time owing to lack of materials, and also labour difficulties, the last average is not unsatisfactory, more especially when the conditions which had to be encountered owing to the nature of the country traversed by the line are taken into consideration.

The permanent way consists of rails weighing 80 lbs. to the yard and is a single line throughout, with the exception of the lines at the terminal stations. The rails vary in length, some being 33 feet and others 45 feet, the latter having been adopted to reduce the number of rail joints. The sleepers were at first 9 feet long, 10 inches wide by 5 inches in depth. Subsequently they were standardised at 8 feet 6 inches long, 9 inches wide and 5 inches in depth, thus effecting a material saving in timber.

Ballasting has been effected over a limited length of line so far, but is being carried on regularly, though not on a very extensive scale at present.

The stations at the terminal points are of the usual pattern with raised platforms and verandah roofs. That at Kalgoorlie is a continuation of the station belonging to the Western Australian Government railways, the trains on the respective systems being run on opposite sides of the same platform in order to facilitate a rapid exchange of traffic.

At Port Augusta it was necessary to erect a new station on a fresh site, the original station site being entirely unsuitable for the purpose of the new line. The station buildings have been constructed so as to accommodate the officials of the various departments connected with the railway. Engineering and other shops are in operation to carry out the erection and repair of the locomotives and other rolling stock. It is the intention of the Railway Department to undertake the construction of all the rolling stock required for its lines when the conditions for such construction become favourable.

Provision has also been made at Kalgoorlie for the repairs to rolling stock and other railway material.

#### RAILWAYS ...

The intermediate stations on the line have no platforms, the passenger rolling stock being designed so that passengers can get on or off the train without any difficulty at the rail level.

With regard to water supply, the following table will give information as to the reservoirs which have been constructed, and their capacity :---

' Distance.			Looslity				
Ex Kalgoorlie.	Ex Port A	ugusta.		Locai	169.		Capacity in Gallons.
Miles. Chains.	Miles. C	bains.					
69 0		•	Karonie	•••	•••	•••	7,000,000
104 40		•	i	•••	•••		7,000,000
132 40			-				3,000,000
•••	53	0	Bookaloo				6,000,000
•••	94	0	Wirappa				5.000.000
	130	0	Burando				5,000,000
•••	190	Ó	Kultanab	<b>7</b>			8,000,000
	250	Ō	Wilgena				5.000.000

# **RESERVOIRS ON TRANS-AUSTRALIAN RAILWAY.**

Borings for water have been made at many points along the line. In certain cases the daily supply from some of the bores is but small, and the water obtained not satisfactory for locomotive purposes. In other cases the results have been more satisfactory. In this connection it may be mentioned that at one stage of the line, 337 miles in length, there was not any local water to be obtained, and all the water required for locomotives, machinery, men, and animals on that stage had to be conveyed by rail.

Owing to the natural difficulties on the route, which have already been referred to, the Railway Department had to cater and provide for the staff entirely, such operations necessarily entailing a large amount of extra work other than that of the actual construction of the line. These duties have still to be performed for the permanent staff employed along the line, and a mixed train is being run once a week in order to carry the necessary supplies. This train is known as the "Bread and Butter" train.

The passenger rolling stock in use is mounted on two four-wheel bogies, the cars having a length of 65 feet. There are two classes, first and second, both of which have sleeping accommodation. In addition there are dining and lounge cars (the latter for the first-class only). This stock runs very easily notwithstanding the absence of ballast for the major portion of the line. It is, however, the intention to introduce much larger cars when the conditions for their construction become more favorable.

The passenger locomotives are of a type similar to those which have done good service on the New South Wales Government railways. They are of the 4.6.0 type, with driving wheels 5 ft. in diameter, and cylinders 20 in. x 26 in., the working pressure of the boiler being 160 lbs. These are known as the "G" class. The goods or freight engines are also of a type which has been in use on the New South Wales Government railways for some years. They are known as the "K" class, and are of the 4.8.0. type, with driving wheels 4 ft. 3 in. in diameter, and cylinders 22 in. x 26 in. The boilers have superheaters.

The time allowed for the journey from Port Augusta to Kalgoorlie has been fixed at 37 hours 20 minutes (actual), which gives an average speed of 28.16 miles per hour throughout, inclusive of stoppages. Exclusive of stoppages, which aggregate slightly under three hours, the average is about 30.5 miles per hour. In the opposite direction the gross time is 37 hours 30 minutes (actual), which gives an average speed of 28.03 miles per hour. Exclusive of stoppages, which aggregate about 3 hours 10 minutes, the average is 30.6 miles per hour.

The greatest elevation of the line above sea level is at a point 101 miles east of Kalgoorlie, where it is 1326 feet. This is a rise of 86 feet above Kalgoorlie. Port-Augusta is only 21 feet above sea level. With the exception of a short distance of 1 in 80, the ruling grade is 1 in 100.

On the 22nd October, 1917, the first through train left Port Augusta with an official party on board for Kalgoorlie. It should be mentioned that owing to deviations from the original route, the length of this line was reduced from 1063.39 miles to 1051.73 miles, a saving of 11.66 miles.

5. Federal Territory Railway—Queanbeyan-Canberra.—This line was built by the Railway Construction Branch of the Public Works Department, New South Wales, and was completed and taken over by the Chief Commissioner of Railways for that State, who has since worked the line for and on behalf of the Commonwealth Government. The line was opened for departmental goods traffic on 25th May, 1914. It connects with the New South Wales railway system at Queanbeyan, and is 4.94 miles in length, in addition to which the sidings cover 2.75 miles.

6. Summary of Federal Railways.—The following table shews the railway lines open for traffic under the control of the Commonwealth at 30th June, 1917, together with the lines under construction and those which have been or are being surveyed :—

Terminals.					Miles.			
Open for	TRAFF	чċ.						
Darwin to Katherine (Northern Territory) Oodnadatta (South Australia) Federal Territory (Canberra line) Trans-Australian—Kalgoorlie to 546.49 mile Port Augusta to 411.71 m	  es niles		···· ··· ···	  	199.56477.964.94546.49411.71			
Total opened for traffic				••••	1640.66			
UNDER CON	STRUCI	NION.						
Kalgoorlie (Western Australia) to Port Augu	sta (Sou	th Austra	lia)		93.53			
SURVEYED OR B	EING S	URVEYEI	),					
Katherine River to Mataranka (Northern Territory)           Mataranka to Daly Waters (Northern Territory)           Kingoonya to Boorthanna (South Australia)           Canberra (Federal Territory) to Jervis Bay (New South Wales)           Canberra (Federal Territory) to Federal Territory Border in the direction of Yass (New South Wales)           Daly Waters (Northern Territory) to Odnadatta (South Australia)								
Total surveyed or being surveyed	•••	•••	•••		1339.34			

FEDERAL GOVERNMENT RAILWAYS, 30th JUNE, 1917.

7. Average Miles Worked, Cost of Construction, Revenue, Expenditure, Train Mileage, Number of Passenger Journeys, and Tonnage of Goods and Live Stock carried on Federal Railways.—In the following table will be found particulars of the average

miles worked, cost of construction, revenue, working expenses, train mileage, number of passenger journeys, and tonnage of goods and live stock carried on the Federal lines during the undermentioned periods:---

# FEDERAL RAILWAYS.—AVERAGE MILES WORKED, COST OF CONSTRUCTION, Revenue, Working Expenses, train mileage, number of passenger Journeys, and tonnage of goods and live stock, 1911-17.

					·		
Year ended June 30.	Average Miles Open.	Cost of Construc- tion.	Revenue.	Working Expenses.	Train Miles run.	No. of Pass. Journeys.	Tonnage of Goods and Live Stock.
	•		TRANS-A	USTRALIA	N.		
<u> </u>	1	£ ·	£	£	1	+	[
1915	370	2,846,090	142,159	147,846	497,553	12,324	282,471
1916	668	4,747,062	273,959	273,959	622,919	7,667	248,744
1917	865	6,079,313	290,750	290,750	570,493	4,160	583,250
	•.	·	Oodi	NADATTA.			•
1011	+940	9 151 900	+00.054	+99.150	+00.091	*	*
1911	1240	2,151,509	129,904	100,100	1 190,051	*	14 071
1019	478	0 159 909	75 860	77 096	214,021	*	15 309
1913	410	9 159 498	76 917	86 109	201,755	+	10,502
1915	478	2,155,156	66 664	95 871	273 488	*	*
1916	478	2 158 355	64 518	95,069	276 690	*	*
1917	478	2,281,271	66,429	102,298	254,927	*	*
	<u> </u>	1	FEDERAI	L TERRITO	RY.	•	<u> </u>
1914	0.5	45,486					
1915	5	46,108	1,088	1,635	†6,000	*	<b>*</b> ·
1916	5	47,103	1,040	1,638	1,080	1,079	12,114
1917	5	52,591	592	1,446	1,169	1,578	6,586
	<u>'</u>	<u> </u>	NORTHER	N TERRITO	PRY.	· · · · · · · · · · · · · · · · · · ·	
		) <u> </u>		1	]	1	1
1911	<b>‡73</b>	1,040,734	\$5,614	15,882	<b>±15,046</b>	±1,130	<b>1</b> 985
1912	146	1,040,702	13,267	18,769	30,916	1,791	1,895
1913	146	1,040,702	14,398	17,963	30,683	1,249	2,781
1914	146	1,040,702	17,819	22,991	30,229	2,739	3,615
1915	146	1,040,702	22,143	27,796	39,652	3,857	11,995
1916	146	1,055,754	31,518	47,953	52,424	4,718	30,007
1917	187	1,664,370	28,695	39,771	87,652	8,034	27,529
			TOTAL	ALL LINES	S.		
+1011	010		05 500	00.000	105 075		
1010	313	3,192,043	35,568	39,032	105,077	\$1,130	\$935
1912	604	3,192,412	71,206	88,130	240,237	91,791	15,966
1017	1694	3,194,025	90,207	30,009	012,422	91,249	18,083
1015	000	6 089 054	194,100	079 149	816 609	12,709	13,015
1016	1 007	9 009 074	202,004	419 610	059 119	819 464	1294,466
1917	1,535	10,077,545	386,466	434,265	914,241	§13,772	§617,365
<u> </u>	<u> </u>	l			1	<u> </u>	<u> </u>

\* Not available. † Estimated. ‡ For six months only. § Exclusive of Oodnadatta line. || Exclusive of Federal Territory line. ¶ Exclusive of Oodnadatta and Federal Territory lines.

8. Number and Description of Rolling Stock, 1917.—The following table shows the numbers of locomotives and rolling stock in use on the Federal railways, classified according to gauge :—

Pa	1		1	Ga	uge.		
Ra	liway.		ſ	4 ft. 8½ in.	3 ft. 6 in.	Total.	
		Loco	omotiv	ES.			
Trans. Australian			• }	49		. 43	
Oodnadatta	•••	•••		14	+	10	
Federal Territory				t			
Northern Territory					12	12	
Total				42	13	55	
	]	PASSENG	ER VE	HICLES.	,		
Trans-Australian			· · · ·	36		36	
Oodnadatta	•••		]	•••	*		
Federal Territory	•••			<b>†</b>			
Northern Territory		•••		•••	4	4	
Total	•••			36	4	40	
	VEHICL	ES OTHE	CR THA	N PASSENC	ER.		
Trans-Australian				726	31	757	
Oodnadatta	•••			•••	*		
Federal Territory				<b>†</b> .			
Northern Territory				•••	316	• 316	
Total				726	347	1,073	

# CLASSIFICATION OF LOCOMOTIVES AND ROLLING STOCK ON FEDERAL RAILWAYS, 1916-17.

\* South Australian Government railway locomotives and rolling stock used. † New South-Wales Government railway locomotives and rolling stock used.

9. Number of Railway Employees.—The following table shews the number of employees on the Federal railways at 30th June, 1917, classified according to (a) salaried staff, and (b) wages staff.

FEDERAL RAILWAYS.—NUMBER OF EMPLU	DICES UN	KAILWAIS,	1810-11
-----------------------------------	----------	-----------	---------

	D-11				1916-3	17.
	Ranway.				Salaried Staff.	Wages Staff.
Trans-Australian			•••		157	2 981
Dodnadatta	•••	•••	•••		-	*
Northern Territory	•••	•••	•••		16	161
<b>m</b> ( )				-		
Total	•••	•••	•••		173	3,142

\* Worked by South Australian Government railways. Government railways.

† Worked by New South Wales

10. Accidents .- Number of Killed and Injured .- The subjoined table gives particulars of the number of persons killed and injured through train accidents and the movement of rolling stock since the 1st January, 1911, on the Federal railways :----

# FEDERAL RAILWAYS .- TOTAL NUMBER OF PERSONS KILLED AND INJURED ON FEDERAL RAILWAYS, 1911-17.

	19	11.*	1911	-12.	1919	2-13.	1913	3-14.	191	4-15.	191	5-16.	1916	5-17.
Railway.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Trans-Australian Oodnadatta Federal Territory Northern Territory	 1 	 1  1	  	 1 	  	 2 	2  	3 13 	13 2 	34 2 	1   1	16 6  1	1  	37 4  2
Total	1	2		1		2	2	16	15	36	2	23	1	48

\* To 30th June.

#### (c) State Railways.

1. Mileage Open, 1901 to 1917 .- The following table shews the length of State railways open for traffic on the 30th June in the years 1901-2 and 1912-17 :--

,									
Year	•	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N. Ter.	All States.
		Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
1901-02	•••	3,026	3,302	2,801	1,736	1,360	*462	145	12,832
1911-12		3,832	3,622	4,123	1,460	2.598	496	1 1	16.131
1912-13		3,930	3,647	4,381	1,690	2.854	507	1	17.009
1913-14		3.967	3.835	4.570	1.845	2,967	519		17,703
1914-15		4.134	3.875	4.838	2.157	3,332	533		18,869
1915-16		4,188	4,100	4,967	2,187	3.332	562	1	19.336

STATE RAILWAYS .--- MILEAGE OPEN FOR TRAFFIC, 1901-2 and 1912-17.

\* To the 31st December, 1902. † Including the mileage (478) of the Oodnadatta line. ‡ Taken over by Commonwealth Government, 1st January, 1911.

5,214

2,221

3,425

581

19,336

20,001

1916-17

4.437

4,123

The following statement shews the actual mileage opened for traffic in the year 1916-17, and also the annual average increase in mileage opened since 1907 in each State:-

Mileage.	N.S.W.	Vic.	Q1d.	S.A.	W.A.	Tas.	Total [all States.
Mileage opened during 1916-17 Average annual mileage increase in 10 years to 30th June, 1917	249 98 <u>1</u>	22 <del>]</del> 72 <del>]</del>	247 207 <del>]</del>	34 <del>1</del> 86 <del>1</del>	93 166	19 <del>]</del> 12	665 643

STATE RAILWAYS .--- MILEAGE OPENED ANNUALLY.

(i.) New South Wales. During the year ended 30th June, 1917, the following lines were opened for traffic:—Extension at Boorowa (3 mile); Barellan to Griffith (321 miles); Wollongong to sidings near Port Kembla (23 miles); Stockinbingal to Caragabal (51 miles); Tullamore to Tottenham (333 miles); Gosford Racecourse line (11 miles); Dunedoo to Coonabarabran (743 miles); and Wagga Wagga to Humula (521 miles); making a total of 249 miles.

(ii.) Victoria. The following lines were opened for traffic during 1916-17:— Neerim South to Nayook (8 miles); and Rushworth to Gigarre (late Stanhope North) 14<sup>1</sup>/<sub>4</sub> miles; a total of 22<sup>1</sup>/<sub>4</sub> miles.

(iii.) Queensland. The increase of 247 miles in the mileage opened for traffic in 1916-17 was due to the opening of the following lines:—Roma to Orallo (28.54 miles); Cheepie to Quilpie (47.46 miles); Archer Park to Ridgelands (17.50 miles); Kunwarara to Marlborough (18.41 miles); Emmet to Yaraka (32.10 miles); Koolamarra to Mount Cuthbert (27.76 miles); Butru to Dajarra (20.41 miles); Rollingstone to Moongobulla (6.08 miles); Oona to Dobbyn (20.48 miles); Jaggan to Tarzali (3.63 miles); Tumoulin to Ravenshoe (4.50 miles); and by purchase Biboohra to Mount Molloy (20.00 miles).

(iv.) South Australia. The only line opened for traffic in this State during the year 1916-17 was on the 5-ft. 3-in. gauge, from Salisbury to Long Plains, a distance of  $34\frac{1}{4}$  miles.

By the transfer on 1st January, 1911, to the Commonwealth Government of the line from Port Augusta to Oodnadatta, the railways of the State have undergone a reduction to the extent of 478 miles. This line, however, was leased to the State by the Commonwealth Government until 31st December, 1913, since which date it has been worked on behalf of the Commonwealth under agreement. (See page 662.)

(v.) Western Australia. In the year 1916-17 the following new lines were opened for traffic:—Kukerin to Lake Grace (251 miles); Wyalkatchem to Bencubbin (521 miles); Bolgart to Calingiri (151 miles); and an extension of the Coolgardie Racecourse line (1 mile); making a total of 93 miles.

 $\sim$  (vi.) Tasmania. During the year 1916-17 the following lines were opened for traffic :—Russell to Maydena (National Park) (4<sup>1</sup>/<sub>4</sub> miles), and Flowerdale to Preolenna (15<sup>1</sup>/<sub>4</sub> miles), a total of 19<sup>1</sup>/<sub>2</sub> miles.

2. Average Mileage Worked, Train Miles Run, Number of Passenger Journeys, and Tonnage of Goods and Live Stock Carried, on State Government Railways.— The table on page 669 gives the actual mileage open for traffic at the end of each financial year, but, in considering the returns relating to revenue and expenditure, and other matters, it is desirable to know the average number of miles actually worked during each year. The next table shews the average number of miles worked, the total number of train miles run, the number of passenger journeys, and the tonnage of goods and live stock carried by the Government railways of each State during the years 1901-2 and 1912-17 inclusive :—

С

# STATE RAILWAYS.—AVERAGE MILEAGE WORKED, TRAIN MILES RUN, NUMBER OF PASSENGER JOURNEYS, AND TONNAGE OF GOODS AND LIVE STOCK CARRIED, 1901-2 AND 1912-17.

Year.	N.S.W.	Victoria.	Q'land.	Sth. Aust.	West. Aust.	Tasmania.	N. Ter.	All States.
-------	--------	-----------	---------	------------	-------------	-----------	---------	----------------

#### AVERAGE MILEAGE WORKED.

1901-2	2,953	3,265	<b>‡2,801</b>	1,736	1,356	468	145	12,724
1912-13	3,872	3,639	4,351	1,534	2,783	508	**	16,687
1913-14	3,959	3,747	4,507	1,815	2,910	525		17,463
1914-15	4,057	3,848	4,730	2,026	3,096	536		18,293
1915-16	4,169	3,955	4,939	2,185	3,332	552		19,132
1916-17	4,313	4,104	5,067	2,193	3,370	577	/ <u></u>	19,624

# TRAIN MILES RUN.

		1					1	1
1901-2	11.649.059	11.284.944	5,666,058	4.196.138	4.507.919	1902.918	30.275	38.237.311
1912-13	19.184.247	14.234.550	11,464,084	6,342,871	5,623,132	1,006,508		57,855,392
1913-14	20,549,695	15,028,649	11,346,334	6,731,284	5,565,062	1,000,740		60,221,764
1914-15	20,420,023	15,303,209	11,988,521	5,580,679	5,404,814	1,005,145		59,702,391
1915-16	21,556,034	13,826,538	11,571,746	5,630,984	5,149,289	1,051,511	}	58,786,102
1916-17	20,300,717	14,022.040	10,729,187	5,730,539	4,500,211	1,080,459	·	56,363,153

#### NUMBER OF PASSENGER JOURNEYS.

1						1 1		1
1901-2	30,885,214	57,465,077	8,421,258	9,643,058	8,158,299	\$761,345	3,755	115,338,006
1912-13	79,490,012	111,513,908	19,599,072	19,382,330	17,920,096	1,649,539	**	249.854.957
1913-14	86,328,421	116,611,448	22,252,476	19,809,533	19,208,420	1,708,334		265,918,632
1914-15	88,774,451	117,259,926	24,257,552	18,831,273	18,635,327	1,750,905		269,509,434
1915-16	92.850.838	115.771.238	24.438.905	20.512.753	18.884.541	2.078.228		274.536 503
1916-17	96,709,846	108,341,540	24,837,714	18,107,015	17,466,744	1,971,888		267.434.747

#### TONNAGE OF GOODS AND LIVE STOCK CARRIED.

	1	1 (				I		4
1901-2	6,467,552	3,433,627	1,881,570	1,392,257	1,888,146	<b>  1</b> 407,505	2,436	§15.473.093
1912-13	11,666,250	5,150,404	3,797,581	3,016,039	2,866,241	464,934	**	26,961,449
1913-14	13,245,842	5,816,088	4,301,410	3,103,471	3.170.144	408.864		30.045.819
1914-15	11.920.881	5.410.045	4.970.873	2.076,280	2,523,859	408.069		27.310.007
1915-16	11,915,500	5,829,835	4.570.883	2,396,938	2,554,858	388,782		27,656,796
1916-17	11,732,864	5,962,602	4.035.379	2,822,401	2,400,246	401.076		27.354.568

\* These figures are partly estimated, the actual returns excluding journeys by season ticket holders. † Exclusive of the Oodnadatta line (478 miles) as from the 1st January, 1911. ‡ Including the Etheridge railway 143 miles in length. § Exclusive of live stock returns for Tasmania. If For the calendar year 1902. The average mileage worked in some cases is greater than the actual mileage open, owing to the fact that the Government railways have running powers over certain private lines. ¶ Exclusive of live stock. \*\* Taken over by Commonwealth Government, 1st January, 1911.

3. Length and Gauge of Rallway Systems in each State.—A map shewing the State railway lines, and also some private lines open to the public for general traffic, in the different States of the Commonwealth is given on page 653 hereinbefore. In all the States the Government railways are grouped, for the convenience of administration and management, into several divisions or systems, some of which have already been briefly referred to in dealing with the history of construction of the railways. The subjoined summary shews concisely the gauge and length of the main and branch lines included in each division or system of the different States of the Commonwealth for the year ended the 30th June, 1917:—

.

# STATE RAILWAYS, 1916-17.

	Particulars.	Length, i Suburba and G	including in Lines, lauge	Subur- ban.
_		4 ft. 84 in.	3 ft. 6 in.	4ft.8}in.
1.	NEW SOUTH WALES.	Miles.	Miles.	Miles.
	(1.) The Northern line and brauches—	488.48		98.84
	(b) Branch lines	585.16		5.21
	(ii.) The North Coast line and branches-			
	(a) Main line. West Maitland-Murwillumbah	352.56		12.85
	(b) Branch lines $\dots \dots \dots$	17.89	•••	
	(iii.) The Western line and branches—	508 80		34 25
	(a) Main line. Sydney-Dourse	967.36		24.58
	(iv.) The Southern line—			
	(a) Main line. Granville-River Murray	386.25		20.69
	(b) Branch lines	981.62	•••	
	(v.) The South-coast (Illawarra) line-	04.04		94.09
	(a) Main line. Sydney-Nowra	94.94		94.25
	(vi.) Broken Hill line Broken Hill-Tarrawingee	10.00	40.09	0.00
	(III) DIORON IIII IIIO. DIORON IIII IIII IIII III		10.00	
	Total length all lines, 4437.08 miles	4,396.99	40.09	240.64
_	* Including lines 34 miles from Sydney and Newcastle respectivel	y, and the	Richmond	line.
~	······································		)	*
2.	VICTORIA.	5 ft. 3 in.	2ft.6 in.	5ft.3 in.
	(i.) The South-eastern system-			[
	(a) Main lines. Dandenong-Port Albert	117.27		19 50
	(b) Branch lines	47 49	3.93	15.50
	(ii.) The Eastern system—	11.10	0.10	
	(a) Main lines. South Yarra-Sale	125.27		16.00
	Traralgon-Orbost	132.12	•••	
	(b) Branch lines	74.69	26.06	1.60
•	(111.) The North-eastern system—	107 44		14 76
	(a) Main line. Essendon JuncElver Murray	575.90	90.40	14.70
	(iv.) The Northern system—	010.20	00.40	1.50
	(a) Main line. Melbourne-Echuca	156.00		20.25
	(b) Branch lines	491.77		
	(v.) The Midland system—			
	(a) Maryborough-Merbein	246.49	•••	•••
	(vi) The Western and South-western systems-	557.85		
	(a) Main lines. Sunshine-Warrenhein	61.95		10.75
	Newport-Port Fairy	180.24		13.00
	N. Geelong JuncServiceton	267.57		
	(b) Branch lines	798.79	43.90	•••
	(vii.) Metropolitan District—	97.07		17 00
	(a) Richmond-Realesville	37.27	19.00	19.00
	(c) Princes Bridge-Hurst Bridge	22.70	10.22	19.50
	(d) Whittlesea Junction-Whittlesea	22.07		16.25
	(e) Suburban lines—Port Melbourne, St. Kilda,		ľ	
	Sandringham, Burnley-Darling, Deepdene			
	Burwood, Fawkner, Williamstown, etc	38.69		38.69
	Tetal length all lines 4100 64 miles	4000 74	101.00	105 50
_	LOUAI IOUGID All IIDES, 4122.04 miles	4000.74	121.90	199.48
	* Within 20 miles of Melbourne.			

STATE 1	RAILWA	YS-Co	itinued.
---------	--------	-------	----------

	Portionlarg	Length, i Suburba and G	ncluding n Lines, auge.	Suburban
	Paracutrs.	3ft. 6 in.	2ft. 0in.	3 ft. 6 in.
 3.	QUEENSLAND.	Miles.	Miles.	Miles.
	(a) South-coast line Veerongnilly to Tweed Heads	68.13		<b>*</b> 19.93
	(b) South Metropolitan lines and branches	78.86	•••	28.09
	(a) Main line Brishane to Toowoomba	102.20		+94 09
	(d) Branch lines	170.07	•	121.00
	(a) Southern line Toowoomba to Wallangarra	122.70		1
	(f) Branch lines	113 70	•••	
	(a) South western line Warwick to Dirranhandi	256 44	•••	
	(b) Western line Teowoomba to Cunnamulla	503 19	•••	
	(i) Branch lines	408 28		
	(i) Nth coastline Northeaste Junction to Mary	100.20		
	borough	161 59		+10.95
	(1) Crowdon Junction to 235 miles 14 chains	70 49		+10.00
	( $n$ ) Orbyton suffering to 200 miles it of $n$ interval.	410 32		1
	(v) Suburban lines	94 49		04 49
	(ii) The Centrel division—	24.10		24.40
	(ii.) The Central division (ii.)	1		l
	285 miles 14 chains to Rockhamnton	160 58		1
	Glenmore Junction (near Bockhampton) to	100.00		
	Marlborough	62 60	)	1
	(b) Control line Bookhampton to Cuppamulla	494 54	•••	1
	(a) Branch lines	405 97		
	(iii) The Northern division	439.01		
	(iii.) The North Coast line (particing of)-	1	[	
	Koumale to Paget Junction (Mackaw line)	39.60	1 ·	1
	Bowon to Constairs (Bowon line)	65.99		1
	Constairs to Stewart's Crook (Gt. N. line)	40.16		1
	Townswille to Moongobulle	99 06	1	
	Mooliba to Coirne (Coirne line)	41 71		
	(b) Mackaw line (exclusive of North Coast line) and	41.71	1	
	(0) Mackay file (exclusive of North-Ooast file) and	69.19		
	(a) Bowen line (see North Coast line)	00.10		
	(d) Great Northern Bailway	1		
	Townsyille to Cloneurry	479 08		
	Branch lines	200.93		
	(a) Geraldton and Mourilyon Trammar	030.20	00.9	
	(f) Coirne line Coirne to Berenchee	104 46	45.00	· · · · ·
	Bronch lines	104.40	1	
	(a) Cooktown line Cooktown to Levin	60.90		1
	(b) Normanton line Normanton to Crowdon	05.00		
	(i) Mount Mulligon line	00.00		
	(i) Mount Garnet line	29.00	1	1
		. 52.00	<u> </u>	
	Total length all lines, 5213.79 miles	. 5184.44	29.3	5 107.49

\* To Beenleigh.

† To Ipswich.

‡ To Petrie.

Particulars.	Length Suburb and (	including an lines, Jauge.	Suburban
	5 ft. 3in.	3ft. 6in.	5 ft. 3 in.
4. SOUTH AUSTRALIA.	Miles.	Miles.	Miles.*
(i.) Midland system—	199.81	ļ	94 51
(a) Main line. Adelaide-Terowie	177 70		00.01
(b) Branch lines $\dots$ $\dots$ $\dots$ $\dots$	111.12		22.91
(ii.) The Northern system—	ł	0.11	1
(a) Terowie-Quorn	•••	94.41	
(b) Other lines	5.15	477.81	
(iii.) The Southern system—	1		
(a) Main line. Adelaide-Serviceton (near)	194.93		23.50
(h) Branch lines	195.32	1	34.14
(b) Dialoi mass	298.14		
$(\pi)$ South eastern system			
(v.) Wele-les Mount Combien	1	112 26	
(a) woiseley-mount Gampler		119 73	
$(0) \text{ Branch lines} \dots \dots \dots \dots \dots$		10.01	
(vi.) Port Broughton line		10.01	••••
(vii.) Eyre Peninsula system		000 10	
(a) Port Lincoln-Cape Thevenard		269.53	•••
(b) Branch lines		132.84	•••
Total length all lines, 2220.66 miles	1011.07	1,209.59	105.06

# STATE RAILWAYS-Continued.

\* Within 25 miles of Adelaide.

		3 ft. 6 in.	3 ft. 6 in.
5.	WESTERN AUSTRALIA.	Miles.	Miles.†
	(i.) Eastern railway—		
	(a) Main line. Fremantle-Northam	78.13	40.78
	(b) Branch lines	93.71	34.70
	(ii.) South-western railway—		
	(a) East Perth-Picton Junction	110.11	18.20
	(b) Branch lines	498.80	19.96
	(iii.) Great Southern railway-		
	(a) Main line. Spencer's Brook-Albany Jetty	280.05	1
	(b) Branch lines	556.75	
	(iv.) Eastern Goldfields railway—		
	(a) Main line. Northam-Laverton and Leonora	533.35	1
	(b) Branch lines	156.51	
	(v.) East Northern-Mullewa railway-		
	(a) Main line	262.86	1
	(b) Branch lines	164.84	
	(vi.) Northern railway—		
	(a) Main line. Geraldton-Meekatharra	333.97	
	(b) Branch lines	207.84	
	(vii.) Hopetoun-Ravensthorpe railway	33.78	
	(viii.) Port Hedland-Marble Bar	114.40	
	Total length all lines, 3,425.10 miles	3,425.10	113.64

† Suburban included in preceding column.

	Particulars.				Length, including Suburban Lines, and Gauge.		
				3ft.6in.	2ft.0in.	3ft.6in.	
6.	TASMANIA.			Miles.	Miles.	Miles.	
	(i.) Main line—				ł	1	
	(a) Hobart-Evandale Junction	•••		121.80		9.69	
	(b) Branch lines	•••		113.77			
	(ii.) Western line—						
	(a) Launceston to Myalla	•••		135.00			
	(b) Branch lines	•••		71.14			
	(iii.), North Eastern line				l		
	(a) Launceston to Branxholm			71.01			
	(b) Branch line			0.60			
	(iv.) Sorell line	•••		14.65		l	
	(v.) Strahan-Zeehan line and Branch	line		30.10		1	
	(vi.) North-east Dundas tramway				19.38		
	(vii.) Comstock tramway			•••	4.20		
		AF 11	¢			0.00	
	Total length all lines, 581	.05 miles	•••	558.07	23.58	9.69	
	* Within 10	) miles of Ho	bart.				
	GRAND TOTAL OF STAT	E RAILWAY	s, 20.0	00.92 M	LES.		

#### STATE RAILWAYS-continued.

4. Administration and Control of State Rallways.—In each State of the Commonwealth the policy has been established that the railways should be under the control of the Government. This policy, as has been shewn, was actualised early in the railway history of Australia, and, excepting in cases presenting unusual circumstances, may be regarded as the settled policy of the country. In earlier issues of the Year Books (see No. 6, p. 693) will be found a description of the methods adopted by the various State Governments in the control and management of their railways.

5. Lines under Construction, and Authorised Lines, 1917.—The following statement gives particulars up to the 30th June, 1917, of the mileage of State railways (a) under construction, and (b) authorised for construction but not commenced:—

STATE	RAILWAYS.—MILEAGE	UNDER	CONSTRUCTION	AND	AUTHORISED,			
30th JUNE, 1917.*								

Particulars.	N.S.W.	Vic.	Q'land.	S.A.	<b>W.A.</b>	Tas.	All States.
Mileage under construc- tion Mileage authorised but	<b>† 6</b> 68.21	116.72	;323.00	172.65	242.25	45.73	1568.56
not commenced	398.10	52.00	1469.00	2.50	92.50		2014.10

\* For similar statistics of Federal Railways see page 666. † Exclusive of 223.46 miles on which work was suspended. ‡ Exclusive of 128.00 miles on which work was suspended.

(i.) Lines under Construction. In spite of the great extension of State railways which has taken place since the year 1875 throughout the Commonwealth, there are still, in some of the States, tracts of country of immense area which are as yet practically undeveloped, and in which little in the nature of permanent settlement has been accomplished; the general policy in the States is to extend the existing lines inland, in the form of light railways, as settlement increases, and although it is true that lines which were not likely to be commercially successful in the immediate future have been constructed from time to time, for the purpose of encouraging settlement, the general principle that the railways should be self-supporting is kept in view. (a) In New South Wales the lines under construction are chiefly of the "pioneer" class, and are made with a view to affording railway communication over level country to districts in which the

traffic would not warrant the expenditure necessary to provide thoroughly equipped lines. As the traffic increases, the permanent way is strengthened in order to allow the heavy types of engines to run over it. It is probable that railway extension in New South Wales, in the near future, will be mainly confined to lines of the "pioneer" class. The lines under construction on 30th June, 1917, were those from Wauchope to Kempsey (30.30 miles), and Kempsey to Macksville (29.79 miles). These lines, when completed, will form part of an alternative main route between Newcastle and Brisbane. Other lines under construction are as follow :- Wyalong to Cudgellico (70.44 miles), Humula to Tumberumba (28 miles), Dubbo to Merrygoen (59.40 miles), Forbes to Caragabal (37.62 miles), Cobarto C.S.A. Mines (7.25 miles), Condobolin to Menindie (285.70 miles), Broken Hill to Menindie (73.70 miles), Denman to Merriwa (34.92 miles), and the City and Suburban Electric Railways (11.09 miles), a total distance of 668.21 miles. The following lines have also been under construction, but further work thereon has been suspended for the present :-- Nimitabel to Bombala (37.85 miles), Sydenham to Botany (6.20 miles), Werris Creek to Binnaway (88.11 miles), Macksville to Raleigh (20.68 miles), Coff's Harbour to Glenreagh (26.37 miles), and Glenreagh to Dorrego (44.25 miles), a total distance of 223.46 miles. (b) Victoria. In this State the following lines were under construction by the Board of Land and Works on the 30th June. 1917 :- 5-ft. 3-in. gauge: Dartmoor to Mumbannar (13.48 miles), Shelley to Cudgewa (19.64 miles), Cavendish to Toolondo (44 miles), Neerim South to Toorenga River (5.98 miles), Koo-wee-rup to McDonald's Track (30.75 miles), and North Geelong to Fyansford (2.87 miles), making in all 116.72 miles. An electric tramway of 4ft. 81/2 in. gauge is also under construction from Sandringham to Black Rock, a distance of 2.38 miles. (c) Queensland. In December, 1910, the North Coast Railway Act was passed. Under this Act a series of lines, when constructed, will link up a number of existing lines in such a way that a through line will be obtained from Rockhampton to Cairns, via Mackay and Townsville, a total distance of 569 miles. By the completion of this line it will be possible to travel from Cairns to the southern border of the State at Wallangarra, a total distance of about 1189 miles. At the same time the Great Western Railway Act was passed. Under this Act provision is made for the extension in a. westerly or south-westerly direction of the lines already constructed to Quilpie, Yaraka, Winton, and Dajarra, in such a manner that they will form junctions with a line to be made running north-westerly from Eromanga to Camooweal. These extensions. together with the north-westerly line, will make an aggregate distance of 990 miles to be constructed. With the completion of both these schemes, the railways of this State will be brought into direct communication with each other on both their east and west boundaries. On the 30th June, 1917, the following lines, of an aggregate length of 323 miles, were under construction :- Enoggera to Terror's Creek (24 miles), Murgon to Proston (26 miles), Branch to Windera (12 miles), Orallo to Injune Creek (33 miles), and Dawson Valley line, Rannes to Baralaba (23 miles). Of the Great Western Railway the following part has been under construction but operations have been suspended :-- Section C: From Winton to Elderslie (37 miles). The following parts of the North Coast Railway are under construction :---Section A: Marlborough towards St. Lawrence (59 miles); Section B: Koumala to Carmila Creek (25 miles); Mackay northwards to Midge Point (31 miles); Section D: From Moongobulla to Ingham (28 miles); Section E: From Mooliba to Innisfail (12 miles). In the northern division the line from Merinda to Bowen coalfields, 50 miles long, is also under construction. The following lines were under construction during the year, but work was suspended :--Goondoon to Kalliwa (31 miles), Kalbar to Mount Edwards (10 miles), and Tara to Surat (50 miles). (d) South Australia. In this State the lines under construction on the 30th June, 1917, were as follow:-Mount Gambier to the Victorian boundary (12 miles), Riverton to Spalding (51.25 miles), Paringa to Renmark (2.5 miles), Balhannah to Mount Pleasant (22 miles), New Palmer to Sedan (20 miles), Nuriootpa to Truro (9.88 miles), and Palmer to Monarto (28.77 miles), 5-ft. 3-in. gauge; and Kielpa to Mangalo Hall (26.25 miles), 3-ft. 6-in. gauge-an aggregate distance of 172.65 miles. (e) In Western Australia the following lines were in course of construction by the Public Works Department on the 30th June, 1917 :---Wagin to
Bowelling (62 $\frac{1}{2}$  miles), Bolgart Extension to Piawaning (34 $\frac{3}{4}$  miles), Esperance northward (60 miles), and Koadinin to Merredin (85 miles), a total distance of 242 $\frac{1}{4}$  miles. (f) Tasmania. At 30th June, 1917, the following lines were under construction, Branxholm to Moorina (13.63 miles), Stanley to Trowutta (25.50 miles), National Park to Maydena (6.60 miles), a total distance of 45.73 miles.

(ii.) Lines Authorised for Construction. (a) New South Wales. At the 30th June, 1917, the following lines had been authorised for construction :--Mirrool to Hillston (62.18 miles), Barmedman to Rankin Springs (70.91 miles), Coonabarabran to Burren Junction (95.36 miles), Craboon to Coolah (23.95 miles), Gilgandra to Collie (24 miles), Canowindra to Eugowra (26.70 miles), Grafton to South Grafton (2.34 miles), Roslyn to Taralga (15.82 miles), and Molong to Dubbo (76.84 miles), a total distance of 398.10 miles. (b) In Victoria the following lines were authorised, but their construction had not been commenced up to the end of June, 1917 :- 5-ft. 3-in. gauge: White Cliffs to Yelta (10 miles), Alberton to Won Wron (12.25 miles), Nandaly to Kulwin (19.75 miles), and Bittern to Red Hill (10 miles)-a total of 52 miles. (c) Queensland. In addition to the new lines upon which work has been commenced, Parliament has also authorised the construction of the following parts of the Great Western Railway: Section A, from Quilpie to Eromanga (120 miles); Section B, from Yaraka (251 miles); Section C, 37 miles to Springvale (324 miles); and Section D, from Dajarra (258 miles); and on the North Coast Railway, Section B, from Carmila Creek to St. Lawrence (17 miles), Mackay northwards to Midge Point (24 miles); Section C, from Midge Point to Proserpine (21 miles); Section D, from Ingham to Cardwell (25 miles); Section E, from Innisfail southwards to Cardwell (66 miles). The following lines were also authorised for construction: Inglewood to Texas and Silverspur (44 miles), Mount Edwards to Maryvale (28 miles), Lanefield to Rosevale (17 miles), Gatton to Mount Sylvia (11 miles), Juandah to Taroom (42 miles), Dirranbandi extension (52 miles), Mundubbera to the Northern Burnett (32 miles), Malanda to Millaa Millaa-second section-(8 miles), Evanslea to Cecil Plains (19 miles), Longreach to Winton (110 miles) - a total of 1469 miles. (d) In South Australia, Parliament has authorised the construction of a line on the 5-ft. 3-in. gauge from Parings to Renmark, a distance of 2.50 miles. (e) In Western Australia the following lines were authorised for construction up to the 30th June, 1917:-Busselton-Margaret River (37<sup>4</sup> miles), Dwarda-Narrogin (33 miles), and Nyabing-Pingerup (21<sup>3</sup>/<sub>2</sub> miles), a distance of  $92\frac{1}{2}$  miles.

6. Cost of Construction and Equipment of State Railways.—The total cost of construction and equipment of the State railways of Australia at the 30th June, 1917, amounted to  $\pounds 204,202,437$ , or to an average of  $\pounds 10,210$  per mile open for traffic. Particulars as to the capital expenditure incurred in each State on lines open for traffic are given in the following table :—

State.	Length of Line Open. (Route).	Total Cost of Construction and Equipment.	Average Cost per Mile Open.	Cost per Head of Population.	Mileage per 1000 of Population.
	Miles.	£	£	£	Miles.
New South Wales*	4,437.08	72,006,621	16,229	38.54	2.37
Victoria	4,122,64	55,652,275	13,498	39.68	2.94
Queensland	5,213.79	36,476,000	6,996	53.54	7.65
South Australia*	2.220.66	17,687,344	7,964	41.14	5.17
Western Australia*	3,425.10	17,466,802	5,100	56.61	11.10
Tasmania	581.65	4,913,395	8,447	. 24.90	2.95
All States	20,000.92	204,202,437	10,210	41.77	4.09

STATE RAILWAYS .--- MILEAGE AND COST TO 30th JUNE, 1917.

\* Exclusive of Federal Railways.

It will be seen that the lowest average cost per mile open is in Western Australia, and is only £5100, which is slightly less than one-third of the highest average cost, namely, £16,229 in New South Wales, compared with an average of £10,210 for all the State Government railways. In Western Australia there have been comparatively few engineering difficulties to contend with; moreover, the system was adopted in several instances in that State of giving contractors the right to carry traffic during the period of their contracts, with the result that, at least in all goldfields railway contracts, the cost of construction was considerably lessened.

In the above table the figures relating to cost of construction and equipment do not include the discounts and flotation charges on loans allocated to the railways. This will explain the reason for the differences between the amounts shewn above for Queensland and South Australia and those shewn in the railway reports for these States.

(i.) Reduction of Cost per Mile in Recent Years. The average cost per mile of the lines constructed lately in the Commonwealth is very much less than the figure given in the above table, in consequence of the construction of light "pioneer" lines, which have already been referred to, and which it was originally considered in New South Wales could be laid down at a cost of £1750 per mile (exclusive of stations and bridges). It should also be remembered that in the early days of railway construction there were considerable engineering difficulties to overcome, and that labour was scarce and dear. Since 1892 over one thousand six hundred miles of the "pioneer" lines have been opened in New South Wales, the average cost ranging from about £2000 to £7500 per mile, according to the difficulties met in the country traversed. The lowest cost per mile for any line previously constructed had been that of the line from Nyngan to Cobar and the Peak, the average cost of which, to the end of June, 1917, was £3786. In Victoria also the cost of construction has been greatly reduced in recent years. The total cost to the 30th June, 1917, of the narrow gauge (2 ft. 6 in.) lines, having a length of one hundred and twentytwo miles, was only £341,160, which gives an average cost per mile of only £2796. In the other States the cost of construction per mile has been similarly reduced by building light railways as cheaply as possible. Fairly substantial permanent way is laid down with reduced ballast, and, as settlement progresses and traffic increases, the road is strengthened, and the stations and siding accommodation enlarged. The subjoined table gives examples of some of the more expensive lines, most of which were built in the early days of railway construction in Australia :---

Tina			~			Length.		Total	Average	Date
Line.			Gauge.		Double Lines and over.	Double Lines and over. Line.		Total. Cost.		Open- ing.
NEW SOUTH WALES— Penrith to Bathurst Sydney to Kiama Homebush to Waratah VICTORIA— Melbourne to Bendigo N. Geelong to Ballarat	 	::::	ft. 4 4 5 5	in. 83 81 83 83 83 83 83 83 83 83 83	Miles. 88.50 39.90 95.71 100.89 41.45	Miles. 22.55 57.79  11.98	Miles. 111.05 97.69 95.71 100.89 53.43	£ 4,100,776 4,195,138 3,547,954 4,944,829 1,955,816	£ 36,928 42,943 37,069 49,012 36,605	1876 1887 1889 1862 1862

# STATE RAILWAYS.—EXAMPLES OF LINES CONSTRUCTED AT LARGE CAPITAL EXPENDITURE PER MILE OPEN.

The next table gives instances of lines which have been constructed in more recent years at a comparatively small cost per mile.

The average cost per mile of the 458.77 miles comprised in the above table was £40,858, whereas the average cost of the 360.06 miles referred to in the next table was £1911.

Line.		uge.	Length.	Total Cost.	Average Cost per Mile.	Date of Opening.
	ft.	in.	Miles.	£	£	
NEW SOUTH WALES-						1
Parkes to Condobolin	4	81	62.75	132,780	2,116	1898
Burren Junction to Collarenebri	4	81	42.55	104,506	2,456	1906
VICTORIA-			l			1
Wangaratta to Whitfield	2	6	30.49	40,147	1,317	1899
Wycheproof to Sealake	5	3	47.89	85,137	1,778	1895
Ultima to Chillingollah	5	3	20.14	34,537	1,715	1909
QUEENSLAND-						
Dalby to Bell	3	6	23.50	38,307	1,630	1906
Mahar to Jandowae	3	6	28.24	60,865	2,155	1914
SOUTH AUSTRALIA-						
Wandilo to Glencoe	3	6	9.13	11,682	1,280	1904
Cummins to Yeelanna	3	6	8.82	16,043	1,818	1909
Tailem Bend to Pinnaroo	5	3	86.55	163,955	1,883	1906

# STATE RAILWAYS .--- EXAMPLES OF LINES CONSTRUCTED AT SMALL CAPITAL **EXPENDITURE PER MILE OPEN.**

The comparisons afforded in the two preceding tables are subject to certain limitations, inasmuch as the cost is naturally greater in the case of the older lines. Further, the figures given represent the cost of construction only (i.e., are exclusive of cost of equipment), and cannot therefore be directly compared with the average cost per mile open given in the table on page 677.

(ii.) Capital Cost of Construction and Equipment, Total and per Mile Open. The increase in the total capital cost of construction and equipment of Government railways in each State for 1901-2 and for each year from 1912 to 1917 is shewn in the following table :--

Year.	N.S.W.	Victoria.	Q'land.	Sth. Aust.	West. Aust.	Tas.	N. Ter.	All States
			TOTAL CO	OST OF L	INES OPEN	۲.		
·····	£	£	£	£	l £	£	£	£
1901-2	40,565,073	40,613,784	20,119,143	*12,769,899	7,410,426	13,840,747	1,018,700	126,337,779
1912-13	57,003,036	46,989,111	29,895,220	14,035,437	14,913,128	4,400,292	1 1	167,236,224
1913-14	60,128,491	49,216,744	31,817,792	15,240,779	15,873,852	4,496,634		176,774.292
1914-15	64,008,436	51,518,792	33,405,877	16,597,139	16,980,712	4,628,911		187,139,867
1915-16	68,825,592	54,428,148	34,787,623	17,236,543	17,118,195	4,798,646		197,194,74
1916-17	72,006,621	55,652,275	36,476,000	17,687,344	17,466,802	4,913,395		204,202,437
			Cost	PER MILI	E OPEN.			_
	£	£	£	l · £	£	£	£	1 £
1901-2	13.405	12.300	7.183	*7.428	5,449	+8,313	7,124	9,860
1912-13	14,505	12,884	6.824	8,307	5,225	8,679	i t	9,773
010 14		1 10 004	1 0.000	0.000	1 6 650	0 004		1 0,000

# STATE RAILWAYS .- CAPITAL COST OF CONSTRUCTION AND EQUIPMENT, 1901-2 and 1912-17.

7 964 † To the 31st December, 1902. Including the Oodnadatta line. Transferred to Commonwealth Government, 1st January, 1911.

7,695

5.096

5.138

5,100

8 68

8,535

....

9,918

10.198

10.210

6,905 7,004

6 996

1914-15

1915-16

1916-17

15,483

16,434

16,229

13.975

13.498

The subjoined table shews the total loan (iii.) Loan Expenditure on Railways. expenditure on Government railways and tramways (including lines both open and unopen) in each State during the financial year 1901-2, and on railways only for all States except Western Australia in 1913-14, and Tasmania for the years 1912-13 to 1916-17.

Year.	N S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	All States.
1901-2* 1912-13 1913-14 1914-15 1915-16 1916-17	£ 2,243,672 3,614,306 4,903,328 4,394,318 4,787,669 3,706,422	£ 483,325 1,231,113 2,361,660 2,809,926 2,440,317 1,266,352	£ 751,451 2,066,819 1,679,482 1,739,156 2,034,614 1,242,249	£ 121,907 1,207,335 1,489,168 1,285,431 929,143 413,095	£ 578,985 1,948,876 *1,227,711 670,209 414,026 308,027	£ †80,948 *116,393 *146,055 *228,285 *233,601 *133,056	£ 4,260,288 10,184,842 11,807,404 11,127,325 10,839,370 7,169,201

STATE RAILWAYS .- LOAN EXPENDITURE, 1901-2 and 1912-17.

\* Including tramways. † For the calendar year 1902.

The following statement shews the total loan expenditure on railways to the 30th June, 1917 :-

STATE RAILWAYS.—TOTAL LOAN EXPENDITURE IN EACH STATE TO 30th JUNE, 1917.

State		N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.*	All States.
Expenditure .		£ 77,205,050	£ 53,831,507	£ 38,358,275	£ 20,146,099	£ 17,340,913	£ 5,411,039	£ 212,292,883

\* Including tramways.

7. Gross Revenue; Total per Average Mile Worked, and per Train-mile Run.— The following table shews the total revenue from all sources, the revenue per average mile worked, and the revenue per train-mile run in each State during 1901-2 and each financial year from 1912 to 1917 inclusive :—

STATE RAILWAYS.—GROSS REVENUE, TOTAL PER AVERAGE MILE WORKED, AND PER TRAIN MILE RUN, 1901-2 and 1912-17.

Year.		n.s.w.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N. Ter.	All States.
			то	TAL GRO	SS REVE	NUE.			
	1	£	£	£	£	£	£	£	3. 1
1901-2		3,668,686	3,367,843	1,382,179	1,085,175	1,521,429	*233,211	12,522	11,271,045
1912-13		6,748,985	5,205,442	3,321,672	2,222,436	2,037,853	327,113	) †	19,863,501
1913-14		7,742,241	5,560,958	3,660,022	2,337,251	2,257,011	330,168	· ·	21,887,651
1914-15		7,616,511	5,161,073	3,832,003	1,745,378	2,058,244	323,265		20,736,474
1915-16		8,006,078	5,705,163	3,745,350	1,965,410	2,088,110	348,028		21,858,139
1916-17		8,380,084	5,952,719	3,831,967	2,273,530	1,877,382	340,505	l	22,656,187
		GROS	S REVEN	UE PER	AVERAG	E MILE	WORKED	).	
	1	£	£	£	£	£	£	£	£
1901-2		1.242	1,031	493	625	1.122	*498	86	886
1912-13		1,743	1,430	763	1,449	732	644	Ť	1.190
1913-14		1,956	1,484	812	1,288	776	629		1.253
1914-15		1,877	1,341	810	861	665	603	•••	1,134
1915-16		1,920	1,443	758	899	627	630		1,142
1916-17		1,943	1,450	756	1,037	557	591		1,155
		(	FROSS RI	EVENUE	PER TR.	AIN-MILE	RUN.		
		d.	đ.	d.	d.	d.	d.	d.	d.
1901-2		75.58	71.62	58.55	62.07	81.00	*61.99	99.27	70.74
1912-13		84.43	87.77	69.54	84.09	86.98	78.00	1 F	82.40
1913-14		90.42	88.81	77.42	83.33	97.34	79.18	l	87.23
1914-15		89.52	80.94	76.71	75.06	91.40	77.18		83.36
1915-16		89.14	99.03	77.68	83.77	97.32	79.43		89.24
1916-17		99.07	101.89	1 85.72	95.22	100.12	75.64	۱ <u> </u>	96.47
	* F	or the cale	ndar year	1902. †	Federal R	ailway sin	ce 1st Janu	ary, 1911.	

8. Coaching, Goods, and Miscellaneous Receipts.—The gross revenue is composed of (a) receipts from coaching traffic, including the carriage of mails, horses, parcels, etc., by passenger trains; (b) receipts from the carriage of goods and live stock, and (c) rents

and miscellaneous items. The subjoined table shews the gross revenue for 1901-2 and 1912-17, classified according to the three chief sources of receipts. The total of the three items specified has already been given in the preceding paragraph.

STATE	RAILWAYS.—COACHING,	GOODS,	AND	MISCELLANEOUS	RECEIPTS,
	1901	-2 and 1	912 <b>-</b> 1	7.	

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N. Ter.	All States.	
		C	OACHING	TRAFFIC	RECEIPTS	5.			
1001.0	£ 1.007 500	£	£	£	£	£ 100	£	£	
1901-2	1,307,790	1,580,218	430,434	369,677	442,719	110,196	3,032	4,309,072	
1912-10	2,940,230	2,702,103	1,105,384	753,109	040,218	160,792	+	8,393,940	
1910-14	9 915 004	2,808,700	1,207,100	752,495	617 559	160,909	•••	0,941,004	
1914-10	9 574 069	2,190,010	1,204,090	008,400	646 566	170 704	•••	0,009,244	
1016 17	9 697 656	3,003,203	1,009,100	721,000	607 597	171 000	•••	9,404,904	
1910-17	3,037,030	2,910,007	1,575,051	139,483	001,001	171,220		9,441,904	
	GOODS AND LIVE STOCK TRAFFIC RECEIPTS.								
1001.0	0.069.097	1 510 400	000.004	691 045	1 097 000	110 001	<b>F</b> 006	6 607 794	
1901-2	2,205,837	1,719,462	862,234	081,040	1,037,099	110,001	7,996	11 009 016	
1019 14	3,703,373	2,352,038	2,140,003	1,441,809	1,299,019	154,022	÷•••	10 599 011	
1910-14	4,397,997	2,005,415	2,559,780	1,034,187	1,400,002	159 045	•••	12,000,011	
1914-10	4,200,234	2,200,370	2,210,280	1,049,074	1,000,740	156 960	•••	11,044,040	
1016 17	4,329,971	2,010,210	2,304,304	1,211,400	1,000,402	150,000	•••	12,029,022	
1910-11	4,042,019	2,954,259	2,455,000	1,002,000	1,170,038	106,102	•••	12,141,529	
			MISCELLA	NEOUS RE	CEIPTS.	<u>'</u> '	•	·	
	1			1	1			1	
1901-2	37,053	68,163	84,511	34,453	41,611	6,954	1,494	274,239	
1912-13	103,380	90,641	27,785	47,418	92,616	11,799	<b>‡</b>	373,639	
1913-14	107,732	88,838	43,136	50,571	106,484	9,695		406,456	
1914-15	94,983	97,025	31,028	27,901	89,951	11,694		352,582	
1915-16	102,044	91,690	41,233	32,390	85,092	11,384		363,8 <b>33</b>	
1916-17	199,809	99,903	24,568	31,684	93,787	11,123		460,874	
	•	<u> </u>	I	·	I		l	l	

\* Tasmanian figures for 1902 are for year ended the 31st December. † Exclusive of Oodnadatta line as from 1st January, 1911. ‡ Federal Railway since 1st January, 1911.

(i.) New South Wales. The total earnings for the year 1916-17 amounted to £8,380,084, an increase of £374,006 as compared with the previous year. Increases of £63,593, £212,648, and £97,765 took place in the coaching traffic, goods and live stock traffic, and miscellaneous respectively.

(ii.) Victoria. In Victoria, traffic receipts shewed an increase of £247,556 as compared with the previous year. This was due to an increase of £324,049 and £8213 in the receipts from goods and live stock traffic and miscellaneous respectively, and a decrease of £84,706 in coaching traffic receipts.

(iii.) Queensland. In Queensland, there was an increase of £86,617 in 1916-17 relatively to 1915-16. There were increases of £33,778 and £69,504 in respect of coaching and goods and live stock receipts respectively, but miscellaneous receipts were lower by £16,665.

(iv.) South Australia. In this State there were increases of £17,928 and £290,898 in coaching, and goods and live stock receipts respectively, and a slight decrease of £706 in miscellaneous receipts, the net increase being £308,120 in excess of that for previous year.

(v.) Western Australia. In this State the earnings in 1916-17 shewed a decrease of £210,728 as compared with 1915-16. There was an increase of £8695 in miscellaneous receipts, but decreases of £39,029 and £180,394 in the coaching, and goods and live stock receipts respectively.

(vi.) Tasmania. The gross revenue in 1916-17 shewed a decrease of £7523 as compared with the previous year. In the goods and live stock receipts there was an increase of £1302, but there were decreases of £8564 and £261 in the coaching and miscellaneous receipts respectively.

The following table shews for the two years 1915-16 and 1916-17 the percentage which each class of receipts bears to the total gross revenue :---

# STATE RAILWAYS.—PERCENTAGE OF REVENUES FROM VARIOUS SOURCES ON TOTAL REVENUE, 1915-17.

	1				1915-16.			
Particulars.,	N.1	s.w.	Vic.	Qld.	S.A.	W.A.	Tas.	All States.
Coaching Goods and live stock Miscellaneous	44 54 1	% 1.64 1.08 1.28	% 52.64 45.75 1.61	% 35.77 63.13 1.10	% 36.71 61.64 1.65	% 30.96 64.96 4.08	% 51.66 45.07 3.27	% 43.30 55.03 1.67
	1				1916-17.			
Particulars.	N.	s.w.	Vic.	QId.	S.A.	W.A.	Tas.	All States.
Coaching Goods and live stock Miscellaneous •	48 54 2	% 3.41 4.21 2.38	% 49.03 49.29 1.68	% 35.84 63.52 0.64	% 32.53 66.08 1.39	% 32.36 62.64 5.00	50.28 46.45 3.27	% 41.70 56.27 2.03

9. Coaching Traffic Receipts per Average Mile Worked, per Passenger-train Mile, and per Passenger Journey.—The subjoined table shews the receipts from coaching traffic per average mile of line worked, per passenger-train mile, and per passenger journey in each State and for all States for the year ended the 30th June, 1917:—

# STATE RAILWAYS.—COACHING TRAFFIC RECEIPTS PER MILE WORKED, PER PASSENGER TRAIN MILE, AND PER PASSENGER JOURNEY, 1916-17.

			Coad	hing Traff	c Receipts	
State.	Number of Passenger- Train Miles.*	Number of Passenger Journeys. Gross.		Per Average Mile Worked.	Per Pas- senger- Train Mile.	Per Pas- senger Journey.
	No.	No.	£	£.	d.	a.
New South Wales	10,434,819	96,709,846	3,637,656	843	83.67	9.03
Victoria	7,363,454	108,341,540	2,918,557	711	95.13	6.47
Queensland	3,581,156	24,837,714	1,373,531	271	92.05	13.27
South Australia	2,635,047	18,107,015	739,483	337	67.35	9.80
Western Australia	1,981,637	17,466,744	607,537	180	73.58	8.35
Tasmania	470,984	1,971,888	171,220	297	.87.25	20.84
Total	26,467,097	267,434,747	9,447,984	481	85.67	8.48

\*The returns include the undermentioned mixed-train mileage, which has been divided between passenger-train miles and goods-train miles in the proportion of one-third and two-thirds respectively in the case of the following States :---

New South Wales	 1,556,599	Western Australia		1,043,125
Victoria	 2,578,948	Tasmania	•••	655,664

The preceding table shews that, amongst the States, there is a considerable difference in the amount of the average receipts per passenger journey. This amount ranges from 6.47pence in Victoria, where there is a large metropolitan suburban traffic, to 20.84 pence in Tasmania. The difference in these amounts cannot be accounted for by the amounts of rates charged, which are fairly uniform in the several States (see sub-section 17), but is largely due to the different traffic conditions which prevail on various lines in the Commonwealth (see sub-section 14). In order to analyse these figures adequately it would be necessary to have particulars regarding the number of passenger-miles, *i.e.*, the total distance travelled by passengers, in each State, but these particulars are not generally available (see sub-section 15.)

The preponderance in the number of passenger journeys in Victoria is accounted for, to a great extent, by the large number of metropolitan suburban passengers in that State. Of the total number of passengers carried in Victoria, 100,138,586 were metropolitan suburban passengers, *i.e.*, were carried between stations within twenty miles of Melbourne, while in New South Wales the number of suburban passenger journeys between stations within thirty-four miles of Sydney, including the Richmond line, and of Newcastle, including Greta, was 86,755,110. In Sydney a large proportion of the metropolitan suburban traffic is carried on the electric and steam tramways, the number of passenger journeys during the year 1916-17 being 278,477,872. In Melbourne, on the other hand, the number of passengers carried on the cable tramways systems during the same period was 103,118,377; and the number carried on the St. Kilda-Brighton, Prahran-Malvern Trust, Melbourne-Brunswick-Coburg Trust, Hawthorn Trust, and the North Melbourne tramways, 45,565,707, making a total of 148,684,084. This matter is referred to hereinafter. (See sub-section 14.)

10. Goods and Live-Stock Traffic Receipts per Mile Worked, per Goods-train Mile, and per Ton Carried.—The following table shews the gross receipts from goods and livestock traffic per mile worked, per goods-train mile, and per ton carried, for the year ended the 30th June, 1917:—

STATE	RAILWA	YS.—	GOODS	AND	LIVE-ST	OCK	TRA	FFIC	RECEIP	rs	PER	MILE
V	VORKED,	PER	GOODS	TRAIN	MILE,	AND	PER	TON	CARRIED,	19	16-17.	

		Number	Goods	Good	Goods and Live-Stock Traffic Receipts.					
State.		of Goods-Train Miles.	and Live-Stock Tonnage.	Gross.	Per Average Mile Worked.	Per Goods- Train Mile.	Per Ton Carried.			
		No.	Tons.	£	£	a.	d.			
New South Wales		9.865.898	11.732.864	4.542.619	1.053	110.50	92.92			
Victoria		6.658.586	5,962,602	2,934,259	715	105.76	118.11			
Queensland		7.148.031	4.035.379	2,433,868	480	81.72	144.75			
South Australia		3.095.492	2,822,401	1,502,363	685	116.48	127.75			
Western Australia		2,518,574	2,400,246	1,176,058	349	112.07	117.59			
Tasmania	:	609,475	401,076	158,162	274	62.28	94.64			
Total	•••	29,896,056	27,354,568	12,747,329	650	102.33	111.84			

\* The returns include the undermentioned mixed-train mileage, which has been divided between passenger-train miles and goods-train miles in the proportion of one-third and two-thirds respectively in the case of the following States:--

New South V	Vales		1,556,599		Western Austra	lia	1,043,125
Victoria		•••	2,578,948	1	Tasmania	• •••	655,664

From the preceding table it will be seen that the average cost of freight per ton ranges from 92.92 pence in New South Wales to 144.75 pence in Queensland. The remarks made in the preceding sub-section hereof with regard to the average fare paid per passenger and to passenger-miles, apply equally to the average amount of freight paid per ton and to ton-miles.

11. Working Expenses.—In order to make an adequate comparison of the working expenses of the Government railways in the several States, allowance should be made for the variation of gauges and of physical and traffic conditions, not only on the railways of the different States, but also on different portions of the same system. Where traffic is light, the percentage of working expenses is naturally greater than where traffic is heavy; and this is especially true in Australia, where ton-mile rates are in many cases based on a tapering principle—*i.e.*, a lower rate per ton-mile is charged upon merchandise from remote interior districts—and where on many of the lines there is but little back-loading. Further, though efforts have been made from time to time to obtain a uniform system of accounts in the several States, the annual reports of the Commissioners do not yet comprise fully comparable data of railway expenditure.

The following table shews the total annual expenditure, comprising expenses on (a) maintenance of way, works, and buildings; (b) locomotive power—repairs and renewals; (c) carriages and wagons—repairs and renewals; (d) traffic expenses; (e) compensation; and (f) general and miscellaneous charges; and also the percentage of the total of these expenses upon the corresponding gross revenues in each State for 1901-2 and for each year 1912-17:—

Year.		N.S.W.	*Victoria.	Q'land.	§S. Aust.	W. Aust.	Tas.	N. Ter.	All States.
		_	То	TAL WO	RKING EX	CPENSES.			
1901-2 1912-13 1913-14 1914-15 1915-16 1916-17	   P	£ 2,342,369 4,644,381 5,409,820 5,311,162 5,661,168 5,915,36J PERCENT.	£ 2,166,119 3,589,194 3,865,498 4,238,411 4,118,744 4,285,456 AGE_OF_V	£ 992,751 2,150,991 2,371,261 2,401,679 2,715,061 2,994,187 VORKING	£ 689,517 1,393,775 1,505,765 1,448,495 1,545,489 1,725,341 EXPENS	£ 1,256,370 1,506,600 1,572,008 1,497,826 1,511,655 1,448,451 ES ON GI	£ 173,292 217,357 222,713 225,995 248,651 289,186 30SS EA1	€ 34 649 +    3NINGS.	£ 7,655,067 13,502,798 14,947,065 15,123,568 15,830,768 16,657,981
1901-2 1912-13 1913-14 1914-15 1915-16 1916-17		% 63.85 68.82 69.87 69.73 70.71 70.59	% 64.32 68.95 69.51 82.12 72.19 71.99	% 71.83 64.76 64.79 62.67 73.29 78.14	% 63.54 62.71 64.43 82.99 78.63 75.89	% 82.58 73.93 69.65 72.77 72.39 77.15	% †74.31 66.45 67.45 69.91 71.45 84.93	% 276.70 +  	% 67.92 68.11 68.29 72.93 72.43 73.53

STATE RAILWAYS.—TOTAL WORKING EXPENSES AND PERCENTAGES OF WORKING EXPENSES UPON GROSS REVENUE, 1901-2 and 1912-17.

\* Including amounts paid for pensions and gratuities, and also special expenditures and charges for belated repairs and in reduction of deficiencies. ‡ Federal railway, since 1st January, 1911. \$ Exclusive of the Oodnadatta line as from 1st January, 1911.

(i.) New South Wales. In this State the total working expenses in 1916-17 amounted to £5,915,360, an increase of £254,192 as compared with the previous year. This increase was owing to a variety of causes, among which the principal were the increase of wages by awards of wages boards, and the higher cost of coal and materials.

(ii.) Victoria. In Victoria the increase in working expenses was owing mainly to increments to staff and to the higher price of coal.

(iii.) Queensland. In this State the working expenses increased £249,126 from  $\pounds 2,745,061$  in 1915-16 to £2,994,187 in 1916-17. The increase was mainly due to the additions to the wages of the staff, the extra cost of materials, and the opening of new lines 247 miles in length.

(iv.) South Australia. In South Australia the working expenses in 1916-17 shewed an increase of £179,852 over 1915-16, viz., from £1,545,489 to £1,725,341. This was owing to an increase in the train mileage, coupled with the advance in the price of fuel, the raising of wages under awards, and the adoption of the eight-hours principle at many stations.

(v.) Western Australia. In this case the expenditure was £63,204 lower than in the previous year. This was mainly due to the falling-off of the train mileage, which was 649,078 less than in the year 1915-16. During the year 93 miles of new railway came into operation.

(vi.) Tasmania. The working expenses in 1915-16 were £289,186 as compared with £248,651 in the previous year, being an increase of £40,535. Increases to staff and higher prices for coal and materials are mainly responsible for this, coupled with an increase in the mileage worked.

In the preceding table it will be observed that with the exception of the year 1915-16 the percentages of the total working expenses to the total gross earnings of the States railways, have increased each year during the period 1912-13 to 1916-17.

(vii.) Working Expenses per Average Mile Worked and per Train Mile Run. The following table shews the working expenses per average mile worked and per train mile run in each State for the years 1901-2 and 1912-17:--

Year.		N.S.W.	Victoria.	Q'land.	†S. Aust.	W. Aust.	Tas.	N. Ter.	All States.
		WORKI	NG EXPE	NSES PE	R AVERA	GE MILI	E WORKI	ED.	
		£	£	£	£	£	£	£	£
1901-2	•••	1 000	003	304	. 397	921	310	258	002
1912-13		1,200	900	494	908	041	428		009
1913-14	•••	1,307	1,032	526	830	540	424		826
1914-15	•••	1,309	1,101	508	715	484	422		827
1915-16		.1,358	1,042	556	707	454	í 450	····	827
1916-17	•••	1,372	1,044	591	787	430	502		849
		Wo	RKING E	EXPENSE	S PER TI	RAIN MII	E RUN.	<u>.</u>	·
	!	d.	d.	d.	d.	d.	d.	d.	d.
1901-2	•••	48.20	46.07	42.05	39.44	66.89	46.06	274.67	48.05
1912-13	•••	58.11	60.52	45.03	52.74	64.30	51.83		56.01
1913-14	••••	63.18	61.73	50.16	53.69	67.80	53.41		59.57
1914-15	'	62.42	66.47	48.08	62.29	66.51	53.96		60.80
1915-16		63. <b>0</b> 3	71.49	56.93	65.87	70.45	56.75		64.63
1916-17	•••	69.93	73.35	66.98	72.26	77.25	64.24		70.93
* For t	hece	lendar ve	ar 1002	+ Excludi	ing the Oc	dnedatta l	ine as fro	n the let o	i . f Jenuer

# STATE RAILWAYS.—WORKING EXPENSES PER AVERAGE MILE WORKED AND PER TRAIN MILE RUN, 1901-2 and 1912-17.

\* For the calendar year 1902. † Excluding the Oodnadatta line as from the 1st of January, 1911.

12. Distribution of Working Expenses.—The subjoined table shews the distribution of working expenses, among four chief heads of expenditure, for the years 1901-2 and 1912-17:—

					_				
Yea	.r.	N.S.W.	Victoria.	Q'land.	*S. Aust.	W. Aust.	Tas.	N. Ter.	All States.
				MA	INTENAN	CE.			
		£	£	£	£	l £	£	£	l £
1901-2		554,483	490,438	355,615	166,691	246,931	158,612	29,001	1,901,771
1912-13	•••	1,024,215	876,631	601,866	291,361	322,267	58,534		3,174.874
1913-14		1,109,749	928,702	649.925	308,244	362,517	57,685		3,416,822
1914-15	•••	918,790	1,107,310	626.798	280,062	346,771	58,253		3,337,984
1915-16		895,526	998,619	738,160	306,420	361,627	66,090		3,366,442
1916-17		932,990	927,315	774,833	391,334	349,714	82,316		3,458,502
		Lo	COMOTIVE	E, CARRI	AGE, AND	WAGON	CHARGE	s.	
1901-9		1 102.314	845.464	389.766	343 579	670 485	+63 792	3 910	3.418 603
1912-13		2,162,217	1.465.732	914.827	729,675	747.940	86 300	0,210	6,105,991
1913-14		2.687.079	1.636.480	1.015.522	803 421	746 882	96 676		6,986,060
1914-15		2,755,669	1.789.836	1.051.683	793,997	714 173	99,829	•••	7,205,187
1915-16		2,917,299	1.747.319	1.198.160	859 334	714 802	107 885		7.544.799
1916-17		2,926,231	1,953,262	1,326,902	909,660	681,243	125,661		7,922,959
		<u></u>		TRAFF	IC EXPE	NSES.	۱ <u> </u>		
1901-2		588 938	671 588	926 937	162 626	306 409	+42 416	9 108	2 000 322
1019-13	•••	1 343 707	947 868	585 681	346 705	307 274	60,820		3 682 055
1913-14		1.491.423	1.066.738	656,406	365.954	415 836	57 731		4.054.088
1914-15		1.502.945	1.099.026	671,622	347,437	392 628	57 814		4.071 472
1915-16		1.638.942	1,127,568	744, 229	350 472	393,033	62 326		4.316 570
1916-17		1,763,466	1,137,703	821,941	391,309	375,655	63,867		4,553,941
			<u> </u>	‡OTH	ER CHAR	GES.	<u> </u>		
1001 0		06.624	159 690	01 199	16 600	20 545	+0 470	990	994 901
1010 12	•••	30,034	100,029	40 617	10,028	32,345	11,702	350	520 970
1012-13	•••	101 560	290,903	40,017	20,039	1 39,819	10,601		100,005
1014.15	•••	121,009	200,010	51 574	20,190	40,710	10,021		509.095
1012 16	•••	103,100	045 020	64 510	20,999	40 102	10,099		600,920
1016.17	•••	000,401	067 176	70 511	23,203	41 990	17 249		700 570
1010-11	•••	402,013	201,110		00,000	=1,009	11,084		122,019
		•	4	•			,	1	

STATE RAILWAYS .- DISTRIBUTION OF WORKING EXPENSES, 1901-2 and 1912-17.

13. Net Revenue.—The following table shews the net sums available to meet interest charges, also the percentage of such sums upon the capital cost of construction and equipment of lines opened for traffic in each State for the years 1901-2 and 1912-17:—

STATE RAILWAYS.—NET REVENUE AND PERCENTAGE OF NET REVENUE ON CAPITAL COST OF LINES OPEN, 1901-2 and 1912-17.

Year.		N.S.W.	Victoria.	Q'land.	*S. Aust.	W. Aust.	Tas.	N. Ter.	All States.
				NET	REVENUI	ē.		·	
	1	£	£	£	£	£	£	£	£
1901-2		1.326.317	1,201,724	389,428	395,658	265,059	159,919	-22.127	3.615.978
1912-13		2,104,104	1,616,248	1,170,681	828,661	531,253	109,756		6,360,703
1913-14		2,332,421	1,695,460	1,288,761	831,486	685,003	107,455	·	6,940,586
1914-15		2,305,349	922,662	1,430,324	296,883	560,418	97,270		5,612,906
1915-16		2,344,910	1,586,419	1,000,289	419,921	576,455	99,377	1	6,027,371
1916-17		2,464,724	1,667,263	837,780	548,189	428,931	51,319		5,998,206
	PER	CENTAGI	E OF NET	r Reven	UE ON C	APITAL E	XPENDI	TURE.	
		%	%	%	8	%	%	96	8
1901-2		3.27	2.96	1.94	3.10	3.58	<b>†1.56</b>	-2.17	2.81
1912-13		3.69	3.40	3.93	5.90	3.56	2,49		3.80
1913-14		3.88	3.44	4.05	5.46	4.32	2.39	·	3.93
1914-15		3.60	1.79	4.28	1.79	3.30	2.10		8.00
1915-16		3.41	2.91 .	2.88	2.44	3.27	2.07		8.06
1016-17		3 4 2	1 300	9,30	3 10	9 46	1.04	1	0.04

\* Exclusive of Oodnadatta line as from the 1st of January, 1911.

+ For the calendar year 1902.

Note.-The minus sign (---) denotes net loss.

(i.) Net Revenue per Average Mile Worked and per Train Mile Run. Tables shewing the gross earnings and the working expenses per average mile worked and per train mile run have been given above. The net earnings, *i.e.*, the excess of gross earnings over working expenses, per average mile worked and per train mile run are shewn in the following table :--

Year.		N.S.W.	Victoria.	Q'land.	*S. Aust.	W. Aust.	. Tas.	N. Ter.	All States.
·		NET	REVEN	UE PER	AVERAGI	E MILE	WORKED		
	1	£	£	£	£	£	£	£	£
1901-2		449	368	139	228	195	<b>†128</b>	-153	284
1912-13	· • • • •	543	444	269	540	191	216		381
1913-14	{	589	452	286	458	235	205		397
1914-15		568	240	302	. 147	181	181		307
1915-16		562	401	202	192	173	180		315
1916-17		571	406	165	250	127	89		30 <b>6</b>
		1	NET REV	ENUE P	ER TRAIN	MILE F	RUN.	<u> </u>	
		d.	d. [	d.	d.	d.	d.	d.	d.
1901-2		28.87	25.56	16.50	22.53	14.11	<del>†</del> 15.93	-175.40	23.16
1912-13		26.32	27.25	24.51	31.35	22.67	26.17	· · · ·	26.39
1913-14		27.24	27.07	27.26	29.64	29.54	25.77		27.66
1914-15	[	27.10	14.47	28.63	12.77	24.89	23.23		22.56
1915-16		26.11	27.54	20.75	17.90	26.87	22.68		24.61
1916-17		· 29.14	28.54	18.74	22.96	22.87	11.40		25.54

STATE RAILWAYS.—NET REVENUE PER AVERAGE TRAIN MILE WORKED AND PER TRAIN MILE RUN, 1901-2 and 1912-17.

\* Exclusive of Oodnadatta line as from the 1st of January, 1911.

† For the calendar year 1902. Note.—The minus sign (-) denotes net loss.

14. Traffic Conditions.—Reference has already been made to the difference in the traffic conditions on many of the lines of the Commonwealth (see sub-sections 9, 10, and 11 hereof). These conditions differ not only in the several States, but also on different lines in the same State, and this is true with regard to both passenger and goods traffic. By far the greater part of the population of Australia is confined to a fringe of country near the coast, more especially in the eastern and southern districts. A large proportion of the railway traffic between the chief centres of population is therefore carried over lines in the neighbourhood of the coast, and is thus, in some cases, open to sea-borne competition. On most of the lines extending into the more remote interior districts, traffic is light; the density of population diminishes rapidly as the coastal regions are left behind; and there is a corresponding diminution in the volume of traffic, while, in comparison with other more settled countries, there is but little back-loading.

As an indication of the different traffic conditions prevailing in the several States, the following table is given shewing the numbers of passenger journeys and the tons of goods carried (a) per 100 of the mean population; and (b) per average mile worked in each State during the financial year 1916-17:—

STATE	RAILWAYS.—PASSENGER	JOURNEY	S AND	TONNAGE	0F	GOODS
	AND LIVE	STOCK, 19	16-17.			

Partic	n.s.w.	Vic.	Q'land.	S.A.	W.A.	Tas.	All States			
	(a)	PER	: 100	OF ME	AN PO	PULATI	ION.			
Passenger journeys Goods and live stock	 	 	No. Tons	5,180 628	7,688 423	3,665 596	4,183 652	5,550 763	995 202	5,458 558
	(b) PE	R AV	ERAG	e Mili	E OF 1	LINE W	ORKE	D.	·	
Passenger journeys Goods and live stock	 	 	No. Tons	22,423 2,720	26,399 1,453	4,902 796	8,257 1,287	5,183 712	3,417 695	13,628 1,394

Particulars of the actual numbers of passengers and tons of goods and live stock carried have already been given (see sub-section 2 hereof).

(i.) Metropolitan and Country Passenger Traffic. A further indication of the difference in passenger traffic conditions might be obtained from a comparison of the volume of metropolitan, suburban, and country traffic in each State. Particulars are, however, available only for the States of New South Wales and Victoria. The subjoined table shews the number of metropolitan and country passengers carried in each of the States mentioned and the revenue derived therefrom during the year 1916-17:—

# STATE RAILWAYS.—METROPOLITAN, SUBURBAN, AND COUNTRY PASSENGER TRAFFIC, 1916-17.

Portionland	Number	of Passenger	Journeys.	Revenue.				
rareculars.	Metropolitan.	Country.	Total.	Metropolitan.	Country.	Total.		
N.S.W Victoria	*86,755,110 †100,138,586	9,954,736 8,202,954	96,709,846 108,341,540	£ *1,043,453 †1,113,050	£ 2,158,714 1,465,429	2 3,202,167 2,578,479		

\* Within 34 miles of Sydney and Newcastle, and including the Richmond line. † Within 20 miles of Melbourne.

From this table it will be seen that the number of passenger-journeys in country districts in Victoria was less than the corresponding number in New South Wales, while the number of metropolitan passenger-journeys in Victoria was greater than in New South Wales, although in the latter State both Sydney and Newcastle are included. In Sydney a larger proportion of the suburban traffic is carried by the tramway systems than in Melbourne. The Sydney ferries also carry a large number of suburban passengers (see § 3., Tramways).

For several years it has been recognised that the suburban passenger transport, both in Sydney and in Melbourne, was increasing so rapidly that it must eventually become impossible to cope with it under the existing systems. A scheme for the electrification of the Melbourne suburban lines was under the consideration of the Victorian Government in 1908, but owing chiefly to a doubt as to its success from a financial standpoint, its adoption was for a time deferred. In November, 1912, however, a Commission was appointed by Parliament to again consider the 1908 scheme, and, acting on its report, the Government decided to at once proceed with the electrification of the suburban lines. Contracts for the construction of power-houses and the necessary equipment were put in hand at an estimated cost of £2,250,299. It was anticipated that a portion of the suburban railway system would be electrically operated by the end of 1915, but, owing to delays in the delivery of plant, due to the war, the date of opening had to be postponed. It is now expected that electrically-propelled trains will be in operation early in the year 1919. In Sydney, a Metropolitan Railway Construction Branch of the Railway Department has been created to deal specially with this matter. The Minister has approved of the construction of an underground city railway, the plans have been prepared, and a commencement has been made with the preliminary works. The preliminary work in the location of a system of electric railways for the eastern, western and northern suburbs is also in hand.

(ii.) Goods Traffic. The differing conditions of the traffic in each State might also, to some extent, be analysed by an examination of the tonnage of various classes of commodities carried and of the revenue derived thereform. Comparative particulars regarding the quantities of some of the leading classes of commodities carried on the Government railways are available for all the States; corresponding information regarding the revenue derived from each class of commodity is not, however, generally available in

a comparable form. In this connection it may be stated that the following resolution was passed at the Interstate Conference of Railway Commissioners held in Melbourne in May, 1909 :— "That in view of the variations in the character and classification of the goods traffic in the different States, the subdivisions of tonnage carried and revenue in each State shall be those which best suit local conditions."

The following table shews the number of tons of various representative commodities carried, and the percentage of each class on the total tonnage carried during the financial year 1916-17:---

State.	Minerals.	Fire- wood.	Grain and Flour.	Hay, Straw, and Chaff.	Wool.	Live Stock.	All other Com- modities.	Total.
		· .	TONS CA	ARRIED.				
New South Wales Victoria Queensland South Australia Western Australia Tasmania	Tons. <sup>1</sup> 6,732,571 <sup>2</sup> 893,624 1,409,951 882,216 569,083 104,531	Tons. 241,123 523,582 262,838 138,010 598,750 42,972	Tons. <sup>3</sup> 1,327,067 1,840,721 <sup>4</sup> 30,511 796,622 437,894 <sup>6</sup>	Tons. 344,639 274,240 <sup>5</sup> 276,964 56,140 80,244 31,532	Tons. 117,762 63,507 62,523 19,774 12,572 5,957	Tons. 577,798 408,241 532,979 111,263 66,040 20,833	Tons. 2,127,340 1,958,687 1,459,613 818,376 635,663 195,251	Tons. 11,468,300 5,962,602 4,035,379 2,822,401 2,400,246 401,076
All States	10,591,976	1,807,275	4,432,815	1,063,759	282,095	1,717,154	7,194,930	27,090,004
	PERCE	NTAGE	ON TOTA	L TONN	AGE CAI	RRIED.	·	<u> </u>
New South Wales Victoria Queensland South Australia Western Australia Tasmania	% <sup>1</sup> 58.71 <sup>2</sup> 14.99 34.94 31.26 23.71 26.06	% 2.10 8.78 6.51 4.89 24.95 10.71	% <sup>3</sup> 11.57 30.87 <sup>4</sup> 0.76 28.22 18.25 	% 3.00 4.60 *6.86 1.99 3.34 7.86	% 1.03 1.06 1.55 0.70 0.52 1.49	% 5.04 6.85 13.21 3.94 2.75 5.20	% 18.55 32.85 36.17 29.00 26.48 48.68	% 100.00 100.00 100.00 100.00 100.00 100.00
All States	39.10	6.67	16.36	3.93	1.04	6.34	26.56	100.00

	STATE	RAILWAYS	-CLASSIFICATION	OF	COMMODITIES	CARRIED,	1916-17
--	-------	----------	-----------------	----	-------------	----------	---------

1. Exclusive of 264,564 tons of coal, on which only shunting and haulage were collected. 2. Coal, stone, gravel, and sand. 3. Up journey only. 4. Flour only. 5. Sugar cane. 6. Included in all other commodities.

15. Passenger-Mileage and Ton-Mileage.—In earlier issues of the Year Book reference has been made to the resolution on the subject of passenger mileage and ton-mileage statistics, passed at the Interstate Conference of Railway Commissioners held in Melbourne, in May, 1909; and to the Report [Cd. 4697] on the same subject by a Committee appointed by the President of the Board of Trade in the United Kingdom (see Year Book No. 10, p. 654).

In the Commonwealth, information regarding "passenger-miles" and "ton-miles" is available, either wholly or in part, for three of the States only, viz., New South Wales, South Australia, and Tasmania, but is not available at all for either Victoria, Queensland, or Western Australia. Of the three States which give particulars of the nature indicated, New South Wales furnishes the information in a classified form according to class of passengers and nature of commodities carried. South Australia supplies particulars for all classes of passengers and goods together, and Tasmania supplies particulars for all classes of passengers together and a classification of nature of commodities carried. Western Australia furnished particulars as to ton-miles for the years 1907-12, but has since discontinued to record them.

(i.) Passenger-Miles. Particulars for the whole of the Commonwealth period regarding total "passenger-miles" are available for one State only, namely, Tasmania. For New South Wales to the end of 1909-10, particulars are available for suburban and extended suburban traffic only—*i.e.*, including all stations within 34 miles of Sydney (including

the Richmond line), and of Newcastle (including Greta), but since that date all passenger traffic is included. For South Australia particulars are available for each year since 1904. No particulars are available for other States. In the tables given below the average number of passengers carried per "train," etc., is obtained by dividing the number of "passenger-miles" by the number of "passenger-train-miles." Similarly the "density of traffic" is obtained by dividing the number of "passenger-miles" by the "average miles worked."

STATE RAILWAIS, -SUMMART UP PASSENUER MILES. 1902 and 1913	STATE	RAILWAYS.—	-SUMMARY	OF	"PASSENGER	MILES."	1902	and	1913-1	7.
--	-------	------------	----------	----	------------	---------	------	-----	--------	----

Year ended 30th June.	Pass'nger Train Mileage.	Number of Passenger Journeys.	Total Passenger Miles.	Amount Received from Passengers.	Average Number of Passengers carried per Train.	Average Mileage per Passenger- journey.	Average Receipt per Passenger-mile.	Average Fare per Passenger- journey.	Density of Traffic per Average Mile Worked.
	Miles. (,000 omitted.)	No. (,000 omitted.)	No. (,000 omitted.)	£	No.	Miles.	d.	d.	No.
			NEW	SOUTH WA	ALES.				
1913 1914 1915 1916 1917	9,667 10,081 10,099 10,283 10,435	79,490 86,328 88,774 92,851 96,710	$1,192,584\\1,235;025\\1,230,901\\1,321,491\\1,473,707$	2,571,446 2,832,450 2,910,684 3,147,041 3,202,167	123 123 122 129 141	15.00 14.30 13.87 12.85 15.24	0.52 0.55 0.57 0.57 0.52	7.76 7.87 7.87 8.13 7.95	308,002 311,954 303,402 316,980 341,690
			Sou	TH AUSTRA	LIA. <sup>1</sup>				
1913 1914 1915 1916 1917	2,804 2,952 2,815 2,786 2,635	19,382 19,809 18,831 20,513 18,107	228,707 236,764 215,489 218,609 210,303	619,094 635,967 560,012 603,203 615,909	82 80 77 78 80	11.80 11.95 11.44 10.66 11.61	0.64 0.63 0.60 0.66 0.70	7.67 7.70 7.14 7.06 8.16	149,092 130,449 106,362 100,050 95,897
				TASMANIA.					
1902 <sup>2</sup> 1913 1914 1915 1916 1917	336 438 446 454 465 471	761 1,650 1,708 1,751 2,078 1,972	19,444 35,607 36,028 36,051 46,719 40,164	88,541 135,545 140,185 132,680 154,225 145,941	58 81 81 79 100 85	25.60 21.58 21.09 20.59 22.48 20.37	1.09 0.91 0.91 0.88 0.79 0.87	27.91 19.71 19.69 18.19 17.81 17.76	42,086 70,092 68,624 67,260 84,567 69,607

Exclusive of the returns of the Oodnadatta line on and after 1st January, 1911.
 2. To 31st December, 1902.

(ii.) Ton-Miles. Particulars regarding total "ton-miles" are available for each year since 1901 for the States of New South Wales, South Australia, and Tasmania. Corresponding particulars for Western Australia are available for the years 1907 to 1912, but not for subsequent years. The average freight-paying load carried per "train" is obtained by dividing the total "ton-miles" in the fourth column by the goods-train mileage in the second column. In New South Wales the tonnage carried is exclusive of coal, on which only shunting and haulage charges are collected, and the amount of earnings specified excludes terminals. In South Australia and Tasmania they include terminals, while in Western Australia they exclude wharfage and jetty dues, but include all other **oharges**.

STATE RAILWAYS .- SUMMARY OF "TON MILES." 1901-2 and 1913-17.

Year ended the 30th June.	Goods Train Mileage.	Total Tons Carried.	Total "Ton- Miles."	Earnings.	Average Freight- paying Load carried per "Train."	Average Miles per Ton.	Earn- ings per "Ton- mile."	Density of Traffic per Average Mile Worked.
	No. (,000 omitted.)	No. (,000 omitted.)	No. (,000 omitted.)	£	Tons.	Miles.	d.	Tons.
<u> </u>			NEW	SOUTH WAL	LES. <sup>1</sup>			
1902 1913 1914 1915 1916 1917	6,586 9,517 10,469 10,321 11,273 9,866	6,164 11,402 12,901 11,660 11,614 11,468	436,814 861,940 1,037,911 916,923 1,028,760 1,136,485	$\begin{array}{c} 1,947,305\\ 3,153,626\\ 3,760,384\\ 3,633,613\\ 3,738,227\\ 3,936,639\end{array}$	66.32 90.57 99.14 89.84 91.26 115.19	70.87 75.60 80.45 78.64 88.58 99.10	1.07 0.88 0.87 0.95 0.87 0.83	148,464 222,608 262,165 226,010 246,764 263,502
		I <u></u>	Sout	TH AUSTRAL	IA. <sup>2</sup>	<u>,</u>		I
1902 1913 1914 1915 1916 1917	2,468 3,539 3,780 2,766 2,845 3,095	1,392 3,016 3,1C3 2,076 2,397 2,822	170,523 355,404 402,356 237,014 278,942 298,442	681,045 1,441,859 1,534,187 1,049,074 1,211,465 1,502,363	69.09 100.43 106.45 85.70 98.04 96.41	122.48 117.84 129.65 114.15 116.37 105.74	0.96 0.97 0.92 1.06 1.04 1.21	98,803 231,685 221,684 116,986 127,662 136,089
			WÈSTE	ERN AUSTRA	LIA. <sup>8</sup>			•
1907 1908 1909 1910 1911 1912	1,940 1,976 2,011 2,281 2,548 2,747	2,091 2,059 1,997 2,242 2,489 2,542	144,856 142,719 143,629 163,651 182,738 184,748	964,653948,373945,9561,042,7891,154,6621,154,087	$\begin{array}{c} 74.67 \\ 72.22 \\ 71.41 \\ 71.75 \\ 71.71 \\ 67.25 \end{array}$	69.26 69.32 71.92 73.00 73.42 72.67	$1.60 \\ 1.59 \\ 1.58 \\ 1.53 \\ 1.52 \\ 1.49$	86,429 77,989 72,871 77,855 79,938 77,767
			ŋ	CASMANIA.4				
1902 <sup>5</sup> 1913 1914 1915 1916 1917	567 569 554 551 586 609	407 447 389 388 367 380	14,331 17,747 18,709 19,809 20,105 21,288	109,266 144,073 142,642 141,049 145,094 146,248	25.26 31.17 33.76 35.90 34.29 34.93	35.30 39.67 48.06 51.09 54.81 55.98	1.82 1.94 1.82 1.70 1.73 1.65	31,019 34,104 35,826 37,000 36,392 36,894

1. Exclusive of tonnage on which only shunting and haulage charges are collected. 2. Ex-clusive of the returns of the Oodnadatta line on and after 1st January, 1911. 3. Particulars for years prior to 1907 and for years subsequent to 1912 are not available. 4. Exclusive of live stock. 5. To 31st December.

(iii.) Classification of Commodity Ton-Mileage. As previously mentioned New South Wales and Tasmania are the only States for which particulars, specifying the ton-mileage and the earnings per ton-mile for various classes of commodities, are available.

The subjoined statement gives particulars for the last financial year in respect of New South Wales. Miscellaneous traffic consists of timber, bark, bricks, drain-pipes in sixton lots, and cement in full truck loads, agricultural and vegetable seeds in five-ton lots, and traffic of a similar nature. A and B classes consist of lime, vegetables, tobacco leaf, caustic soda and potash, copper ingots, fat and tallow, water and mining plant in six-ton lots, leather in one and three-ton lots, agricultural implements in five-ton lots,

and other traffic of a similar nature. The table does not include 264,564 tons of coal on which only shunting and haulage charges were collected, nor does it include £62,523 for haulage, tonnage dues, etc.

Particulars.			Total Tons Carried.	Total Miles Carried.	Average Miles per Ton	Earnings (exclusive of Ter- minals).	Earnings per Ton Mile.	Per cent. on Total Tonnage
			Tons.	Miles.	Miles.	£	d.	%
Coal coke	, and chal	۵.	5 787 925	262 886 396	45.42	524 057	0.48	50.47
Other miner	vila suai		704 975	41,646,944	59.08	98,300	0.57	6.15
Crude ores			239,671	24,998,401	104.30	59,421	0.57	2.09
Miscellaneo	18		707.801	65.957.549	93.19	201.644	0.73	6.18
Firewood			241.123	7.739.428	32.10	27.581	0.86	2.10
Fruit			92,714	12.678.777	136.75	56.262	1.06	0.80
Grain. flour	. etc. (1	Up	·-,·					
Journey)	· ·	·	1,327,067	326,896,522	246.33	595,953	0.44	11.57
Hay, straw,	and cha	ւff	344,639	78,330,561	227.28	120,023	0.37	3.00
Frozen meat	i		42,994	7,197,612	167.40	34,965	1.17	0.38
A Class	•••		535,656	46,311,398	86.46	235,040	1.22	4 67
в"			342,725	35,402,229	103.30	266,219	1.80	2.99
С"	•••		29,797	2,013,803	67.58	23,028	2.74	0.26
1st Class	•••		160,008	15,563,760	97.27	199,028	3.07	1.39
2nd "			215,645	32,705,983	151.67	564,859	4.14	1.88
Wool	•••		117,762	34,620,007	293.98	290,363	2.01	1.03
Live stock	•••		577,798	141,535,676	244.96	639,896	1.09	5.04
Total	•••			1,136,485,046	99.10	3,936,639	0.83	100.00

NEW SOUTH WALES.—SUMMARY OF TON-MILEAGE FOR THE YEAR ENDED 30th JUNE, 1917.

In the following table will be found particulars of the ton-mileage and earnings per ton-mile in the case of Tasmania:---

TASMANIASUMMARY	0F	TON-MILEAGE	FOR	THE	YEAR	ENDED	30th	JUNE.	1917.

Particulars.	Total Tons Carried.	Total Miles Carried.	Average Miles per Ton.	Earnings.	Earnings per Ton Mile.	Per cent on Total Tonnage
	Tons.	Miles.	Miles.	£	đ.	%
Agricultural produce	80,615	4,230,655	52.47	26,360	1.49	21.20
horse feed	31.532	1.889.933	59.93	10.337	1.31	8 29
Manures	11.284	321,568	28.49	1.378	1.02	2.97
Native coal	. 58,711	6,107,748	104.03	19,488	0.76	15.44
Minerals, other than	1					
native coal	. 45,820	1,248,080	27.23	7,938	1.52	12.05
Bark	. 921	35,957	39.04	295	1.96	0.24
Firewood	42,972	1,112,879	25.81	5,157	1.11	11.30
Timber	38,279	1,754,754	45.84	9,451	1.29	10.07
Wool ·	5,957	374,389	62.84	4,457	2.86	1.57
Miscellaneous goods	64,152	4,211,677	65.65	61,387	3.49	16.87
Total	380,243	21,287,640	55.98	146,248	1.64	100.00

16. Interest Returned on Capital Expenditure.—In the table in sub-section 13 hereof, it will be seen that the State Government railways in the year 1901-2 made a profit of 2.81 per cent. on the capital expenditure at that time. In the subsequent years up to and including the year 1910-11, the percentages were 2.48, 3.04, 3.28, 3.91, 4.37, 4.23, 4.13, 4.18 and 4.56 respectively, rates which shew substantial increases with one exception on that for the first-named year. Since 1910-11, the rates have fallen each year with the exception of the year 1918-14, the rate for the year 1916-17 being 2.94, or 1.62 lower than that for 1910-11. The reasons for this reduction are to be found in the increases of the charges in respect of working expenses, brought about by the opening of new lines, the higher cost of materials, and the raising of the rate of wages, while in the last three years additional expenses have been incurred in consequence of the war. The return on the capital invested as at the 30th June, 1917, was not equal to the interest payable for that year, the rate of which was 3.83 per cent. This average, however, does not accurately express the position. At an early period the necessity for the construction of railways to open up undeveloped districts was recognised, and the money had to be raised at a very high rate of interest. It may be noted, however, that although the loans made for expenditure on railway construction and equipment very largely increase the amount of the public debt of the States, forming, in fact, three-fifths of the total debt, the money borrowed has not been sunk in undertakings which give no return, but has been expended on works which are increasingly reproductive, yielding in most cases a direct return on the capital expended, and representing a greater value than their original cost. In Europe the national debts of various countries have been incurred principally through the expenses of prolonged wars, and the money has gone beyond recovery, but in Australia the expenditure by the States up to a recent period is represented to a large extent by public works which pay a direct return. In addition to the purely commercial aspect of the figures relating to the revenue and expenditure of the State railways, it is of great importance that the object with which many of the lines were constructed should be kept clearly in view; the anticipated advantage in building these lines has been the ultimate settlement of the country rather than the direct returns from the railways themselves, and the policy of the State Governments has been to use their railway systems for the development of the country's resources to the maximum extent consistent with the direct payment by the customers of the railways of the cost of working and interest charges.

(i.) Profit or Loss after Payment of Working Expenses and Interest.—The net revenue of the Government railways of each State after payment of working expenses is shewn in sub-section 13 hereof. The following table shews the amount of interest payable on expenditure from loans on the construction and equipment of the railways of each State, the actual profit or loss after deducting working expenses and interest and all other charges from the gross revenue, and the percentage of such profit or loss on the total capital cost of construction and equipment.

It will be seen that during the two years ended 30th June, 1914, all the States, with the exception of Queensland in 1913, and Tasmania for both years, shew a net profit after paying working expenses and interest. In the year ended 30th June, 1915, only two States, New South Wales and Queensland, shew a profit, all the other States a loss, while in the two years ended 30th June, 1917, all the States shew a loss.

The losses during the last two years for all the States are due to the causes to which allusion has already been made in the remarks as to increases in the working expenses of the railways (see pp. 684 and 685 *ante*). It will be observed in the following table that the interest charges in 1917 were  $\pounds 1,166,278$  higher than they were in 1915.

# STATE RAILWAYS.—INTEREST ON LOAN EXPENDITURE, PROFIT OR LOSS, AND PERCENTAGE OF PROFIT OR LOSS ON TOTAL COST, 1901-2 and 1912-17.

Year.		N.S.W.	Victoria.	Q'land.	<sup>1</sup> S. Aust.	W. Aust.	Tas.	N. Ter.	All States.
	Ам	OUNT O	F INTER	EST ON	RAILWA	y Loan	Expeni	DITURE.	
		£ 1,434,638	£ 1,492,695	£ 837,205	£ 469,787	£ 234,932	£ 140,550	£ 47,012	£ 4,656,819

		1			1				<u> </u>
1916-17		2,858,789	2,006,197	1,500,800	. 673,985	643,765	181,617		· 7,865,153
1015-16	••• ••	2 568 650	1 022 410	1 418 990	662 592	695,050	180 770	•••	7 279 050
1014-15		0 070 070	1 764 970	1 319 106	594 919	596 060	170 240		6 609 875
1913-14		2.089.495	1.674.036	1.250.598	566.497	556.843	169.268		6,306,737

PROFIT OR LOSS AFTER PAYMENT OF WORKING EXPENSES, INTEREST, AND OTHER CHARGES.<sup>2</sup>

	£	₃£	£	£	£	£	£	£
1901-2		-290,971	-447,777	- 74,129	+ 30,127	- 80,631	69,139	-1.040.841
1912-13	+200,444	+ 24,321	- 280	+335,754	+ 25,328	- 54,656		+ 530,911
1913-14	+ 242,926	+ 21,424	+ 38,163	+264,989	+128,160	- 61,813		+ 633,849
1914-15	+ 26,279		+118,128	-287,929	- 25,651	- 75,079		-1,085,969
1915-16	-223,749	-335.991	-417,991	-243,667	- 48,795	- 81,395		-1,351,588
1916-17	-394,064	-338,934	663,020	-125,796	-214,834	-130,298	·	-1,866,946

PERCENTAGE OF PROFIT OR LOSS ON CAPITAL COST OF CONSTRUCTION AND EQUIPMENT.<sup>2</sup>

	%	з %	%	%	%	%	%	· %
1901-2	0.27	-0.72	-2.22	-0.58	+0.41	-2.10	-6.71	0.82
1912-13	+ 0.35	+0.05	-0.00	+2.39	+0.17	-1.24		+0.32
1913-14	+0.40	+0.04	+0.12	+1.74	+0.81	-1.37		+0.36
1914-15	+0.04	-1.63	+0.35	-1.73	)0.15	-1.62	i i	0.58
1915-16	-0.33	0.62	-1.20	-1.41	0.29	-1.70		0.69
1916-17	0.55		-1.82	-0.71	-1.23	-2.65	<u>'</u>	0.91

1. Inclusive of Oodnadatta line to 31st December, 1910. 2. + Indicates a profit; — indicates a loss. 3. Allowing for payment of special expenditure and charges (see sub-section 11 above).

17. Passenger Fares and Goods Rates.—Fares and rates are changed from time to time to suit the convenience and varying necessities of the railways, but, as traffic is developed and revenue increases, they are in many cases reduced to an extent consistent with the direct payment by the customers of the railways of the cost of working and interest charges.

(i.) Passenger Fares. On the Australian Government railways two classes are provided for passenger traffic. The fares charged may be classified as follows: -(a) Fares between specified stations (including suburban fares). (b) Fares computed according to mileage rates. (c) Return, periodical, and excursion fares. (d) Special fares for workingmen, school pupils, and others. Fares in class (a) are issued at rates lower than the ordinary mileage rates. Fares in class (b) are charged between stations not included in class (a). On the average, mileage-rate fares run about 1.8 pence per mile for first-class and about 1.2 pence per mile for second-class single tickets. In New South Wales, Victoria, and Queensland the mileage rates are based upon a tapering principle, i.e., a lower charge per mile is made for a long journey than for a short journey. In Victoria and Western Australia, return fares are generally about 11 to 12 times the single fare, and the second-class are about 30 to 45 per cent. lower than the first-class fares. In New South Wales, Queensland, South Australia, and Tasmania the issue of ordinary return tickets outside the suburban areas has now been discontinued. Special excursion return tickets are, however, issued at certain times of the year, subject to restrictions as to break of journey and trains available for such tickets.

The following table shews the passenger fares for different distances charged in each State, between stations for which specific fares are not fixed :—

		For a journey of—							
State.	•	50 Miles.	100 Miles.	200 Miles.	300 Miles.	400 Miles.	500 Miles.		
	FIF	ST-CLAS	S SINGL	E FARES	•				
New South Wales <sup>1</sup> Victoria Queensland South Australia Western Australia Tasmania	···· ···· ···	5.     d.       5.     1       8.     10       8.     2       7.     6       8.     4       7.     5	s.     d.       12     3       17     6       15     4       15     0       16     8       14     8	s.     d.       20     8       34     8       29     10       30     0       ·33     4       29     3	s. d. 41 2 51 8 43 4 45 0 50 0 	s. d. 55 7 67 4 56 0 60 0 66 8 	s. d. 66 10 83 4 68 8 75 0 83 4 		
Average Average per passenger-mile	 d.	7 7 1.81	15 3 1.83	30 8 1.84	46 2 1.85	61 1 1.83	75 5 1.81		
·	SECO	OND-CLA	SS SINGL	E FARES	5.		·		
New South Wales <sup>1</sup> Victoria Queensland South Australia Western Australia Tasmania	···· ····	s. d. 3 4 6 0 5 5 5 0 5 3 5 0 5 3 5 0	s.     d.       8     1       11     8       9     11       10     0       10     5       9     10	s. d. 17 0 23 2 19 0 20 0 20 10 19 7	s.     d.       25     5       34     4       27     1       30     0       31     3	s. d. 33 0 45 0 34 3 40 0 41 8 	s.     d.       38     7       55     6       41     6       50     0       52     1		
Average Average per passenger-mile	 d.	5 0 1.20	10 0 1.20	19 11 1.20	29 7 1.18	38 9 1.16	47 6 1.14		

ORDINARY PASSENGER MILEAGE RATES ON STATE RAILWAYS, 1917.

1. Inclusive of suburban rates up to 34 miles.

(ii.) Parcel Rates. In all the States parcels may be transmitted by passenger train upon payment of the prescribed rates, which are based upon weight and distance carried. The rates vary slightly in the different States. In New South Wales they range from threepence for a parcel not exceeding 3 lbs. for any distance up to 25 miles, to twelve shillings and fivepence for a parcel weighing from 85 lbs. to 112 lbs., for a distance of 500 miles. In Victoria the charge for a parcel weighing from 84 lbs. to 112 lbs. for a distance of distance over 450 miles is twelve shillings and fivepence. The rate in Queensland for a parcel weighing from 85 to 112 lbs. for 500 miles is thirteen shillings; in South Australia for 550 miles thirteen shillings and sixpence; in Western Australia for 500 miles fourteen shillings; and in Tasmania for a distance of 250 miles the rate is five shillings and sixpence.

(iii.) Goods Rates. The rates charged for the conveyance of goods and merchandise may generally be divided into three classes, viz.:—(a) Mileage rates, (b) District or "development" rates, and (c) Commodity rates. In each of the States there is a number—ranging from 8 in Victoria to 15 in Tasmania—of different classes of freight. Most of the mileage rates are based upon a tapering principle, *i.e.*, a lower charge per ton-mile is made for a long haul than for a short haul; but for some classes of freight there is a fixed rate per mile irrespective of distance. District rates are charged between specified stations and are somewhat lower than the mileage rates. In addition to the ordinary classification of freights under class (a), certain commodities, such as wool, grain, agricultural produce, and crude ores, are given under class (c) special rates, lower than the mileage rates.

Space will not permit of exhibiting a complete analysis of goods rates in the several States. As an indication of the range and amount of such rates the subjoined tables are given. The first table shews for each State the truck-load rates charged for hauls of different distances in respect of agricultural produce not otherwise specified; these special rates are here given for this class of produce, since it is generally forwarded in truck-loads.

R	ATES	FOR	AGRIC	ULTURAI	L PRODUCE	: IN	TRUCK-LOADS	ON	STATE	RAILWAYS	, 1917.

			Charge per Ton in Truck-loads for a Haul of-									ť		
State.			50 N	files.	100 1	Miles.	200 h	liles.	300 1	Miles.	400 N	liles.	500 I	files.
New South Wales	••••		s. 5	d. 6	s. 8	d. 3	8. 10	đ. 5	s.   11	d. 7	s. 12	d. 6	s. 13	d. 2
Queensland South Australia <sup>1</sup>	•••	•••	4 6	2 10 9	9	8 2 8	12	8 0 3	14 12 18	8 0 10	10 13 23	6 0 5	18 14 28	4 0 0
Western Australia Tasmania	•••		6 7	3 1	8 11	11 8	12 12 12	1 6 ·	17	0	22		24	ŏ
Average Average per ton-mile		 d.	6 1	1 .46	9 1	6 .14	12 0.	2 73	14 0	10 .59	17 0.	6 52	19 0.	6 47

1. Wheat is carried at a lower rate than that specified above for agricultural produce.

The next table shews for each State the ordinary mileage rates charged per ton for hauls of different distances in respect of (a) the highest-class freight, and (b) the lowest-class freight :—

# ORDINARY GOODS MILEAGE RATES ON STATE RAILWAYS, 1917.

	Charge per Ton for a Haul of-									
State.		50 Miles.	100 Miles.	200 Miles.	300 Miles.	400 Miles.	500 Miles.			
	н	IGHEST-C	LASS FE	EIGHT.		·	·,			
New South Wales Victoria Queensland South Australia Western Australia Tasmania		s. d. 27 10 24 9 44 2 29 10 41 1 33 9	s. d. 54 4 48 9 80 7 57 4 71 1 54 0	s. d. 94 8 92 0 145 2 107 9 125 10 100 0	s. · d. 119 11 125 9 <sup>1</sup> 209 9 148 1 171 9 	s. d. 130 0 154 9 1242 0 183 4 209 4 	s. d. 140 1 183 6 <sup>1</sup> 255 7 213 7 240 8 			
Average Average per ton-mile	 d.	33 8 8.08	61 1 7.32	110 11 6.65	155 1 6.20	189 11 5.52	206 8 4.96			
	L	OWEST-C	LASS FR	EIGHT.						
New South Wales Victoria Queensland South Australia Western Australia Tasmania	· · · · · · · · · · · · · · · · · · ·	s. d. 4 0 3 2 4 10 3 8 5 0 2 10	s. d. 5 2 4 8 9 2 6 11 8 4 5 7	s.     d.       6     0       7     0       15     9       11     0       14     2       8     6	s. d.       7     9       9     4       20     1       12     4       19     2	s. d. 9 10 10 2 24 6 14 0 23 4 	s. d. 11 11 11 2 28 10 15 8 27 6 			
Average Average per ton-mile	 d.	3 11 0.94	6 8 0.80	10 5 0.62	13 9 0.55	16 4 0.49	19 0 0.46			

1. Maximum freight on highest class goods to Western stations is 200 shillings per ton.

The classification of commodities varies in the several States. Generally, the highestclass freight includes expensive, bulky, or fragile articles, while the lowest-class comprises many ordinary articles of merchandise, such as are particularly identified or connected with the primary industries of each State.

In New South Wales, for example, the highest-class freight comprises such articles as boots, drapery, drugs, groceries, furniture, liquors, crockery and glassware, cutlery, ironmongery, confectionery, and carpets. In the same State the lowest-class freight includes agricultural produce, ores, manures, coal, coke, shale, firewood, limestone, stone, slates, bricks, screenings, rabbit-proof netting, timber in logs, and posts and rails.

18. Numbers and Description of Rolling Stock, 1916-17.—The following table shews the rolling stock in use on the State Government railways in each State, classified according to gauge:—

_								
STATE.			5 ft. 3 in.	4ft. 81 in.	3 ft. 6 in.	2 ft. 6 in.	2 ft. 0 in.	Total.
			Loco	OMOTIVE	s			
New South Wales Victoria Queensland South Australia Western Australia Tasmania	···· ···· ····	···· ···· ····	<sup>1795</sup> <sup>3244</sup> 	1,275   	 *657 *241 424 73	   	    7	1,275 812 661 485 424 80
Total	•••	•••	1,039	1,275	1,395	17	11	3,737
		]	PASSENG	ER VEH	ICLES.	I	· <u>·</u>	
New South Wales Victoria Queensland South Australia Western Australia Tasmania	•••• •••• ••••	···· ··· ···	 1,570  364 	1,624   	 758 137 378 167	 34  	·    6	1,624 1,604 763 501 378 173
Total			1,934	1,624	1,440	34	11	5,043
	VE	HICL	ES, OTH	ER THAN	PASSEN	GER.	I	<u> </u>
New South Wales Victoria Queensland South Australia Western Australia Tasmania	···· ···· ···	  	19,905  4,082  	22,373	 13,916 5,505 10,081 1,721	 252   	 119  77	22,873 20,157 14,035 9,587 10,081 1,798
Total	•••	•••	23,987	22,373	31,223	252	196	78,031

# ROLLING STOCK ON STATE GOVERNMENT RAILWAYS IN EACH STATE, CLASSIFIED ACCORDING TO GAUGE, 1916-17.

1. Including three motor coaches, one steam and two gasoline. 2. Including one gasoline motor coach. 3. Including seven rail and two road motors. 4. Including three motor coaches, two steam and one gasoline.

19. Number of Railway Employees.—The following table shews the number of employees in the Railway Departments of each State in the year 1901 and in each year from 1912 to 1917 inclusive, classified according to (a) salaried staff, and (b) wages staff.

From these figures it will be seen that there has been a steady increase in the number of persons engaged in the Railway Departments of the several States. During the period from 1901 to 1917, the total has increased from 42,270 to 86,860—an increase of 44,590, or over 105 per cent. The largest numerical increase for the individual States was that of New South Wales, viz., 22,197. It will be observed, however, that the numbers of employes in 1916-17 were less in all the States, excepting Queensland, than they were in the previous year, the difference amounting to 6716.

Separate returns for salaried and wages staff are not available for South Australia prior to 1916-17; the number of salaried staff is therefore included in the wages staff.

STATE	RAILWAYS	-NUMBER OF	EMPLOYEES	IN	RAILWAY	DEPARTMENTS,
		1901	and 1912-17.			

		1900-1.		1912-13.		1913-14.		1914-15.		1915-16.		1916-17.	
State.		Salaried Staff.	Wages Staff.	Salaried Staff.	Wages Staff.	Salaried Staff.	Wages Staff.	Salaried Staff.	Wages Staff.	Salaried Staff.	Wages Staff.	Salaried Staff.	Wages Staff.
New South Wales Victoria Queensland South Australia <sup>2</sup> Western Australia Tasmania		1,372 1,432 994  876 178	1 11,747 10,524 4,633 3,855 5,407 1,252	3,180 2,471 2,136  1,016 204	28,566 21,115 8,114 8,754 6,734 1,131	3,422 2,598 2,301  1,079 224	31,810 22,169 8,502 8,995 6,913 1,180	3,649 2,661 2,403  1,054 218	33,096 24,314 8,286 10,182 7,093 1,277	4,148 2,428 2,889  1,011 222	34,634 20,500 9,877 10,460 6,204 1,203	4,590 2,344 3,024 1,057 961 233	30,726 17,126 10,784 9,241 5,623 1,151
All States		4,852	37,418	9,007	74,414	9,624	79,569	9,985	84,248	10,698	82,878	12,209	74,651

1. Exclusive of gate-keepers with free house only. 2. Prior to 1916-17, separate returns for salaried and wages staffs are not available; the number of salaried staff in the earlier years is included with the wages staff.

20. Accidents.—Number of Killed and Injured.—The subjoined table gives particulars of the number of persons killed and injured through train accidents and the movement of rolling stock on the Government railways in each State for the year 1900-1, and for each of the years 1912-13 to 1916-17 inclusive:—

				1901	anu	1314	-17.			-			
		190	0-1.	191	2-13.	191	3-14.	191	4-15.	191	5-16.	1916	5-17.
State.		Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
New South Wales Victoria Queensland South Australia Western Australia Tasmania	  	1 45 13 8 25 1	1 371 100 50 2205 8	84 36 27 18 15 	582 723 349 224 139 43	$112 \\ 45 \\ 32 \\ 19 \\ 25 \\ 1$	570 473 454 202 154 42	78 48 30 20 14 	645 409 102 172 131 39	87 54 26 14 18 10	710 360 181 193 131 89	63 32 30 11 20 1	572 465 280 247 106 4
All States	••••	•••		180	2,060	234	1,895	190	1,498	209	1,664	157	1,674

STATE RAILWAYS.—NUMBER OF PERSONS KILLED AND INJURED, 1901 and 1912-17.

1. Not available. 2. Including all accidents which occurred on railway premises as well as those caused through train accidents and movement of rolling stock.

#### (D) Graphical Representation of Government Railway Development.

1. General.—Its railways are so important a factor in the development of Australia that it has been deemed desirable to graphically represent the main facts of their progress from 1860 onwards. To this end the graphs shewn on pages 654 to 656 have been prepared. The distribution of the railways is shewn on the map on page 653.

2. Capital Cost and Mileage Open (page 654).—The graph shews that the ratio between these elements was, naturally enough, very variable from 1860 to 1870, consequent upon progressive decrease in cost of construction. It then became subject to a more regular change, implying reduction of average cost, though in recent years a slight increase has been in evidence.

3. Cost per Mile Open.—The fluctuations in cost per mile open from 1860 are clearly indicated by the graph on page 654. In 1855 the cost per mile open was no less than £28,430; by 1858 it had fallen to £17,752, when it rose again to a maximum of £35,958 in 1862. It then diminished rapidly till 1885—when it reached £10,074 per mile—rose to £10,244 in 1886, then fell slowly till 1888, when it amounted to £10,092 per mile. Again rising, this rate attained to £10,481 in 1892, since when it has, on the whole, been declining, reaching its lowest value, £9465, in 1911. In 1912, 1913, and 1914 it rose to £9544, £9665, and £9820 respectively, but fell in 1915 to £9632. In 1916 it rose to £9895, and in 1917 was £9901.

4. Gross Revenue.—This graph (page 654) exhibits considerable irregularities, the most striking of which are the maxima at 1892, 1902, 1914 and 1916. The fall commencing in 1892 was in consequence partly of the commercial crisis and partly of the then droughty conditions of several of the States, while that of 1902-3 was due to drought. In the latter case the recovery was very rapid, and there has been a continuous rise up to the year 1914. In 1915, there was a fall amounting to £1,016,421. In 1916, the increase over 1915 was £1,260,646, while in 1917 there was an increase of £813,479 over the previous year.

5. Working Expenses.—In this case the graph (page 654) has the same characteristics as those of gross revenue. It should be noted, however, that working expenses have been increasing during the last three years at a greater rate than gross revenue, owing to increases in wages and the higher cost of materials.

6. Net Revenue.—This graph (page 654) shews a fairly constant rate of increase up to 1900. Thence to 1903 there was a continuous fall, which was followed by a rapid rise to 1907. In 1911 and 1914 there were maxima, followed by a fall in 1915 and a rise in 1916. In 1917 there was a slight fall.

7. Percentage of Working Expenses on Gross Revenue.—This is shewn for each State and for the Commonwealth, from the year 1855, on page 655. The curve for the Commonwealth shews considerable fluctuations, but points also to the fact that, although a slight rise occurred in 1908, there was from 1903 to 1907 a rapid, and therefore very satisfactory, decline in the percentage of working expenses to gross revenue; since 1907, however, there has been a steady increase up to 1915. In 1916 the percentage slightly declined, but rose again in 1917. In the case of the individual States it will be seen that the curves shew considerable fluctuations, particularly in the early years of the period under review.

8. Percentage of Net Revenue on Capital Cost.—For the Commonwealth and States, from the year 1855, this graph is shewn on page 656. After exhibiting somewhat remarkable oscillations in the earlier years, and less marked ones between 1885 and 1900, and also a rapid fall to 1903, the curve for the Commonwealth from that year shews a well-marked increase until the year 1908, a slight fall occurring in that year and in 1909. Maxima were reached in 1865, 1877, 1881, 1907, and 1911—viz., 3.44, 3.71, 4.12, 4.37 and 4.46 per cent. Since 1911 there has been, with one exception in 1914, a continuous fall.

For the individual States the results are in general very satisfactory up to 1911. The greatest maximum percentage attained by each of the States in any year during the period under review is as follows:—New South Wales 5.31 in 1881, Victoria 4.18, Queensland 4.51, and South Australia 6.47 in 1911, Western Australia 11.48 in 1896, and Tasmania 2.49 in 1913. Since 1911 (1913 in the case of Tasmania) the States have shewn varying and declining rates. The effect of the drought of 1915 is discernible, also the rise of wages and higher cost of materials, to which allusion has already been made.

The remarkable maximum for Western Australia in 1896 is consequent upon the large use made of the railways at the time of the development of the Western Australian goldfields.

9. General Indications of Graphs.—Reviewing the cost of railways, as a whole, it may be noted that at the undermentioned dates the average cost per mile open was as follows :—

STATE RAILWAYS .--- AVERAGE COST PER MILE OF LINE OPEN, 1857 to 1917.

COMMONWEALTH.

Date	1857.	1867.	1877.	1887.	1897.	1907.	1917.
Cost per mile	£	£	£	£	£	£	£
	18,462	21,775	13,244	10,106	9,818	9,620	9,901

While the sinister influence of the drought of 1902 is strikingly shewn in the curves. (a) by the fall in the gross and net revenue in 1902-3, (b) by the fall in the percentage of net revenue on capital cost, and (c) by the increase of working expenses on gross. revenue, the rapidity of recovery is even more striking, and goes to indicate the great elasticity of the economic condition of the Commonwealth. Although the percentage of net revenue on capital cost during the year 1916-17 has been exceeded in previous years, nevertheless it is satisfactory that the State Government railways, necessarily constructed largely in accordance with a policy of widespread development of Australia's resources rather than as mere commercial enterprises, and costing so large a sum as  $\pounds 204, 202, 437$ for construction and equipment up to the 30th June, 1917, should yield a return of no less than 2.94 per cent. It should be mentioned that the graphs for the Commonwealthinclude the Federal railways.

# (E.)-Government Railways Generally.

1. Relling Stock.—In the following table particulars of the numbers of the rolling: stock employed on both the Federal and State Government railways are set out, classified according to gauge, as at the 30th June in the years 1901, 1906, 1911, and 1917 respectively, together with the percentage of the numbers for each gauge on the total for the mainland. For geographical reasons the figures for Tasmania are shewn separately from those for the mainland.

	19	01.	. 18	06.	19	11.	1917.	
Gauge.	No.	%	No.	%	No.	1 %	No.	%
Mainland—								
5 ft. 3 in.	692	35.36	663	30.48	705	26.82	1,039	27.99
4,, 82,,	495	25.29	655	30.12	908	34.35	1,317	35.48
<b>3</b> ,, 6,,	765	39.09	850	39.08	1,011	38.45	1,335	35.96
2,, `6,,	5	0.26	7	0.32	10	0.38	17	0.46
2,, 0,,	•••				•••		4	0.11
Total	1,957	100.00	2,175	100.00	2,629	100.00	3,712	100.00
2 ft 6 in	64		69		72		73	
2,, 0,,	7		7		7		7	
Grand total	2,028		2,251		2,708		3,792	

# ROLLING STOCK EMPLOYED ON THE FEDERAL AND STATE RAILWAYS AS AT 30th JUNE, 1901, 1906, 1911, and 1917.

LOCOMOTIVES.

# ROLLING STOCK EMPLOYED ON THE FEDERAL AND STATE RAILWAYS , (Continued).

	190	n.	190	6.	191	1. ·	1917.	
Gauge.	No,	%	No.	%	No.	%	No.	%
Mainland—								
5 ft. 3 in.	1,358	49.58	1,438	47.59	1,597	42.41	1,934	39.39
4,, 8 <u>1</u> ,	610	22:27	713	23.59	1,136	30.16	1,660	33.81
3,, 6,,	761	27.78	859	28.42	1,012	26.87	1,277	26.01
2,, 6,,	10	0.37	12	0.40	21	0.56	34	0.69
2,,0,,	•••				•••		5	0.10
Total Tasmania—	2,739	100.00	3,022	100.00	3,766	100.00	4,910	100.00
3 ft. 6 in.	163	I	176		170		167	1
2 ,, 0 ,,	8		6		6		6	
Grand total	2,910	••••	8,204		3,942		5,083	

# PASSENGER VEHICLES.

# . VEHICLES, OTHER THAN PASSENGER.

	190	)1.	190	)6.	191	1.	1917.	
Gauge.	No.	%	No.	%	No.	%	No.	%
Mainland—- 5 ft. 3 in. 4 ,, 81 ,,	12,209 11,540	31.06 29.35	13,282 13,010	29.90 29.29	15.451 17,112	27.82 30.81	<b>23</b> ,987 23,099	31.03 29.88
$ \begin{array}{ccccccccccccccccccccccccccccccccccc$	15,481 82 	39.38 0.21 	18,026 99 	40.59 0.22 	22,793 190 	41.0 <b>3</b> 0.34 	29,849 252 119	38.61 0.33 0.15
Total	<b>3</b> 9,312	100.00	44,417	100.00	55,546	100.00	77,306	100.00
3 ft. 6 in. 2 ,, 0 ,,	1,389 50	····	1,525 61	 	1,618 71	 	1,721 77	····
Grand total	40,751		46,003		57,235		79,104	

In the sixteen years under review the percentages of the numbers of locomotives for each gauge on the total number of locomotives on all Government railways on the

mainland have undergone the following changes: on the 5-ft. 3-in. gauge the percentage has fallen by 7.37 per cent., the 4-ft.  $8\frac{1}{2}$ -in. gauge increased by 10.19, and the 3-ft. 6-in. gauge fallen by 3.13 per cent.

As regards passenger vehicles the alterations are as follow: on the 5-ft. 3-in. gauge the percentage has fallen by 10.19 per cent., the 4-ft.  $8\frac{1}{2}$ -in. gauge increased by 11.54 and the 3-ft. 6-in. gauge fallen by 1.77 per cent.

In the case of vehicles other than passenger the changes have been small, the 5-ft. 3-in. gauge percentage having fallen 0.03, the 4-ft.  $8\frac{1}{2}$ -in. gauge risen by 0.53 and the 3-ft. 6-in. gauge fallen by 0.77 per cent.

2. Railway Mileage Open for Traffic.—The Government railway mileages open for traffic, classified according to gauge, as at the 30th June in each of the years 1901, 1906, 1911, and 1917, are set out in the following table, which gives as well the percentages of each mileage on the total on the mainland, the figures for Tasmania being shewn separately, as in the case of the preceding table relating to rolling stock:—

# RAILWAY (ROUTE) MILEAGE OF THE STATE AND FEDERAL RAILWAYS, CLASSIFIED ACCORDING TO GAUGE, AS AT 30th JUNE, IN EACH OF THE YEARS 1901, 1906, 1911, and 1917, WITH PERCENTAGES ON TOTAL FOR MAINLAND.

	Gauge.		190	)1.	190	)6.	191	, 1.	1917.	
Ga	uge.		Miles.	%	Miles.	%	Miles.	%	Miles.	% .
Mainlan	d—							•		
5 ft	. 3	in.	3,696	30.49	3,849	28.67	4.023	25.77	5,011.81	23.80
4.	8	i., 1	2,806	23.15	3,350	24.96	3,721	23.84	5,360.13	25.45
3,	6	,,	5,571	45.96	6,172	45.98	7,742	49.61	10,536.74	50.03
2 ,	6	,,	48	0.40	53	0.39	122	0.78	121.90	0.58
2,,	0	"	•••						29.35	0.14
T	otal		12,121	100.00	13.424	100.00	15, <b>60</b> 81	100.00	21,059.93	100.00
Tasmani	a			ļ					1	
3 ft	. 6	in.	439	1	440		449		558.08	•••
2,,	0	"	19		23		23 <del>]</del>	•••	23.57	•••
G	rand	total	12,579		13,887		16,081		21,641.58	••••

From the above table it will be seen that in the sixteen years from 1901 to 1917 the 5-ft. 3-in. gauge percentage has fallen by 6.69 per cent., the 4-ft. 8-in. gauge increased by 2.30 per cent., and the 3-ft. 6-in. gauge increased by 4.07 per cent.

3. Summary of Working of Federal and State Government Railways.—In the following table a summary is given of the working of all Government railways, both Federal and State, for the year ended 30th June, 1917, fuller particulars of which have been given in the sections B and C of this chapter :—

Particulars.			Federal Railways.	State Railways.	Total for Com monwealth.
Total mileage open		Miles	1.640.66	20,000.92	21,641.58
Average miles open during the year			1.535	19.624.00	21.159.00
Total train mileage		"	914.241	56.363.153	57.277.394
Total cost of construction of lines open		ӣ	10.077.545	204,202,437	214,279,982
Cost per mile		Ĩ	6.141	10.210	9.901
Gross revenue		£	386,466	22.656.187	23.042.653
Working expenses		Ē	434 265	16.657.981	17.092.246
Percentage of working expenses on g	r088	~	202,200		
revenue		%	112.97	73.53	74.18
Net revenue		ر ب	- 47 799	5 998 206	5.950.407
Interest navable (exclusive of Tr	 1 n g .	~	11,100	0,000,200	0,000,101
Australian and Federal Territory li	nes)	£	131 615	7 865 153	7.996.768
Number of passenger journeys	405)	Nõ	119 779	267 434 747	1267 448 519
Toppage of goods and live stock carried	•••	Ton	1617 965	97 354 568	197 971 939
Number of employees at 90th June 101	7	TOU	011,000	21,001,000	1,011,000
Galaxiad	-	Mo	179	10 000	10 990
Magaa	•••	110.	9140	74 651	77 702
Wages		**	0,142	/4,001	11,155
Number of persons kined and injured du	ring			{	1
the year through train accidents	ana			ļ	1
movement of rolling stock-				150	100
Killed	•••	**		157	158
Injured	•••	,,	43	1,674	1 1,717

# SUMMARY OF THE WORKING OF THE FEDERAL AND STATE GOVERNMENT RAILWAYS FOR THE YEAR ENDED 30th JUNE, 1917.

1. Exclusive of Oodnadatta line.

4. Government Railway Facilities.— On page 660 ante the population per mile of line open for general traffic is given in respect of the States' railways for each State. In the following table is given the mileage of all Government railways, State and Federal, in each State and Territory, per 1000 of population :—

# MILEAGE OF ALL GOVERNMENT RAILWAYS. STATE AND FEDERAL, PER 1000 OF POPULATION IN EACH STATE AND TERRITORY AS AT 30th JUNE, 1917.

	Population	Length	Mileage per		
State or Territory.	1917.	State.	Federal.	Total.	1000 of Population.
		Miles.	Miles.	Miles.	Miles.
New South Wales	1,868,586	4,437.08		4,437.08	2.37
Victoria	1,402,650	4,122.64	·	4,122.64	2.94
Queensland	681,302	5,213.79		5,213.79	7.65
South Australia	429,890	2,220.66	982.16	3,202.82	7.45
Western Australia	308,530	3,425.10	454.00	3,879.10	12.57
Tasmania	197,337	581.65		581.65	2.95
Northern Territory	5,043		199.56	199.56	39.57
Federal Territory	2,556		4.94	4.94	1.93
Commonwealth	4,895,894	20,000.92	1,640.66	21,641.58	4.42

# (F.)—Private Railways.

1. Total Mileage Open, 1916-17.—As has been stated in a previous part of this Section (see A. 8) a number of private railway lines have from time to time been constructed in the Commonwealth. By far the greater proportion of such lines, however, has been laid down for the purpose of hauling timber, sugar cane, coal, or other minerals, and is not generally used for the conveyance of passengers or for public traffic; in many cases the lines are often practically unballasted and are easily removable, running through bush and forest country in connection with the timber and sugar-milling industries, and for conveying firewood for mining purposes. Many of these lines may perhaps be said to be rather of the nature of tramways than of railways. Private railways referred to herein include (a) lines open to the public for general passenger and goods traffic; and (b) branch lines from Government railways and other lines which are used for special purposes and which are of a permanent description. Other lines are referred to in the part of this Section dealing with Tramways (see § 3, *Tramways*).

The following table gives particulars of private railways in the Commonwealth open for traffic during 1916-17. A classification of these lines according to their gauge has already been given (see page 661).

Particulars.	Ń.S.W.	Victoria.	Q'land.	S.A.	W.A.	Tas.	C'wealth.
For general traffic For special purposes	Miles. 183.08 161.65	Miles. 24.94 28.83	Miles. 529.62 958.91	Miles.  39.00	Miles. 277.00 722.31	Miles. 162.19 39.80	Miles. 1,176.83 1,950.50
Total	344.73	53.77	1,488.53	39.00	999.31	201.99	3,127.33

MILEAGE OF PRIVATE RAILWAYS OPEN, 1916-17.

2. Classification of Private Railways.—The subjoined statement gives particulars regarding private railways, so far as returns are available, in each State for the year 1916-17. In this statement the lines inset are sub-branches from the main branches specified.

CLASSIFICATION OF PRIVATE RAILWAYS IN AUSTRALIA, 1916-17.

NEW SOUTH WALES.

·	L	ength a	nd Gaug	Nature of Traffic	
Railway Lines.	5 ft.3 in.	4ft.85in	3 ft.6 in.	2ft-0in.	Carried, etc.
	Miles.	Miles.	Miles.	Miles.	
RLVS.—			1		
Two Branch lines		1.50			Goods
One Branch line (Carlingford line)	· · · · ·	0-98		•••	
Total		2.48			
SOUTH-COAST LINE, N.S.W. GOVT					
Bulli Coal Co		2.64			Coal
Bellambi Coal Co		3.06			
South Bulli Coal Co		2.88			
Corrimal-Balgownie Colliery	.)	1.07	1	1	
Mount Keira Colliery		1.65			**
Mount Kembla Coal Co		7.43			
Hoskin's Wongawilli Colliery		8.89			
Mount Pleasant Colliery	• • • •	1	3.50		**
Two other branches		1.27	•••		**
Total		92.89	3.50		

ŧ

		L	ength a	nd Gaug	e.	Nature of Traffic	
Railway Lines.	•		5ft.3in.	4ft.8 <sup>1</sup> / <sub>2</sub> in.	3ft.6in.	2 <b>ft</b> .0in.	Carried, etc.
SOUTHERN LINE, N.S.W. G	Jovr. R	LYS.—					<b>D</b>
Goondah-Burrinjuck <sup>1</sup>		 		0.82		26.25	General
Total				0.82		26.25	
WESTERN LINE, N.S.W. G Prospect Gravel Co., two Commonwealth Oil Corn	ovr. RL	YS.— les		4.54			Metal
from Newnes Junctio	on			33.00			General
Two branches at Eskbar	at Eski nk	oank		1.85			Goods
Two Colliery branches a	t Lithg	ow		1.25			Coal
Cadia branch			•••	10.79			Ore and goods
Commonwealth Portle	ronuale	ement		0.47			Coal
Co.'s branch lines				5.00			Goods
Branch Colliery line at	Cullen I	Bullen		1.40			Coal
Two branch lines to Min				2.70			Ure
Total	• •••		·	62.04	••:		
Northern Line, Sydn: CASTLE, N.S.W. Goy: Seven branch Colliery lin Teralba, Cockle Cree send Junction and A West Wallsend and Seal	EY TO r. RLYS. nes,Fass k, South damsto ham Co	NEW sifern, Wall- wn		7.60			Coal
Branch line				2.41	1		Coal
Redhead Railway, Adam	istown (	to Bel-	·				a
mont Four branch lines	•••			9.09			General
Branch lines at Teralba	and Su	lphide		2.31			<b>.</b> .
Junction				2.64			Gravel, coal and ore
Total		•••		30.40			
a. Northern Line, Ne Murrurundi, N. Riys.—	WCASTL S.W.	E TO Govt.					
Newcastle Coal Mining	Co			2.82	<b>.</b>		Coal
Old Burwood Colliery		•••		6.35			
Lambton Colliery	•••	•••		2.18			
Waratah Coal Co	•			4.55			
Newcastle Wallsend Cos	al Co.	,		4.56			<b>.</b>
Two Dranch lines	•••			1.89		•••	Goods
Hexham-Minmi		•••		6.08			General
Five branch lines		•••		16.94	1		Coal
Achton Fields Colliery							
Fast Grote Bly Fast G	rate In	nation		3.67			
East Greta Rly., East G to Stanford Merthyr	reta Ju	nction		3.67 7.32			General
East Greta Rly., East G to Stanford Merthyr Two branch lines	reta Ju	nction		3.67 7.32 1.74			General Coal
East Greta Rly., East G to Stanford Merthyr Two branch lines Aberdare Rly., Aderdar	e Junct	nction	  	3.67 7.32 1.74			General Coal
East Greta Riy., East G to Stanford Merthyr Two branch lines Aberdare Rly., Aderdar Cessnock Twelve branch lines	e Junct	nction	· ···	3.67 7.32 1.74 12.08 94.14	····		General Coal General Coal
East Greta Riv., East G to Stanford Merthyr Two branch lines Aberdare Riv., Aderdar Cessnock Twelve branch lines Rutherford Racecburse	e Junct	nction	· ···	3.67 7.32 1.74 12.08 24.14 0.87		···· ···· ···	General Coal General Coal -Racecourse traffic
Ashton Frida Controly East Greia Rly., East G to Stanford Merthyr Two branch lines Aberdare Rly., Aderdar Cessnock Twelve branch lines Rutherford Racecburse Six branch lines at Gre Rix's Creek, Rosedal	e Junct  ta—Bra le Sidin	nction ion to nxton, g, and	· · · · · · · · · · · · · · · · · · ·	3.67 7.32 1.74 12.08 24.14 0.87		···· ···· ····	General Coal General Coal -Racecourse traffic
Aberdare Rly., East G to Stanford Merthyr Two branch lines Aberdare Rly., Aderdare Cessnock Twelve branch lines Rutherford Racecburse Six branch lines at Gre Rix's Creek, Rosedal Nundah	e Junct ta—Bra le Sidin	nction , sion to  nxton g, and	· · · · · · · · · · · · · · · · · · ·	3.67 7.32 1.74 12.08 24.14 0.87 5.21	····	···· ··· ···	General Coal General Coal -Racecourse traffic Coal
East Greis Riy., East G to Stanford Merthyr Two branch lines Aberdare Riy., Aderdar Cessnock Twelve branch lines Rutherford Racecburse Six branch lines at Gre Rix's Creek, Rosedal Nundah Branch line at Temple (	ta—Bra le Sidin Court	nction sion to nxton g. and	· · · · · · · · · · · · · · · · · · ·	3.67 7.32 1.74 12.08 24.14 0.87 5.21 0.66		····	General Coal General Coal -Racecourse traffic Coal Goods
East Greis Riy., East G to Stanford Merthyr Two branch lines Aberdare Riy., Aderdar Cessnock Twelve branch lines Rutherford Racceburse Six branch lines at Gre Rix's Creek, Rosedal Nundah Branch line at Temple ( Three branch Colliery II Curlewis and Gunne	ta—Bra le Sidin Court ines at	nction ion to mxton g, and Wilga,		3.67 7.32 1.74 12.08 24.14 0.87 5.21 0.66 7.29	····		General Coal General Coal -Racecourse traffic Coal Goods Coal
East Greis Ry., East G to Stanford Merthyr Two branch lines Aberdare Rly., Aderdar Cessnock Twelve branch lines Rutherford Racecburse Six branch lines at Gre Rix's Creek, Roseda Nundah Branch line at Temple C Three branch Colliery li Curlewis and Gunne Total	ta-Bra le Sidin Court ines at idah	nction sion to mxton g, and Wilga.		3.67 7.32 1.74 12.08 24.14 0.87 5.21 0.66 7.29 115.75	···· ··· ··· ··· ··· ··· ··· ··· ··· ·	····	General Coal General Coal -Racecourse traffic Coal Goods Coal
East Greis Riy., East G to Stanford Mertbyr Two branch lines Aberdare Riy., Aderdar Cessnock Rutherford Racecoburse Six branch lines at Gre Rix's Creek, Rosedal Nundah Branch line at Temple ( Three branch Colliery II Curlewis and Gunne Total	te Junct re Junct ta-Bra le Sidin Court ines at idah	nction , sion to  nxton g, and  Wilga, 		3.67 7.32 1.74 12.08 24.14 0.87 5.21 0.66 7.29 115.75			General Coal General Coal -Racecourse traffic Coal Goods Coal
East Greis Ry., East G to Stanford Merthyr Two branch lines Aberdare Rly., Aderdar Cessnock Twelve branch lines Rutherford Racecburse Six branch lines at Gree Rix's Creek, Rosedal Nundah Branch line at Temple G Three branch Colliery II Curlewis and Gunne Total SILVERTON TRAMWAY- Broken Hill and Corthy	reta Ju re Junct  ta—Bra le Sidin Court ines at adah 	nction , sion to  nxton g, and  Wilga, 		3.67 7.32 1.74 12.08 24.14 0.87 5.91 0.66 7.29 115.75	···· ···· ··· ··· ··· ···	· · · · · · · · · · · · · · · · · · ·	General Coal General Coal -Racecourse traffic Coal Goods Coal
East Greia Ry., East G to Stanford Merthyr Two branch lines	reta Ju re Junct ta—Bra le Sidin Court ines at odah  irn	nction , sion to  nxton g, and  Wilga 	45.00	3.67 7.32 1.74 12.08 24.14 0.87 5.91 0.66 7.29 115.75	···· ···· ··· ··· ··· ··· ··· ··· ···		General Coal General Coal Racecourse traffic Coal Goods Coal General
East Greia Ry., East G to Stanford Merthyr Two branch lines	reta Ju re Junct ta—Bra le Sidin Court ines at adah  Irn	nction , sion to  nxton g, and  Wilga 	···· ···· ···· ··· ··· ··· ··· ··· ···	3.67 7.32 1.74 12.08 24.14 0.87 5.21 0.66 7.29 115.75	···· ···· ··· ··· ··· ··· ··· ··· ···		General Coal General Coal -Racecourse traffic Coal Goods Coal General 

# CLASSIFICATION OF PRIVATE RAILWAYS IN AUSTRALIA, 1916-17 (Continued). NEW SOUTH WALES (Continued).

1. Owned and worked by the Public Works Department.

# CLASSIFICATION OF PRIVATE RAILWAYS IN AUSTRALIA, 1916-17 (Continued). VICTORIA.

Railway Lines.			Lengt Gai	b and uge.	Nature of Eroffe		
			5ft. 3in.	3ft. Oin.	Carried, etc.		
			Miles.	Miles.			
KERANG TO KOONDROOK TRAMWAY Altona Bay Railway—			13.94		General		
Williamstown Racecourse and pit at	Altona		2.83		General		
MCIVOR TIMBER AND FIREWOOD Co., 7	TOOBORA	c	26.00		Firewood		
YARRA JUNCTION to POWELLTOWN		• •••		11.00	General		
			I				
Total for State, 53.77 miles.	Total		42.77	11.00			

# QUEENSLAND.

Deilmen Lines	Leng	th and G	auge.	Nature of Traffic
Rallway Lines.	3 ft. 6 in.	2 ft. 6 in.	2 ft. 0 in.	Carried, etc.
BRANCHES FROM GOVERNMENT RAILWAYS-	Miles.	Miles.	Miles.	
1. SOUTH-COAST LINE-			1	
Beaudesert Tramway to Rathdowney and	lj		•	
Tabooba Junction to Lamington	.  33.00	•••		General
Nerang Central Mill			11.00	Sugar
Blue Metal Co	2.46			Mineral
Laney's Ltd. from Canungra	14.50	•••		Timber
Belmont Shire Council	4.39			General
Australian Meat Export Co	1.64	•••		Live stock & meat
A MARY LINE	0.28			building mat rials
2. MAIN LINE Mount Creaby Water Supply (Tiucli)	= 00			Water Concerns
Fifteen Colliery Brenches	19 10		•••	Coal Conserva-
Three Timber Branches	3 74		•••	Timber
Redbank Freezing Works	0.15			Most
Marburg Sugar Mill	1.04		0.50	Sugar
Five Branch Lines	1.95		0.00	Various
3. SOUTHERN LINE AND BRANCHES-				, di lo de
Tannymorel Colliery	3.50			Coal
Queensland Cement and Lime Co	3.90			Limestone
4. WESTERN LINE AND BRANCHES-				
Three Colliery Branches	1.44			Coal [produce
Munro's Tramway to Perseverance		10.00		Timber and farm-
Pechey's Siding	0.25			Timber
5. NORTH-COAST LINE-			•	
Buderim Tramway		7.00	•••	General
Mapleton Tramway			15.00	.,
Moreton Central Sugar Mill			12.00	- "
Mount Bauple Sugar Mill	9.44	•••	8.00	Sugar
Maryborough Sugar Factory	0.31	•••		- " ,
Walkers' Limited	0.61			Ironwork
Harbours and Rivers Dept. (Urangan)	0.70	•••		Building mat rials
Goodwood Sugar Mill	i ar		2.31	Sugar
Millaquin Sugar Mill and Rennery	2.20		9.00	0.0
woongarra Tramway	13.19		10.37	Sugar
Quinaba Sugar Mill			14.00	Sugar
Jooldi Sugar Mill	0.07		14.50	"
Childers Sugar Mill	2.31		33.75	,,
Waterview Plantation	1 1 05		00-10	,,
Miara Sugar Mill	1.00		0.50	
Fairymead Sugar Mill	7.17		2.40	
Avondale Sugar Mill	3.39			
Invicta Sugar Mill	8.70		14.50	General and sugar
Bingera Sugar Mill	8.50		26.50	Sugar
Gin Gin Sugar Mill			22.56	-
Three Colliery Lines	3.39			Coal
Ten Branch Lines	3.74			Various
6. CENTRAL LINE AND BRANCHES-				
Mount Morgan G.M. Co. (three branches)	3.12			Minerals
Four Colliery Branches	2.52			Coal
Aramac Tramway from Barcaldine	41.00			General
Four Branch Lines	2.53			various
Treasury Department	1.00			DA prosives

# CLASSIFICATION OF PRIVATE BAILWAYS IN AUSTRALIA, 1916-17 (Continued).

	Leng	th and Ga	auge.	Nature of Traffic	
Railway Lines.	3 ft. 6 in.	2 ft. 6 in.	2 ft. 0 in.	Carried, etc.	
7. MACKAY LINE AND BRANCHES-	Miles.	Miles.	Miles.		
Racecourse Central Mill (four branches)	0.90		5.00	Sugar	
Melbourne-Mackay Sugar Co.	0.49		10.00	Sugur	
Pleystowe Central Mill	0.98		35.00	••	
Marian Central Mill	0.50		37.50		
Cattle Creek Central Mill	0.30		5.00		
North Eton Centrel Mill	0.81		21.00		
Homebush Sugar Mill	0.01		21.00	••	
Forloigh Sugar Mill	1		40.00	••	
Diano Grook Control Mill		•••	40.00	**	
Mashaw Hawbawa Baand	0.00		49.00	a	
Mackay Harbour Board	0.80			General	
Bressening from Bowen	20 50			G an ana 1	
Proper pine from Dowen	30-00		50.00	General	
Proserpine Central ann			00.00	Sugar and cane	
9. GREAT NORTHERN NAILWAY-			17.50	a .	
Kalamia Sugar Milli		•••	17.50	Sugar	
Pioneer and inkerman Sugar Mills	38.50		18-50	, Lrais	
Macgregor Tramway to Ballara	22.13	•••		Generaland mine-	
Five Meat Preserving Co.'s Lines	9.07	•••		Meat & live stock	
Ten Mineral Branches	11.54		4.00	Minerals	
Drysdale Brothers	1.02			Meat & live stock	
Townsville Jetty	0.75			General	
Townsville Gas Co	0.54			Coal and coke	
10. CAIRNS LINE AND BRANCHES-					
Hambledon Sugar Mill	1.75		37.50	Sugar	
Mulgrave Central Mill (three lines)	0.39		15.50	etc.	
Babinda Sugar Mill	0.50		27.00	,,	
Chillagoe Bailway	102.73			General	
Stannary Hills Tramway	101-10		21.00	Gonora	
Irvinebank Tramway		1	14.00		
Etheridge Bailway	143.00		1.00		
Three Branch Lines (on ditto)	4 70			Various	
Harbour Board Lines	4.18			Canonal	
11 CERALDON-MOTIPH VAN LINE	0.30			General	
Coondi Sugar Mills			25.05	Smann	
Gouth Johnstone Sugar Mill	•••		25 50	Sugar	
South Johnstone Sugar mill		•••	35.50	r•	
Mourliyan Sugar Mili	•••	•••	21.00	••	
Lines not connected with Govt. Railways-			CO 77		
victoria Sugar Mill (Inguam)		•••	69.75	General and sugar	
Machade Sugar Mill do		•••	52.50	~ " . " "	
Port Douglas to Mossman & Mowbray River		•••	19.00	General	
Mossman Central Mill			24.00	Sugar	
Total for State, 1488.53 miles. Total	585.19	17.00	886.34		

# QUEENSLAND (Continued).

# SOUTH AUSTRALIA.

Railway Lines.			Lengi Ga	h and uge.	Nature of Traffic
			3ft.6in.	2ft. Oin.	
BROREN HILL PROPRIETARY CO.'S LINE— Iron Knob to Hummock's Hill, Spencer's G MARION BAY LINE— Jetty to mine	ulf 		Miles. 34.00 	Miles.  5.00	Carriage of ironstone. Mining products.
Total for State, 39.00 miles	Total	•••	34.00	5.00	

# CLASSIFICATION OF PRIVATE RAILWAYS IN AUSTRALIA, 1916-17 (Continued).

	Railway Lines.	Leng	th and C	lauge.	Nature of Traffic Carried. etc.
_	•	3ft.6 in.	2ft.0in.	1ft.8in.	
1.	MIDLAND RAILWAY- Joining Govt. lines at Midland Junction & Walkaway	Miles. 277.00	Miles.	Miles.	General
2.	W.A. GOLDFIELDS FIREWOOD SUPPLY CO.'S LINE-	102.00			Firewood
3.	KALGOORLIE AND BOULDER FIREWOOD CO.'S LINE-	102.00	•••	•••	111011000
	Goodwood railway, from Lake Side into bush	35.00			**
	Lancefield railway into bush		20.00		
4.	W.A. TIMBER AND FIREWOOD CO. LTD. LINE-				
	into hush	74.00			
5.	SONS OF GWALLA GOLD MINING CO.'S LINE-	11.00	•••		
•••	Railway into bush			27.00	
6.	MURCHISON FIREWOOD CO.'S LINE-				
	Nallan wood railway, from Nallan siding into bush	28.50			••
7.	KARRI TIMBER CO	(	i		
~	W.A. Jarrah Sawmills Line	43.00			Timber
8.	TIMBER CORPORATION CO.'S LINE—	17 50			
a	S WEET THEFT HEWERS' CO.OF SOUTHWE'S LINE.	11.00	•••		
σ.	From Holyoske into hush	18.00			
10	MILLAR'S TIMBER TRADING CO.'S LINES-	, 10.00			
	Upper Darling Range railway, from Pickering Brook				
	, to Canning mills and bush	12.13			
	Jarrahdale and Rockingham railway, from Mundijong				
	to Rockingham and bush	73.00			н
	Yarloop railway to mills and bush	- 54.57		•••	
	Forgueon Biver reilwey, from Dardenun to mills and	40.00			
	into bush	36.09			
	Kirupp saw mills into bush	26.06			
	Marrinup saw mills into bush	8.70			
	Jarrah Woods saw mills into bush	14.85			н
11	. BUNNING BROS. LTD. LINES-				
	Argyle Mill	11.00		•••	"
		16.00	•••	•••	**
	Preston valley	5.50	•••	•••	*
	Wandoo Line Muje	0.20		•••	**
12	NORTH DANDALUP S.M. RAILWAY-	0.00		••••	" <b>,</b>
	To mill and bush	12.00			
13	. SWAN SAW MILL RAILWAY-				
	From Lowden to mill and bush	11.00			м
14	BUCKINGHAM BROS. S.M. RAILWAY-				
10	From Mula to bush	4.50	•••		
15	WILGARRUP KARRI AND JARRAH CO.'S LINE-	0.0*			
16	WEIN OPETE RAILWAY TO BALLA BALLA	0.20	14 00		Copper ore
10	. WHEN UNDER HAILWAT TO DALLIA DALLA		11.00	•••	coppor ore

# WESTERN AUSTRALIA.

TASMANIA.

	Railway Lines.		Lengt Gai	th and uge.	Nature of Traffic		
				3ft. 6in.	2ft. 0in.	Carried, Sec.	
1.	EMU BAY BAILWAY CO.'S LINES-				Miles.	Miles.	
	Burnie to Waratah	•••			47.66		General
	Guildford to Zeehan	•••			49.68	1 1	**
	Rayna to Dundas			••••	5.60		
2.	MOUNT LYELL MINING AND RAILWAY	Co.'s	5 LINES-				
	Regatta Point to Queenstown	•••			21.45		**
	Gormanston to Kelly Basin	•••			27.80		· .,
3.	HUON TIMBER CO.'S LINE				38.05		Timber
4.	ZEEHAN TRAM CO.'S LINE-					1	
	Emu Bay railway to British Queen	•••	•••			1.75	Minerals and occasion-
5.	MAGNET SILVER MINING CO.'S LINES-	_					ally passengers
	Magnet Junction to Magnet	•••	•••			10.00	Minerals and passengers
	Total for State, 201.99 miles		. Total	•••	190.24	11.75	

## SUMMARY OF MILEAGE OF PRIVATE RAILWAYS ACCORDING TO GAUGE, 1916-17.

State			Total for						
15 <b>va</b> 90,	5ft.3in.	4 ft. 81 in.	3 ft. 6 in.	3ft. Oin.	2ft. 6in.	2 ft. 0 in.	lft. 8in.	States.	
		Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
New South Wales		45.00	234.38	39.10			26.25		344.73
Victoria		42.27			11.00				53.77
Queensland	• • •			585.19		17.00	886.34		1,488.58
South Australia	•••			34.00			5.00		39.00
Western Australia			·	938.31			34.00	27.00	999.31
Tasmania				190.24			11.75		201.99
	·								
Total	•••	87.77	234.38	1,786.84	11.00	17.00	963.34	27.00	3,127.33

#### PRIVATE RAILWAYS.

3. New South Wales.—In this State the mileage of private railways open to the public for general traffic at the end of 1916 was 183.08, and of lines used for special purposes, 161.65 miles. Most of these lines were constructed primarily for the purpose of conveying coal from the mines to the Government railway systems. Particulars for the year 1916 of the operations of lines open for general traffic are given, so far as available, in the table on page 712.

(i.) Private Railways Open for General Traffic. The most important of the lines. open for general traffic are as follows :---(a) The Deniliquin-Moama Line. In 1874 permission was granted by the New South Wales Government to the Deniliquin and Moama Railway Company to construct a line forty-five miles long from Deniliquin, in the Riverina district, to Moama, connecting with the Victorian Railway system at the Murray Bridge, near Echuca. The line was opened in 1876, the land required being granted by the Government. (b) The Cockburn-Broken Hill Line. This line is owned by the Silverton Tramway Company. It was opened in 1888, and connects Broken Hill with the South Australian railway system, having a total length of 35.60 miles. (c) East Greta Lines. These lines, belonging to the East Greta Coal Mining Company, run from East Greta Junction, on the Northern line of the Government railways, to Stanford Merthyr, a distance of 7.32 miles, and from Aberdare Junction to Cessnock, 12.08 miles (d) The New Redhead Coal Company's Railway. The lines. -a total of 19.40 miles. owned by this company branch from the Northern line of the Government railways. and run from Adamstown to Burwood Extended Colliery, thence to Belmont, and from Burwood Junction to Dudley Boundary and branches, a total distance of 12.00 miles. The lines are worked by the Railway Department, coal wagons being supplied in part by the coal companies using the line. The colliery companies using the line pay a way-leave for right to run their coal over the line, and the Railway Commissioners. allow the New Redhead Company a proportion of the revenue from the passenger and goods traffic. (e) The Seaham Coal Company's Railway. This line runs from Cockle Creek to West Wallsend and Seaham Collieries, and has a total length of 5.75 miles. (f) Hexham-Minmi Railway. This line branches from the Northern line of the Government railways at Hexham, and has a length of 6.08 miles. (g) The Commonwealth Oil

Corporation's Railway. This line runs from Newnes Junction on the Great Western line of the Government railways to the company's refinery, a distance of 33 miles. The Shay geared type of locomotive is in use on this line. (h) The Warwick Farm Line is a short line, three-quarters of a mile in length, connecting the Government line near Liverpool with the Warwick Farm Racecourse. Government rolling-stock is used. (i) The Goondah-Burrinjuck Line is a line 26.25 miles in length built and worked by the Public Works department in connection with the dam in course of construction at Burrinjuck.

In addition to the lines referred to above, legislative sanction was obtained in 1890 for the construction of a private line from the flux quarries at Tarrawingee to the Broken Hill line, a distance of 40.09 miles. The line was purchased by the Government in 1901, and is operated by the Silverton Tramway Company under lease from the Chief Commissioner, who pays the working expenses and receives the ordinary earnings and onehalf the net receipts on special and holiday traffic. The mileage of this line is included in that of the Government Railways.

4. Victoria.—In Victoria there are two private railways open for general traffic. (a) Kerang-Koondrook tramway, opened in 1889. The cost of construction of this line to the end of September, 1917, was £39,429, paid out of a loan advanced by the Victorian Government. The total length is 13.94 miles. The line is at present controlled by the Kerang Shire Council, but proposals have recently been made for its transfer to the Railway Department. (b) Yarra Junction to Powelltown. This line has a length of 11 miles, and is worked mainly for timber purposes.

A line running from Elsternwick to Oakleigh, a distance of about 5 miles, was constructed by a private company many years ago. It was never in general use, having only an occasional train running over it on special occasions, and has since been partially dismantled.

5. Queensland.— In this State private railways open for general traffic may be grouped under two heads :—(i.) Lines constructed primarily for mining purposes or for the transport of sugar-cane, and (ii.) Shire tramways.

(i.) Mining Railways. (a) The Chillagoe Railway. The most important of these is the Chillagoe railway, constructed under the Mareeba to Chillagoe Railway Act 1897, and opened in 1901. This line runs from Mareeba, on the Cairns railway, to Mungana, a distance of 102.73 miles. (b) The Stannary Hills Line. This line branches from the Chillagoe railway at Boonmoo and runs to Rocky Bluff, via Stannary Hills, a total distance of 21 miles. The gradients on this line, which has a gauge of 2 feet, range as high as 1 in 27, while the radius of some of the curves is as low as 14 chains. An additional length of 8 miles has been surveyed with a view to extending the line.

(ii.) Shire Tramways. Under Part XV. of the Local Authorities Act of 1902 provision is made whereby not less than one-third of the ratepayers in any district may petition the local authority to apply to the Governor for the constitution of a tramway area. The Governor may define the area and may also approve of the plans and specifications of the proposed tramway. The amount which may be advanced by the Government for the construction or purchase of a tramway may not exceed a sum equal to £3000 for every mile of its length. As regards repayment of loans, no sum need be paid during the first three years, but after the expiration of that period the principal and interest must be repaid by half-yearly instalments on the basis provided for by the "Local Works Loans Act 1880 to 1899." For the purpose of raising the money to pay these instalments the local authority may levy a rate upon all ratable property within the tramway area. The money required for the tramway may be raised by the local authorities by the issue of debentures.

6. South Australia.—In this State there are no private railways open for general traffic. There is a private line owned by the Broken Hill Proprietary Company, running from Iron Knob to the seaboard near the head of Spencer's Gulf, a distance of 34 miles. The line is utilised for the carriage of ore for use in connection with the smelting works at Port Pirie and the steel works at Newcastle. There is also a line from Marion Bay, having a length of 5 miles, used for mining purposes.

7. Western Australia.---Owing to the Government's past difficulty in constructing lines urgently required for the development of the country, private enterprise was encouraged to undertake the work of construction on the land-grant principle, and two trunk lines were thus constructed. The greater part of the private lines now open, however, have been constructed in connection with the timber industry. (i.) The Midland Railway. This line is 277 miles in length, and runs from the Midland Junction, ten miles from Perth, to Walkaway, where it joins the Government line running to Geraldton. It was constructed under a concession of 12,000 acres of land per mile of line constructed, to be selected along the entire route of the railway. (ii.) The Great Southern Railway. This line, which was built by private enterprise under the land-grant system, is 242 miles in length, and was acquired by the Government by purchase on the 1st January, 1897. The total price paid, with all the interests of the private company and of the original concessionaire, was  $\pounds 1,100,000$ , which was divided by the Government for book-keeping purposes into £300,000 for the land and £800,000 for the railway. (iii.) Millar's Timber Trading Company's Lines. These lines have mostly been built under special timber concessions and leases. There were, at latest date available, in all eight lines situate in various parts of the State extending into the bush, whence logs are brought to the mills. The total length of these lines was approximately 265.95 miles. (iv.) Other Lines. There are also several other lines in various parts of the State used chiefly in connection with the timber industry. These are specified in the tabular statement on page 708.

8. Tasmania.—In this State there are three private lines open for general traffic, all of which are situated in the western part of the island.

(i.) The Emu Bay Railway Company. The lines owned by this company run from Burnie to Waratah, from Guildford to Zeehan, and from Rayna to Dundas, and have a total length of 102.94 miles.

(ii.) The Mount Lyell Mining and Railway Company. The Mount Lyell railway runs from Regatta Point, Strahan, to Queenstown, and the North Mount Lyell line from Kelly Basin to Linda. 'The former line, 21.45 miles in length, was constructed in 1895-6, while the latter line, 27.80 miles long, was taken over from the North Mount Lyell Copper Company on the amalgamation of the two companies in 1903. The line from Kelly Basin to Linda is now run only intermittently.

(iii.) The Magnet Silver Mining Company's Railway. This line runs from Magnet. Junction, near Waratah, on the Emu Bay Company's line, to Magnet, a distance of 10 miles.

9. Operations of Private Railways, 1916-17.—The tabular statement given below shews particulars, so far as returns are available, for the year 1916-17, of all private railways open to the public for general traffic in the Commonwealth :—

# RAILWAYS. PARTICULARS OF PRIVATE RAILWAYS OPEN FOR GENERAL TRAFFIC, 1916-17.

					-							-
	ġ	_		Expenses.		les.	13	- <u>4</u>	98.	Rolling Stock.		
Line	ð	st.	590	ng.	est,	W	eng	8, 6	9 S	<i></i>	168.	leg.
Dille.	lea	මුපු	P a gr	, F	etc	ain	0 U L.	ToF	28	8	ach	bici
	Ř			Mo	<b>B</b>	Ĕ	А́́ны́	ð	<b>A</b>	<u> </u>	_ පි	
	No.	£	£	£	£	No.	No.	Tons.	No.	No.	No.	No.
			NEW	SOUT	нWA	LES.						
Cimlth Oil Compirin	99.00	104 500	2 462	4 507	2	12 104	1 156	9 100	17	45	0	60
Deniliquin-Moama	45.00	162,672	16,845	11,727	2 <sup></sup>	35,541	12,107	38,303	43	4	6	63
East Greta Railway	19.40	194,035	61,225	78 533	9,701	360,054	850,841	66,323	224 32	19	28	40
Hexham-Minmi	6.08	<sup>9</sup>	803	973	s	4,900	9,850	1,175	7	i	4	ĩ
New Redhead Co.	12.00	102,000	<sup>5</sup> 4,953	<sup>5</sup> 2,291	52,038	°	2	2	°••;	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>
Silverton Tramway	35.60	475,335	161,493	90,574	a	120,617	45,539	9.250 778,718	251	20	1	676
Total <sup>1</sup>	183.08	1,234,763	253,581	170,433	11,739	581,785	935,891	912,767	583		46	879
	<u>   </u>		l							(		
Kerang-Koondrook <sup>6</sup>	13.94	39,229	3,273	2,721	1,794	19,508	12,120	19,700	11	2	2	9
Tarrasrowensown					400	20,000			12			
Total	24.94	85,913	6,384	5,940	2,259	44,508	24,120	59,700	23	6	4	42
•			୍କ	UEEN	SLAND	).						
Aramac-Barcaldine	41.00	86,194	12.001	10.506	3,394	27.230	6.090	14.772	16	2	2	1
Beaudesert	32.00	93,559	12,337	10,651		3	14,090	11,585	27	ູ 1	3	1
Beimont Tramway Bowen-Prosernine	4.31	104 649	6 211	2,986	3 658	9,723	37,630	22,596	" ä	3	s	3
Chillagoe Railway	102.73	420,276	26,119	15,986	2	44,450	16,646	31,294	67	8	2	86
Douglas-Mossman	19.00	44,071	6,439	5,428	11 050	12,000	7,650	9,230	, <sup>12</sup>	s <sup>2</sup>	3	<b>,18</b> ,
Invicta Mill	8.70	20,067	11,201	15,559	1,003	629	3,124	4,230	3	3	з	3
Lucinda Pt. to Stone	53.50	$\mathbf{i}$										
R. and Lg. Pocket Green Hills to Ham-	53.50	2	2	9	3	25.000	2	2	2	3	3	90
bledon Junc	4.50	)				20,000						
Macgregor Maratan Control	22.13	66,328	4,276	2,577	····	7,730	4,141	21,149	8	s	<sup>3</sup>	<sup>3</sup>
S.M	7.25	10,150	734	490		2,100	7,700	750	4	1	2	2
Mt.MolloyTr'mw'y	19.81	42,000	2,330	2,107	a	8,320	1,754	2,475	8	1	³	7
Woongarra	12.19	36,106	1,391	<b>1,962</b>	3	2,558	1,709	5,463	5 4	3	з <u>2</u>	3 <sup>70</sup>
Total <sup>1</sup>	529.62	1,462,901	86,847	71,604	20,245	174,776	128,362	142,117	160	19	17	211
			WEST	ERN A	USTR	ALIA.						
Midland Railway <sup>8</sup>	277.00	2 036 855	89 206	72 475	2	975 564	51 568	. 77 000	022	17	20	400
	2	1,000,000	00,200	12,210	1	10,001	01,000			<u> </u>		100
<u>.                                    </u>	<u>.</u>			TASMA	NIA.							
Emu Bay Railway	102.94	614.036	48,704	22.034	20.453	87.705	30.280	35.419	105	10	10	151
Magnet Railway	10.00	18,750	310	2.567	a	6,240	808	350	9	3	1	8
Mt. Lyell Railway Nth. Mt. Lyell Rly.	27.80	216,086 316,638	30,149 4,635	22,622	•	46,658	22,944 4,243	75,601	96 22	4	.4	117 52
				·		·						·
Total <sup>1</sup>	162.19	1,165.510	83,798	53,607	20,453	151,615	58,275	129,991	232	24	22	328
Total for Cwlth. <sup>1</sup>	J 176.83	5,985,942	519,816	374,059	54,696	1228 248	1198216	1322 504	1,220	121	109	1,860
		·	·	<u> </u>	<u> </u>	·	<u> </u>		<u> </u>	<u>.</u>	·	·

1. Incomplete. 2. Not available. 3. Worked by Government railways. 4. Including one motor car. 5. For year 1915. 6. For year ended 30th September, 1917. 7. Including interest. 8. For year ended 30th June, 1917. 9. Included in working expenses. 10. Including 47.66 miles owned by the Emu Bay and Mount Bischoff Railway Company.

٠

.
#### RAILWAYS.

10. Comparative Railway Statistics.—On page 660 ante a table is given shewing the railway facilities in 1917 in the States, in the Northern Territory, and in the Commonwealth, the railway mileage open for traffic being compared both with the area and population.

In the table below the comparative railway statistics of a like character are given in respect of the principal countries of the world at certain dates. The latter have been taken so that the latest accurate figures for both population and railway mileage could be brought into relation.

# COMPARATIVE RAILWAY STATISTICS IN RESPECT OF CERTAIN COUNTRIES IN EUROPE, ASIA, AFRICA, NORTH AND SOUTH AMERICA, AND AUSTRALASIA, AT THE UNDERMENTIONED DATES.

		Milea		Aron	Miles of	Railway.
Country.	Year.	of Railway.	Population.	in Square Miles.	Per 1000 of Popu- lation.	Per 1000 Sq. Miles of Territory.
Eurone						
United Kingdom	1915	23 709	44 481 494	121 633	0.53	194 98
Austria	1918	14,512	29 193 293	115 882	0.50	125 28
Belgium	1912	5,401	7.571.387	11,373	0.71	474.90
Denmark	1911	2,292	2,775,076	15,582	0.83	147.09
France	1911	130,709	39 601 509	207 054	0.78	148 32
Germany	1914	39,439	67.812.000	208,780	0.58	188.90
Greece	1914	1.365	4.821.300	41,933	0.28	32.55
Hungary	1912	13,333	21,134,862	125,609	0.63	106.15
Italy	1915	11.635	36,120,118	110,632	0.32	105.17
Netherlands	1915	2.313	6,449,348	12,582	0.36	183.83
Norway	1914	1,967	2,440,500	124.643	0.81	15.78
Portugal	1911	1.780	5.957.985	35,490	0.30	50.16
Russia	1913	35.987	143.114.300	1.997.309	0.25	18.02
Spain	1914	9.377	20,500,287	<sup>2</sup> 190.050	0.46	49.34
Sweden	1914	9,094	5,679,607	172,963	1.60	52.58
Switzerland	1915	3,537	3,880,500	15,976	0.91	221.40
Asia		-,	-,,			· · · · · · · · · · · · · · · · · · ·
India <sup>.</sup>	1911	32,839	315,156,396	1,802,629	0.10	18.22
Russia	1913	10,586	27,787,800	6,641,587	0.38	1.59
Africa—		,				
Egypt	1917	2,874	12,569,000	350,000	0.23	8.21
Union of South Africa	1911	7,848	5,973,394	473,100	1.31	16.59
America, North—						
Canada	1914	30,795	8,075,000	3,729,665	3.81	8.26
Mexico	1912	15,804	15,501,684	785,881	1.02	20.11
United States	1915	253,789	100,399,318	2,973,890	2.53	85.34
America, South—	1		{		ł	ł
Argentina	1914	21,880	7,885,237	1,153,119	2.70	18.97
Brazil	1915	16,294	26,542,402	3,290,564	0.61	4.95
Chili	1915	5,015	3,641,477	289,829	1.38	17.30
Australasia—						
C'wlth of Australia	1917	24,769	4,895,894	2,974,581	5.06	8.33
New Zealand	1916	2,989	1,099,295	104,751	2.72	28.53
			1	'		

1. Including lines of "local" interest. 2. Exclusive of Balearic and Canary Islands.

It will be seen from the above table that per 1000 of population the Commonwealth . of Australia had the greatest mileage (in 1917), 5.06 miles; the next in magnitude being Canada (1914) with 3.81 miles, New Zealand (1916) with 2.72 miles, Argentina (1914) with 2.70 miles, and the United States (1915) with 2.53 miles.

The least mileage per 1000 of population is shown in the case of India (1911) with 0.10 mile, followed by Egypt (1917) with 0.23 mile of railway.

With regard to the mileage per 1000 square miles of territory, Belgium (1912) with 474.90 miles was easily first, followed by Switzerland (in 1915) with 221.40 miles, the

United Kingdom (in 1915) with 194.93 miles, Germany (in 1914) with 188.90 miles, and the Netherlands (in 1915) with 183.83 miles.

The least mileage open per 1000 square miles is that of Asiatic Russia (in 1913) with 1.59 miles, the next being 4.95 miles in the case of Brazil (1915).

The mileages in the Commonwealth of Australia and the Dominion of Canada per 1000 square miles of territory are very close to each other, being 8.33 miles (1917) and 8.26 miles (1914) respectively, the latter being slightly less than a tenth of the United States, 85.34 miles (in 1915).

# § 3. Tramways.

1. General.—Tramway systems are in operation in all the States of the Commonwealth, and in recent years considerable progress has been made in the adoption of electrical traction, the benefit of which is now enjoyed by a number of the principal towns of the Commonwealth.

There are also in many parts of Australia private lines which are used for special purposes, usually in connection with the timber, mining, or milling industries. These lines are usually termed tramways, but they are really private railways, the traffic on which has nothing in common with that of a street tramway used for the conveyance of passengers. Though efforts have been made to collect particulars of these lines, the returns are generally too incomplete for publication.

(i.) Total Mileage Open and Classification of Lines. The following table shews the total mileage of tramway lines open for general passenger traffic in each State and in the Commonwealth for the year 1916-17, classified (a) according to the motive power utilised and (b) according to the nature of the authority by which the lines are controlled :—

Nature of l s Controllin	Motive H Ind g Autho	Power prity.	N.S. Wales.	Victoria.	Q'land.	South Australia.	Western Australia.	Tas.	C'wealth
			ACCO	RDING T	ο Μοτιν	E POWE	R.		
			Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Electric			152.99	89.08	41.58	64.58	51.62	23.04	422.89
Steam	•••		74.49	1.15	6.00		12.17	19.25	113.06
Cable	•••			46.Q4	i				46.04
Horse	•••	•••		0.61		<sup>1</sup> 21.11	14.39	8.00	44.11
Total			227.48	136.88	47.58	85.69	78.18	50.29	626.10
		AC	CORDIN	G TO COL	NTROLLI	G AUTH	ORITY.		
Governme	nt		223.98	49.45		117.86	54,79	25.50	371.58
Municipal				52.62	6.00	67.83	8.64	23.04	158.13
Private	•••		3.50	34.81	41.58		14.75	1.75	96.39
Total		••••	227.48	136.88	47.58	85.69	78.18	50.29	626.10

TRAMWAYS.—CLASSIFICATION OF MILEAGE OPEN FOR PASSENGER TRAFFIC, 1916-17.

1. 16.36 miles included in South Australian Government railway mileage.

2. New South Wales.—In this State the tramways, with but few comparatively unimportant exceptions, are the property of the Government, and are under the control of the Railway Commissioners.

(i.) Government Tramways. In Sydney and suburbs the Government tramways are divided into distinct systems. There were in June, 1917, seven such systems in operation within the metropolitan area, the most important being the city and suburban lines, 112.16 miles in length (204.95 miles single track); the North Shore line, 20.38 miles in length

(34.95 miles single track); the Ashfield to Mortlake line, 8.47 miles in length (15.11 miles single track); Manly to the Spit, Brookvale, and Narrabeen, 10.73 miles (14.58 miles single track); and Rockdale to Brighton-le-Sands, 1.25 miles (single track). The last-mentioned line was purchased from a private company and opened for traffic on 7th June, 1914. All of these systems are now operated by electricity. There are two systems on which the motive power used is steam, namely—(a) from Kogarah to Sans Souci, 5.56 miles in length (6.98 miles single track), and (b) from Arncliffe to Bexley, 2.63 miles long (single track).

There are also Government steam tramways in operation at Newcastle, Broken Hill, Parramatta, from East to West Maitland, and from Sutherland to Cronulla. The gauge of line on all the Government tramways is 4 feet  $8\frac{1}{2}$  inches.

(a) Sydney Tramways. In October, 1862, a horse tramway, 1<sup>3</sup>/<sub>2</sub> miles long, was opened for traffic in Sydney. Owing to the rails being laid higher than the road surface, the inconvenience thus caused to other traffic necessitated its removal under the authority of an Act passed in November 1865, and it was not until the 15th September, 1879, that the first steam tramway was opened, running from Bridge-street to Haystreet via Elizabeth-street. In the following few years the steam tramways were considerably extended. The electric system was commenced by the opening of a section of the North Sydney lines on the 20th September, 1893. This was followed by the opening of the Ocean-street-Rose Bay line on the 4th October, 1898, and by the opening of the George-street-Pyrmont line on the 8th September, 1899, which introduced the electric system into the city. The tramways in the heart of the city, running along King-street to the suburb of Woollahra, as well as those in North Sydney, were originally worked by underground cables, and have since been converted into electric lines on the overhead trolley system. As already stated the whole of the steam tramways in Sydney and suburbs, with the exception of the Kogarah-Sans Souci and the Arncliffe-Bexley lines, have now been converted into electric lines, and provision for the extra power required for the electrification of the former of these lines has been made at the central power station.

(b) Other Tramway Systems. In Newcastle the first section of the tramways, from Perkins-street to Plattsburg, was opened on 31st December, 1887; the total length open on the 30th June, 1917, was 34.07 miles (44.42 miles single track). At Broken Hill and Parramatta the first sections of the tramways were opened in 1902. On the 30th June, 1917, the mileage open at Broken Hill amounted to 10.05 miles (11.44 miles single track), and at Parramatta to 6.69 miles (single track). The line from East to West Maitland, 4.59 miles long (single track), was opened in February, 1909. Further particulars are given below.

(c) Particular's of all Government Tramways. The following table shews the total length, the capital cost, the gross revenue, working expenses, net earnings, and the percentages of working expenses on gross revenue, and of net earnings on capital cost, for the financial years 1901-2 and 1912-17:--

NEW SOUTH WALES.—PARTICULARS OF WORKING OF GOVERNMENT TRAMWAYS, 1901-2 and 1912-17.

Year ended the 30th June.	Total Length of Lines Open (Route).	Capital Expended on Lines Open.	Gross Revenue.	Working Expenses.	Net Earnings.	Percentage of Working Expenses on Gross Revenue.	Percentage of Net Earnings on Capital Cost.
	Miles.	£	£	£	£	per cent.	per cent.
1901-2	103.94	2,829,363	631,757	541,984	89,773	85.79	3.19
1912-13	207.88	6,699,305 <sup>1</sup>	1.754,566	1,572,190	182,376	89.61	2.94
1913-14	212.16	7,628,6531	1,934,164	1,669,033	265,131	86.29	3.66
1914-15	219.81	7,970,2931	1,986,060	1,611,287	374,773	81.13	4.70
1915-16	220.83	8,166,4231	1,991,628	1,602,650	388,978	80.47	4.76
1916-17	223.98	8,309,6291	2,008,539	1,691,367	317,172	84.21	3.82
					1	1	1

1. £47,455 of this sum has been paid from the Consolidated Revenue, and no interest is payable thereon.

## TBAMWAYS.

The net result, after providing for all working expenses and £335,361 for interest on the capital invested, was a deficit of £18,189 in 1916-17, as compared with a surplus of £86,292 in the preceding year. During the year 1916-17, 295,303,714 passengers were carried, an increase of 3,281,940 as compared with the previous year.

(d) Particulars of Different Systems of Government Tranways. In the subjoined statement particulars are given of the working of the electric and steam tramways in Sydney, and of other tramways under Government control :---

# NEW SOUTH WALES.—PARTICULARS OF WORKING OF VARIOUS GOVERNMENT TRAMWAYS, 1916-17,

• Line.	Len	gth.	Total Cost.	Gross Revenue.	Working Expenses	In- terest.	Profit or Loss. <sup>1</sup>	Percentage of Working Expenses on Gross
	Route.	Track.						Revenue.
Sudnay and Suburban-	Miles.	Miles.	£	£	£	٠£	£	%
Electric Steam	152.99 8.19	270.84 9.61	7,615,100 50,610	1,853,398 12,217	1,535,423 15,557	307,525 2,072	+ 10,150 - 5,412	82.84 127.34
Total	161.18	280.45	7,665,710	1,865,615	1,550,980	309,897	+ 4,738	83.14
Parramatta Steam Sutherland to Cronulla " Newcastle " East to West Maitland " Broken Hill "	6.69 7.40 34.07 4.59 10.05	6.69 7.40 44.42 4.59 11.44	39,743 51,183 424,218 39,162 89,613	8,010 10,719 105,446 4,995 13,754	10,119 9,729 98,200 5,539 16,800	1,627 2,095 16,472 1,603 3,667	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	126.33 90.76 93.13 110.89 122.15
Total	223.98	354.99	8,309,629	2,008,539	1,691,367	335,361	- 18,189	84.21

1. + indicates a profit; - indicates a loss.

The total capital cost shewn in the preceding table was made up as follows :---

# CAPITAL COST OF NEW SOUTH WALES GOVERNMENT TRAMWAYS AS AT 30th JUNE, 1917.

Permanent Way.	Rolling Stock.	Power-house, Sub-stations, and Plant.	Machi- nery.	Work- shops.	Furni- ture.	Store Advances Account.	Total.
£	£	£	£	£	£	£	£
4,140,616	1,816,822	1,808,218	130,007	215,574	2,392	196,000	8,309,629

The average cost per mile open was £18,486 for permanent way and £18,613 for all other charges, making a total of £37,099 per mile.

During the year 1916-17, four new extensions, amounting in all to a length of 3.20 miles, were opened for traffic. On the 30th June, 1917, two extensions, having a total length of 1.38 miles, were under construction.

(e) Sydney Electric Tramways. The current for the operation of the city and suburban tramways is generated at the power-houses at Ultimo and White Horse Bay, which have been erected at a total cost of £1,808,218, including the cost of the sub-stations and plant. The total output of the power-houses, for both lighting and traction purposes, during the year 1916-17, was 94,326,199 kilowatt-hours, of which the direct-current supply was 352,481, and the alternating current 93,973,718 kilowatt-hours. The following table gives particulars of the working of the electric tramways for the financial years 1912-13 to 1916-17 :—

716

Year ended 30th June.		for T	e Open raffic.		Total C Constru	ost of Iction	Curr for 7	ent used Fraction	Т	am Miles	Passengers Carried.
	Roi	ıte.	Trac	k.	Equipr	nent.	Pu	rposes.			
	Mil	es.	Mile	s.	£		Kilow	att-hours		No.	No.,
1913	141	.45	242.	6 <b>9</b>	6,162	,063	79,839,867		2	5,479,802	275,977,634
1914 ·	145	5.74	252.	34	7,054	,832	86,187,367		- 20	6,973,702	290,547,553
1915	150	).04	261.	09	7,349	,866	81,	591,224	2	5,406,807	269,633, <b>638</b>
1916	151	.05	266.	18	7,526	701	81,0	688 <b>,434</b>	2	5,008,055	272,048,29 <b>3</b>
1917	152	1.99	270.	84	7,615	,110	80,0	608,220	2	8,955,722	275,180,334
Year ended 30th June	1	G: Rev	ross enue.	W Ez	orking openses.	N Reve	et enue.	Percenta of Work Expenses Gross Bevenu	ing son	Number of Cars in Use.	Number of Persons Employed.
		_	£	ļ	£		e	%		. •	
1918	•••	1,61	6,686	1,4	433,972	182	,714	88.70		1,220	9,048
1914	•••	1,78	1,063	1,	520,185	260	,878	85.35		1,396	9,195
1915	•••	1,83	4,022	1,4	469,227 364,		,795	80.11		1,430	8,743
1916	•••	1,83	8,708	1,4	452,470	386	,238	78.99		1,402	9,308
1917	•••	1,85	3,399	1,8	535,423	317	,976	82.84	.	1,398	9,295
								ł	I		

# NEW SOUTH WALES.—PARTICULARS OF SYDNEY ELECTRIC TRAMWAYS, 1912-13 to 1916-17.

(ii.) Private Tramways. A private steam tramway passes through the township of Parramatta. Commencing at the park gates, it runs as far as the Duck River, a distance of  $3\frac{1}{2}$  miles, where it connects with the Parramatta River steamers, conveying passengers and goods to and from Sydney. This line, the gauge of which is 4 ft.  $8\frac{1}{2}$  in., was opened for traffic in 1883. In 1916 the number of tram miles run was 18,200, and the number of passengers conveyed 75,640.

(iii.) Sydney Harbour Ferries. As the ferry services on the waters of Port Jackson are mainly subsidiary to the suburban railway and tramway systems, it has been thought advisable to include them here rather than under Shipping. Returns for the year 1916-17 were received from four companies, and shew that these companies had 68 boats in commission, which were licensed to carry a total of 45,996 passengers, or an average of 676 per boat and per trip. The total number of passengers carried during the year is stated as 36,112,767, an average of 98,937 per day. In addition to the ordinary passenger traffic there are two lines providing for vehicular traffic, which afford the only rapid means of transit for such traffic between the city and the northern suburbs. The four companies employed during the year a total of 971 persons. The gross revenue during 1916-17 amounted to £377,463, and the expenditure to £313,135, thus giving a net revenue of £64,328. The services are well managed, and the boats constructed during recent years-double-ended screwboats-are claimed to be superior in size and equipment to boats employed on similar service in any part of the world.

3. Victoria.—In Melbourne there are several tramway systems carried on under the control of various authorities, the most important being the cable system worked by the Melbourne Tramway and Omnibus Company up to the 1st July, 1916, and since that date by the Melbourne Tramway Board, to which reference will be made further on. There are also five lines of electric tramways, viz.:—(a) St. Kilda to Brighton, belonging

to the Government and under the control of the Railway Commissioners; (b) Flemington Bridge to the Saltwater River and Keilor Road, owned by a private company; (c) lines connecting Prahran, Windsor, St. Kilda and Elsternwick with Glen Huntly, Caulfield, Malvern, Glenferrie and Kew, controlled by the Prahran and Malvern Tramways Trust; (d) lines from Queensberry Street, Melbourne, to Bell Street, Coburg, and Moreland Road to Baker's Road, Fawkner, owned by the Melbourne, Brunswick and Coburg Tramways Trust, and (e) Princes Bridge to Burwood; Burke Road to Boundary Road, Wattle Park; and Bridge Road, Richmond to Power Street, owned by the Hawthorn Tramways Trust. There is also a cable tramway, two and a-quarter miles in length, between Clifton Hill and Preston, owned by the Northcote municipality. There is a short steam tramway, about one mile long, at Sorrento, and there are also systems of electric tramways at Ballarat, Bendigo, and Geelong, constructed and run by private companies. A number of tramways has been constructed for special purposes in various parts of the State under the provisions of the Tramway Act 1890. These tramways correspond to the description of private railways referred to in sub-section 1 hereof. An electric tramway between Sandringham and Black Rock, 2.38 miles in length, is under construction by the Railway Department. A tramway to the Zoological Gardens, with horse traction, is operated by the Melbourne Tramway Trust.

A short account of the formation of the (i.) Melbourne Cable Tramways. Melbourne Tramway and Omnibus Company, and of the Tramway Trust, will be found in previous issues of this book. (See Year Books No. 7, page 652, and No. 9, page 679.) The company was required by the original Act, as amended in 1892, to complete the tramways by the end of the year 1893, and in return a thirty-two years' lease of the tramways was granted to it, dating from the 1st July, 1884-when the liability for interest on the loans commenced-and expiring on the 1st July, 1916. The total amount the Trust was empowered to borrow was £1,650,000, which was raised in London by means of debentures bearing interest at  $4\frac{1}{2}$  per cent. The premiums received amounted to £55,794, making a total of £1,705,794. This amount had been expended by the end of the year 1893, when further loan expenditure ceased. Up to the 30th June, 1917, the total cost of construction and equipment of the tramways amounted to The first line-that to Richmond-was opened to traffic on the 11th £1,975,314. November, 1885, and the work being rapidly pushed on, the other lines were opened at short intervals, and the whole system was completed in 1891. The complete system consists of 43.68 miles of double-track cable lines, using constantly over ninety miles of wire rope, and 0.62 mile of horse tramway at Royal Park. The gauge of track is 4 feet 81 inches.

(a) Particulars of Working. The subjoined statement shews the tram mileage, the number of passengers carried, and the revenue and expenditure for the years 1901-2 and 1913 to 1917:—

Y	ear e 30th	nded the June.		Train Mileage.	Number of Passengers Carried.	Revenue.	Working Expenses.	Percentage of Working Expenses on Revenue
		_		No.	No.	£	£	%
1902				9,226,883	47.261.572	474,835	269,554	56.7
1913				11.889.473	89,359,248	795,091	386,603	48.6
1914				12,056,510	91,438,777	823,567	400,202	48.5
1915				11,887,462	87,707,934	736,154	404.056	54.9
1916			!	11,977,916	96,702,943	805,636	411,426	51.1
1917				12,423,929	103,118,377	843,300	462,132	54.8

# MELBOURNE CABLE TRAMWAYS.—PARTICULARS OF WORKING, 1901-2 and 1913 to 1917.

On the 30th December, 1915, the Victorian Government appointed a Tramway Board of five members to take over the tramways as from 1st July, 1916, and in due course the Board entered into possession of the tramway properties. The amount of compensation to be paid to the company has been the subject of arbitration, but has not yet been settled owing to an appeal as to the amount awarded, which is still under consideration.

(ii.) Electric Tramways. As already mentioned, there are in Melbourne five electric tramway systems, namely (a) the St. Kilda-Brighton line, (b) the North Melbourne tramways, (c) the Prahran-Malvern Tramway Trust system, (d) the Melbourne, Brunswick and Coburg Tramway Trust system, and (e) the Hawthorn Tramway Trust system.

Under the St. Kilda and Brighton Electric (a) The St. Kilda-Brighton Line. Street Railway Act 1904, the Board of Land and Works was authorised to construct a tramway from St. Kilda to Brighton. The amount of interest payable on the cost of the land acquired for the tramway was guaranteed by the municipalities of St. Kilda and Brighton for a period of twenty years, and authority was given by the Act to the municipalities to levy either a general or special rate not exceeding one shilling in the pound for the purpose of paying the guarantee. The profit, if any, during the first twenty years is to be set off in reduction of the guarantee. The line was opened for traffic between St. Kilda and Park-street, Middle Brighton, on the 7th of May, 1906, and the extension to Brighton Beach was opened on the 22nd of December, following. The capital cost to the 30th June, 1917, exclusive of rolling-stock, was £107,731, and of rolling-stock £48,511, making a total of £156,242. The gauge of track is 5 ft. 3 in. The subjoined statement gives particulars of the working of this line for the financial years ended the 30th June, 1913 to 1917 :---

Year ended 30th June.	Mileage Open ( (Route).	Capital Cost.	Car Mileage.	Passengers Carried.	Gross Revenue.	Working Expenses.	Interest.	Net Profit or Loss.
		£			£	£	£	£
1913	5.13	88,133	413,939	1,916,618	16,829	15,808	3,093	-2,072
1914	5.16	95,494	541,449	2,390,949	20,516	20,850	3,333	-3,667
1915	5.16	101.726	577.468	2.718.972	22,614	19,905	3.428	- 719
1916	5.16	132,300	597.819	3,126,984	25.580	22.844	4.697	
1917	5.16	156.242	572,735	3.450.442	27,919	20,502	6.250	+1.167
				· , · · · · · · · · · · · · · · · · · ·	.,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-,	,,

ST. KILDA-BRIGHTON ELECTRIC STREET TRAMWAY, 1913-17.

1. Profit is indicated by +, loss by -.

The average fare paid per passenger was 1.93 pence in 1916-17 as against 1.95 pence in 1915-16. The gross revenue in 1916-17 was 11.70 pence per passenger car mile and £2705 per mile of single track open.

(b) The North Melbourne Tramways, extending through the northern suburbs to the Saltwater River and to Keilor Road, were constructed by a private company, and were opened for traffic on the 11th October, 1906. The route and track mileage for year ended 30th September, 1917, were 7.51 and 11.43 miles respectively, the gauge of line being 4 feet  $8\frac{1}{2}$  inches. The number of passengers carried during the same period was 3,389,329. The current used during the year for traction purposes was 768,597 kilowatt hours, while the number of persons employed was 111.

(c) The Prahran-Malvern Tramway. The lines have been constructed under the control of a trust, which now consists of seven members appointed from the councils of Prahran, Malvern, St. Kilda, Caulfield, Hawthorn, Kew, and Camberwell. At the 30th September, 1917, the total route mileage open was 32.06 miles, the total track mileage being 59.62 miles, and the total capital cost £740,034. The gauge of the track is 4 ft. 81 in. The current is supplied by the Melbourne Electric Supply Company Limited at a price varying according to the consumption of current and the price of fuel. Any surplus revenue, after providing for operating expenses, interest, sinking fund and renewal reserve, is to be paid to the municipal councils interested in proportion to the car mileage run in their respective districts. The first section of the lines was opened for traffic on 31st May, 1910. During the year ended 30th September, 1917, the current used for traction purposes was 6,088,038 kilowatt hours, and the number of tram miles run was 2,804,952, the number of passengers carried 26,209,178, the gross revenue £172,306, and the working expenses £121,463. The number of cars in use was 85, and the number of persons employed 458.

(d) The Melbourne, Brunswick and Coburg Tramways Trust. The first section of these tramways, that between Moreland Road and Bell Street, was opened for traffic on 27th April, 1916. At the 30th September, 1917, the route and track mileages open for traffic were 7.03 and 12.29 miles respectively. During the year ended 30th September, 1917, the current used for traction purposes was 904,070 kilowatt hours, the tram miles run 538,457, the number of passengers carried 4,364,593, the gross revenue £28,674 and the working expenses £18,754. Eighteen cars were in use, and the number of persons employed was 89.

(e) The Hawthorn Tramway Trust. The first section of these tramways, that from Princes Bridge to Power Street, Hawthorn, was opened for traffic on 6th April, 1916, and on 30th September, 1917, the route and track mileages in operation were 11.17 and 18.00 miles respectively. During the year ended 30th September, 1917, the current used for traction purposes was 1,876,521 kilowatt hours, the tram miles run 905,275, number of passengers carried 8,152,165, the gross revenue £60,379, and the working expenses £43,844. The number of cars in use was 26 and the number of persons employed 156.

(f) The Ballarat and Bendigo Electric Tramways are under the control of a private company, and run along the main streets and to and from the outlying suburbs of the two cities. The total length of lines open for traffic is 21.25 route miles and . 25.86 track miles, the gauge being 4 ft.  $8\frac{1}{2}$  in. During the year ended 31st December, 1917, 4,804,378 passengers were carried, the gross revenue being £43,884, and the working expenses £34,267. The number of cars in use was 55, and the number of persons employed was 134.

(g) The Geelong Electric Tranways. This line, which is privately owned, was opened for traffic on the 14th March, 1912, and up to the 31st August, 1917, the cost of construction and equipment, exclusive of generating plant, was £60,073. The system has a route and track mileage of 4.90 and 5.67 miles respectively, the gauge being 4 ft.  $8\frac{1}{2}$  in. The car mileage for the year ending on the last-mentioned date was 229,137 miles, and the number of passengers carried 1,216,491. For the same period the revenue was £15,055, and the expenditure £12,200.

(h) Particulars of Working of all Electric Tramways. The following table gives particulars of the working of all electric tramways in Victoria for each year from 1913 to 1917 inclusive:—

## 720

									••
Year.	Mileage Open for Traffic (Route).	Total Cost of Construc- tion and Equipment.	Current Generated at Central Stations for Traction Purposes.	Tram Miles Run.	Number of Passengers Carried.	Gross Revenue.	Working Expenses.	Number of Cars in Use.	Number of Employees.
1913 1914 1915 1916 1917	Miles. 53.40 61.85 69.47 83.91 89.08	£ 1,009,347 1,082,824 1,299,786 1,765,854 1,861,771	Kilowatt-hrs. 4,551,022 6,591,628 7,445,978 9,553,034 11,910,707	No. 3,182,916 4,110,787 4,358,030 5,327,895 6,462,318	No. 20,181,350 28,071,661 30,150,912 39,928,454 51,556,576	£ 158,954 212,036 223,056 288,206 373,594	£ 116,669 . 156,404 . 164,313 206,367 271,315	No. 169 181 193 235 255	No. 593 735 811 1,009 1,074

VICTORIA.—PARTICULARS OF WORKING OF ELECTRIC TRAMWAYS, 1913-17.

(iii.) Private Tramways for Special Purposes. There are in Victoria several tramways, or more strictly light private railways, used for special purposes, chiefly in connection with the timber, mining, and milling industries. These lines have been constructed either under authority of the Department of Public Works, pursuant to Section 36 of the Tramway Act 1890, or under leases or licenses issued by the Department of Lands and Survey, pursuant to Sections 144 and 145 of the Land Act 1901. Particulars of these lines are too incomplete for publication.

4. Qucensland.—In this State there is a system of electric tramways running through the streets of the city and suburbs of Brisbane and controlled by a private company which has its head office in London. The total length of the Brisbane system was 41.58 route miles at the end of the year 1917. There is also a steam tramway in operation at Rockhampton having a length of 6 route miles. Particulars of Shire tramways have been given in the part of this section dealing with private railways (see p. 704).

(i.) Brisbane Electric Tramways. These tramways are run on the overhead trolley system, the voltage of the line current being 550. The total cost of construction and equipment to the end of the year 1916 was £1,468,906, the gauge of line being 4 ft.  $8\frac{1}{2}$  in. The following table gives particulars of these tramways for the calendar years 1901 and 1913-17.

Year.	Mileage Open for Traffic (Route).	Cost of Con- struction and Equipment.	Current Generated.	Tram Miles Run.	Number of Passengers Carried.	Gross Revenue.	Working Expenses.	No. of Cars in Use.	Number of Persons Employed.
	Miles.	£	Kilowatt- brs.	No.	No.	£	£	Nọ.	No.
1901	25. <b>0</b> 0	1	3,192,955	2,756,443	16,183,801	111,483	64,710	79	375
1913	34.55	1,288,518	7,013,962	3,979,443	44,690,950	316,244	191,936	149	803
1914	38.20	1,437,550	10,002,034	4,111,908	48,162,065	348,406	194,960	154	825
1915	40.20	1,476,866	11,563,696	4,339,863	49,695,313	372.383	233,761	161	803
1916	40.45	1,468,906	9,272,709	4,286,802	51,029,668	364.745	216,607	172	921
1917	41.58	21,468,906	8,964,113	4,377,104	51,860,308	371,850	257,035	172	1,121
	1. Not excitable . 9. Ridungs for 1016								

QUEENSLAND.—BRISBANE ELEČTRIC TRAMWAYS, PARTICULARS OF WORKING, 1901 and 1913-17.

1. Not available. 2. Figures for 1916.

(ii.) Rockhampton Municipal Tramways. These tramways were opened for traffic in 1909, the motive power being steam. The length of track is 6 route miles, and the gauge 3 ft. 6 in. The capital cost to 31st December, 1917, was £42,000. During the year 1,432,329 passengers were carried, the revenue being £10,850, and working expenses £8269. The number of the staff at end of year was 30.

721

(iii.) Sugar-Mill Tramways. In various parts of Queensland there are tramways used in connection with the sugar-milling industry, chiefly for the purpose of hauling cane to the mills. Some of these lines are of a permanent nature, running through sugar-cane plantations, while others are portable lines running to various farms.

5. South Australia.—Up to the year 1906 the tram service in the principal streets of Adelaide and suburbs was a horse system run by various private companies. Power to acquire these lines, and to provide for their extension and management by means of a Trust, was given to the Government by the Municipal Tramways Trust Act 1906. In accordance with the provisions of the Act, a Trust consisting of eight members, of whom two were nominated by the Governor, two elected by the City Corporation, and two each by the Suburban Corporations and the District Councils involved, was formed in 1907, and a length of forty-nine route miles of horse traction tramways was purchased from the private companies for a sum of £282,582. On the 10th March, 1909, the electric car system was inaugurated on the Kensington route. At the end of July, 1917, a length of facts opened being 111.56 miles. The cost of construction and equipment on the 31st July, 1917, was £1,703,151. The following table gives particulars of the tramways for the years ended 31st July, 1913-17:—

SOUTH AUSTRALIA.—ADELAIDE ELECTRIC TRAMWAYS, PARTICULARS OF WORKING, 1913-17.

Year.	Mileage Open for Traffic (Route)	Capital Cost.	Current Used for Traction Purposes.	Car Miles Run.	Number of Passengers Carried.	Gross Revenue.	Working Expenses.	No. of Cars in Use.	No. of Per- sons Em- ploy'd
1913 1914 1915 1916 1917	Miles. 49.69 51.86 54.42 54.42 64.58	£ 1,350,710 1,396,638 1,451,989 1,486,546 1,703,151	Kil'w'tt-hrs. 9,169,269 9,838,252 9,428,315 9,286,910 10,382,667	No. 5,140,706 5,325,660 4,914,857 4,719,043 4,954,848	No. 41,576,483 43,797,227 42,287,503 43,141,885 45,4 <b>3</b> 1,691	£ 310,241 328,810 309,915 322,759 338,361	£ 207,319 202,503 191,070 193,965 211,662	No. 170 170 170 170 170	No. 1,113 1,073 1,045 1,120 1,200

There are also in South Australia nineteen and three-quarter miles of Government horse tramways in country districts, worked in connection with the railway system, and seven and one-half miles of private tramways used for passenger service. The subjoined statement gives various particulars of these lines:—

SOUTH AUSTRALIA.—PARTICULARS OF HORSE TRAMWAYS, 1916-17:

Particulars.	Length.	Gauge.	Nature of Traffic.
GOVERNM	ENT TRA	MWAYS.	
Moonta, Moonta Bay, and Hamley Flat Gawler Victor Harbour and Breakwater Dry Creek and Magazine Magazine and Broad Creek Port Broughton and Mundoora	Miles. <sup>1</sup> 5.15 <sup>1</sup> 1.20 1.00 1.00 1.50 <sup>1</sup> 10.01	ft. in. 5 3 5 3 5 3 2 0 2 0 3 6	Passengers and goods. ''''''''''''''''''''''''''''''''''''
MUNICI	PAL TRA	MWAY.	
Port Adelaide and Alberton	3.50	53	Passengers.
PRIVA	TE TRAM	IWAY.	
Glenelg and Brighton <sup>2</sup>	4.00	4 8 <del>1</del>	Passengers.

1. Included in mileage of Government railways. 2. Not in operation at present.

6. Western Australia.—In this State there are several tramways, amounting in all on the 30th June, 1916, to a length of  $24\frac{3}{4}$  miles, which are the property of the Government. Of these the most important is the line between Roebourne and Cossack, constructed on a 2-ft. gauge and under the control of the Colonial Secretary's Department. The length of this line is  $12\frac{1}{2}$  miles, and it is worked by steam. The remaining  $12\frac{1}{4}$  miles belonging to the Government are made up of four short lengths, varying from two and a quarter miles to four and a quarter miles long, worked by horses, in connection with the jetties at certain ports for the purpose of providing the necessary communication between such jetties and the goods sheds or warehouses. Most of these lines are leased at annual rentals, and are under the supervision of the Harbour Master. Their maintenance and improvement is in the hands of the Public Works Department. In addition to these Government lines there are electric tramway systems at Perth, under Government control; at Kalgoorlie and Boulder City, carried on by private companies; and at Fremantle, under municipal control.

(i.) Steam and Horse Tramways. Particulars as to the working of the Government horse tramways or as to the rents received therefrom are not generally available. The returns of the Roebourne-Cossack steam tramway for the year ended 30th June, 1916, shew that the capital cost of the line to that date was  $\pounds 60,101$ , the gross revenue for the year being  $\pounds 2551$ , and the working expenses  $\pounds 1736$ .

(ii.) *Electric Tranways*. There are now four towns in Western Australia which enjoy the benefits of electric tramway systems, namely, Perth, Fremantle, Kalgoorlie, and Boulder City.

(a) The Perth Electric Tranways were opened for traffic by a private company on the 24th September, 1899, and the system has since been extended to many of the outlying suburbs. This tranway system was taken over by the Government on 1st July, 1913, and is now running in conjunction with the Government railways. On the 30th June, 1917, the route and track miles open for traffic were 28.23 and 36.44 miles respectively, the total cost of construction and equipment to that date being £591,909. During the year, 12,095,661 passengers were carried, the gross revenue being £125,719 and the working expenses £94,196. Sixty-five motors were in use, and the number of employees was 331. The gauge of line is 3 ft. 6 in.

(b) The Fremantle Tramways were opened in November, 1905, under the control of the municipality. On the 31st August, 1917, there were 8.64 route and 11.55 track miles of line open for traffic, the cost of construction and equipment at that date being £117,531. This line has a gauge of 3 ft. 6 in. During the year 4,995,860 passengers were carried, the gross revenue being £39,552 and the working expenses £32,520. Twenty-five cars were in use, and the number of employees was 130.

(c) The Kalgoorlie and Boulder City Tramways are run by a private company, the first line being opened in 1902. At the beginning of 1904 legislative authority was given for the construction of lines in Boulder City and suburbs, and in November, 1904, the last section of the Boulder system was completed. At the end of the year 1917 the total mileage of the whole system—in Kalgoorlie and Boulder City—amounted to  $14\frac{3}{4}$  route or  $20\frac{1}{4}$  track miles, the total cost of construction and equipment being £452,038. During the year, 2,086,526 passengers were carried, the gross revenue being £32,609 and the working expenses £27,131. Twenty-five motors and seven trailers were in use, and the number of employees was 65. The gauge of this line is 3 ft. 6 in.

(d) The Leonora-Gwalia Tramway, two and a quarter route miles in length, was initially a steam tramway. It was opened for traffic by electrification under municipal control on 5th October, 1908, but is now worked with a petrol motor by a private syndicate. It has a gauge of 3 ft. 6 in.

(e) Particulars of Working of all Electric Tramways. The subjoined table shews, so far as returns are available, particulars of the working of all electric tramway systems in the State for the years 1901 and 1913-17.

Year.	Mileage Open for Traffic (Route).	Total Cost of Construc- tion and Equip- ment.	Current Generated.	Tram Miles Run.	Number of Passengers Carried.	Gross Revenue.	Working Expenses.	No. of Cars in Use	No. of Persons Em- ployed.
	Miles.	£	Kilowatt-hrs.	No.	No.	£	£	No.	No.
1901	<sup>1</sup> 16.50	367.037	<sup>2</sup>	721,056	2	46,270	26,673	30	3
1913	48.02	1.042.584	4,728,809	2,602,321	16,164,928	174,803	103,387	109	425
1914	48.83	1.068.058	<sup>3</sup> 4,924,038	2,716,707	17,331,979	184,072	126,586	121	453
1915	50.75	1,092,289	<sup>8</sup> 5,045,163	2,793,519	17,568,161	182,935	130,868	121	471
1916	52.98	1,132,119	<sup>3</sup> 5,203,548	2,874,308	18,355,169	191,125	139,633	123	572
1917 <sup>s</sup>	51.61	1,161,478	5,799,337	2,955,503	19,178,047	197,880	153,847	122	526

WESTERN AUSTRALIA.---PARTICULARS OF ELECTRIC TRAMWAYS, 1901 and 1913-17.

 1. For the year 1901 the figures represent miles of single track.
 2. Not available.

 3. Exclusive of Leonora tramway.

(iii.) Perth Ferries. As the Perth ferry services are mainly subsidiary to the suburban tramway system, they are referred to in this section rather than under *Shipping*. Of the twelve boats in service, four are under the control of the Western Australian Government, the other eight belonging to a private company. The number of passengers carried during the year 1916-7 was 891,546, the revenue and expenditure for the same period were £10,358 and £10,417 respectively, and the number of persons employed 23.

7. Tasmania.—(i.) Tramways. In Hobart there is a system of electric tramways, opened for traffic in 1893, amounting in all to a length of 13 and 16½ route and track miles respectively. This was originally owned by a private company, but is now the property of the Hobart Municipal Council. Under the authority of the Launceston Tramway Act of 1906 the Launceston City Council entered into an agreement with a private company for the construction of a system of electric tramways in the city and suburbs of Launceston. The agreement provided that the company was to run the tramways for a period of twenty-five years, when the Council could purchase the lines and stock at cost price; the electric power required was to be supplied by the Council. This agreement, however, lapsed, and the Council has constructed the tramways, and is running them as a municipal undertaking. The system, which was opened on the 16th August, 1911, has a route and track mileage of 10.04 and 10.90 miles respectively. The gauge of track in both these systems is 3 ft. 6 in.

The following table gives particulars of the working of the two systems for the years 1901 and 1913-17:---

Year.	Mileage Open for Traffic (Route).	Total Cost of Construc- tion and Equip- ment.	Current Generated.	Tram Miles Run.	Number of Passengers Carried.	Gross Revenue.	Working Expenses.	Number of Cars in Use.	Number of Per- sonsEm- ployed.
	Miles.	£	Kilowatt-	No.	No.	£	£	No.	No.
19011	9.00	90,000	*2	321,633	1,734,120	16,097	11,735	20	90
1913	16.71	280,871	1,555,053	836,508	6,344,566	55,875	37,058	47	235
1914	18.91	325,239	1,345,918	908,862	7,147,543	60,885	38,946	49	259
1915	21.43	347,214	2,171,968	999,315	7,462,782	68,170	46,568	60	314
1916	21.95	373,812	1,576,839	1,058,979	7,963,040	73,424	46,758	60	250
1917	23.04	383,219	1,687,407	1,115,090	8,349,789	79,693	49,930	60	259
_									ļ.

TASMANIA.—PARTICULARS OF WORKING OF ELECTRIC TRAMWAYS, 1901 and 1913-17.

1. Hobart tramways only.

2. Not available.

There is also a tramway from Smithton to Marrawah, 25½ miles in length, operated by the Government. Of this distance eight miles are worked as a horse tram, the rest being for steam traction. In the year ended 30th June, 1917, 1364 passengers and 23,212 tons of goods were conveyed, the number of employees being 11.

A private steam tram at Zeehan, 1.75 miles in length, is also in operation. In 1917, 1138 passengers and 7929 tons of goods were conveyed, the number of persons employed being three.

(ii.) *Ferries.* The Hobart ferry service, being of a suburban character, is referred to here rather than under *Shipping.* There is one company controlling a fleet of six boats, and also a ferry operated by the Public Works Department with two boats. In the year 1916-17 the number of passengers carried was 751,463, the revenue £10,609, the working expenses £9546, and the number of persons employed 37.

8. Electrical Traction in Commonwealth, 1916-17.—The subjoined table gives particulars of electric tramways for each State and the Commonwealth. The returns for the Hobart tramways in Tasmania, for the Ballarat and Bendigo tramways in Viotoria, for the Kalgoorlie tramways in Western Australia, and for the Brisbane tramways, are for the calendar year 1917; and for other tramways the returns are, generally, for the financial year 1916-17:—

State.	Mileage open for Traffic (Route)	Capital Cost.	Current Gene- rated.	Tram Miles Run.	No. of Passen- gers Carried.	Gross Revenue.	Work- ing Ex- penses.	No. of Cars, Motors, and Trail'rs	No. of Em- ployee
	Miles.	£	Kilowatt- hours.	No.	No.	£	£	No.	No.
N.S.W Victoria Queensland South Australia West.Australia Tasmania	152.99 89.08 41.58 54.58 51.61 23.04	7,615,100 1,861,771 <sup>3</sup> 1,468,906 1,703,151 1,161,478 383,219	80,608,220 11,910,707 8,964,113 10,382,667 5,799,337 1,687,407	23,955,722 6,462,318 4,377,104 4,954,848 2,955,503 1,115,090	275 180,334 51,586,576 51,860,308 45,431,691 19,178,047 8,349,789	1,853,399 373,594 371,850 338,361 197,880 79,693	1,535,423 271,315 257,035 211,662 153,847 49,930	1,398 255 172 170 122 60	9.295 1,074 1,121 1,200 526 259
Commonwealth	422.88	14,193,625	119,352,451	43,820,585	451 586,745	3,214,777	2,479,212	2,177	13,475

ELECTRIC TRAMWAYS IN THE COMMONWEALTH, 1916-17.

1. Exclusive of Leonora tramway. 2. For year 1916.

In the following table particulars are shewn as to the operations of electric tramways in the Commonwealth for the period 1908-1917 :---

## ELECTRIC TRAMWAYS IN THE COMMONWEALTH, 1908-17.

Year.	Mileage open for Traffic (Route).	Total Cost of Con- struct'n & Equipm't.	Current Generated.	Tram Miles Run.	Number of Pas- sengers Carried.	Gross Re- venue.	Working Ex- penses.	No. of Cars, Motors,& Trailers.	No. of Em- ployees
			Kilowatt-	No	No			No	N
1007.0	Milles.	2 000 001	40.016.002	01 590 014	010 220 105	1 997 091	000 044	1.000	NO. 6 100
1907-8	208.74	6,003,231	49,210,205	24,009,014	210,552,165	1,001,001	1 000,099	1.000	0,102
1908-9	238.76	7,062,667	*55,140,437	26,435,716	232,066,948	1,474,802	1,072,390	1,355	7,420
1909-10	272.24	7.954.192	<sup>2</sup> 62,178,735	30,482,066	268,251,284	1,731,637	1,297,379	1,401	8.372
1910-111	297.47	8,747,597	°80,804,252	33,625,344	312,857,166	2.030.533	1,512,473	1.506	9.329
1911-12	322.24	9.669.808	93,897,694	37,256,203	363,959,404	2.345.428	1.775.927	1.628	11.063
1912-13	345.07	11.147.493	105.967.982	41.258.696	405,480,511	2.635.526	2.092.810	1.864	19,208
1913-14	365 30	12 365 142	°118,894,845	44 147 626	435.058.028	8,915,272	9,939,584	2.071	19.548
1014-15	386.30	13 018 010	9116 567 559	49 811 891	416 798 309	9 990 481	9 935 806	9 135	19 077
1016 16	404 76	10,010,010	9116 560 994	49 069 799	430 497 050	2 076 090	0 055 900	0 160	10 101
1910-10	1 404.70	10,100,000	110,009,029	49 000 505	451 500 745	3,010,802	0,400,000	2,102	10,101
1810-11.	422.88	14,193,625	119,398,491	90,020,080	401,000,740	3,314,777	3'418'818	2,177	15,475

1. Bxclusive of Leonora tramway (W.A.), with exception of mileage. 2. Exclusive of Leonora tramway.