

## RAILWAYS.

TO the proper development of a country like Australasia, ill-supplied with navigable rivers, railway construction is absolutely essential. This has been recognised from an early period, and for the last forty years the Governments of the principal states have been fully alive to the importance of carrying on the work. For a long time, however, they were hampered in their efforts by the difficulty of borrowing money in London at a reasonable rate of interest; but since the year 1871 considerable progress has been made in the work of construction; indeed, by far the greater portion of the public debt of Australasia has been contracted for railway purposes. As the area of the six states and New Zealand almost equals that of Europe or the United States of America, while the population numbers a little over four and a half millions, it is almost needless to say that many of the lines run through districts very sparsely peopled. This is particularly the case in the States of Queensland, South Australia, and Western Australia, where there are vast tracts of territory in which little in the nature of permanent settlement has yet been accomplished, and in none of the states can it be said that the railway lines traverse thickly-settled areas. Indeed, if a fault may be found with the State policy pursued in the past, it is that in some cases expensive lines have been laid down in empty country the requirements of which could have been effectually met for many years to come by light and cheap lines, and that in consequence the railway administrators find themselves heavily burdened with a number of unprofitable lines. A few of these have been closed, but the vast majority are worked at a loss. Notwithstanding these drawbacks, however, the railways of the Commonwealth of Australia collectively yield a net return equal to 2.88 per cent., and those of Australasia 2.95 per cent. on the cost of construction.

## HISTORY OF RAILWAY CONSTRUCTION.

An agitation for the introduction of the railway into the colony of New South Wales was afoot as early as 1846, and in August of that year it was decided at a public meeting held in Sydney to survey a line to connect the capital with Goulburn. But no decided step was taken towards construction until September, 1848, when the Sydney Railroad and Tramway Company was formed for the purpose of laying down a line between Sydney and Parramatta and Liverpool, to be afterwards extended to Bathurst and to Goulburn. The first sod was turned by the Hon. Mrs. Keith Stewart, daughter of Sir Charles Fitzroy, the

Governor of the colony, on the 3rd July, 1850. Although started during a period of trade depression, when there was an abundant supply of labour, the scheme was only well under weigh when the discovery of gold caused a stampede from the city, and the company was left without workmen to carry on the undertaking. Undeterred, however, by the difficulties into which the changing conditions of the country had plunged the Sydney Railroad and Tramway Company, private enterprise in 1853 essayed the further task of constructing a line between Newcastle and Maitland; but this project proved no more successful than the other, and in the following year the Government was forced to step in and carry out the schemes for which the two companies had been promoted. From that time the work of construction was vigorously pressed forward, and on the 26th September, 1855, the line from Sydney to Parramatta, 14 miles in length, was opened to traffic; and on the 11th April, 1857, Newcastle was connected with East Maitland. The extension to Goulburn of the Sydney line was completed on the 27th May, 1869.

While the Sydney Railroad and Tramway Company was endeavouring to surmount the obstacles that had arisen in its path, the work of railway construction was begun in the neighbouring State of Victoria, no fewer than three private companies being promoted in 1853 for that purpose. Material assistance in the shape of land grants and guarantee of interest was afforded by the Government; and on the 13th September, 1854, the first completed railway in Australasia, a line extending from Flinders-street, Melbourne, to Port Melbourne, was opened to traffic. It had been begun nearly three years after the line to connect Sydney with Parramatta, but was only  $2\frac{1}{2}$  miles long. No further mileage was brought into operation until May 13, 1857, when the Melbourne and Hobson's Bay Railway Company, which had constructed the first line, effected communication with St. Kilda; and on the 17th June of the same year a line from Williamstown to Geelong, 39 miles in length, which had been built by another company, was declared open. Meanwhile the Government of the State had not remained inactive. In addition to assisting private enterprise with liberal concessions, it had taken over in 1855 an unfinished line started by the third of the companies referred to, and was carrying on the work of construction on its own account. By the year 1863 it had acquired all the lines in the State with the exception of those owned by the Melbourne and Hobson's Bay Company, which were not purchased until the year 1878.

Although a line from Goolwa to Port Elliot, 6 miles in length, over which the locomotive now passes, was opened on the 18th May, 1854, it was at that time merely a horse tramway; and the first railway in South Australia was a line connecting the city with Port Adelaide,  $7\frac{1}{2}$  miles long, which was thrown open to traffic on the 21st April, 1856. The following year saw a railway constructed as far north as Gawler; while on the 1st October, 1889, a line from Palmerston to Pine Creek, in the Northern Territory, which had been built by the South Australian Government, was opened, the length being  $145\frac{1}{2}$  miles.

The northern State of Queensland had enjoyed the privilege of self-government for several years when, early in 1864, a line to connect Ipswich with Grandchester was commenced, and on the 31st July of the same year it was opened.

Although the Tasmanian Parliament granted a sum of £5,000 in 1863 for the survey of a line to connect Hobart with Launceston, the first railway in the island was one between Launceston and Deloraine, 45 miles in length, which was opened on the 10th February, 1871, having been commenced three years before. It was built by a private company, to whose capital, however, the Government had subscribed eight-ninths of the total amount of £450,000, on condition that the interest should be a first charge on the net receipts, and on the 3rd August, 1872, the line passed entirely into the ownership of the State. Communication between Hobart and Launceston was effected in 1876 by the completion of a line, connecting the southern city with Evandale Junction, which was constructed by an English company. The last of the States comprised in the Commonwealth to introduce the railway was Western Australia, where a line from the port of Geraldton to Northampton was begun during 1874 and opened in 1878. The commencement of railway construction in New Zealand was due to an agitation on the part of the settlers of Canterbury, who were desirous of facilitating communication between the city of Christchurch and the port of Lyttleton. The first portion of the line, as far as Ferrymead Junction, was brought into use on the 1st December, 1863.

The progress of railway construction, except, perhaps, in the State of Victoria, was anything but rapid during the earlier years. This was in a great measure owing to the sparseness of the population and the natural fear that the return would not justify the expenditure which would have to be incurred in making lengthy extensions of the lines. It was also due, as previously pointed out, to the low estimation in which Australasian securities were held in London, and the consequent high rate of interest at which money for railway construction had to be borrowed. Since the year 1871, however, all the States and New Zealand have made satisfactory progress. In the following table will be found the length of line opened during each year, and the total mileage at the close of the working year :—

Year.	Miles opened.					
	Total.			During each year.		
	Common-wealth.	New Zealand.	Australasia.	Common-wealth.	New Zealand.	Australasia.
1854	2½	.....	2½	2½	.....	2½
1855	16½	.....	16½	14	.....	14
1856	32½	.....	32½	16	.....	16
1857	117	.....	117	84½	.....	84½
1858	132	.....	132	15	.....	15
1859	171	.....	171	39	.....	39
1860	215	.....	215	44	.....	44

Year.	Miles opened.					
	Total.			During each year.		
	Common-wealth.	New Zealand.	Australasia.	Common-wealth.	New Zealand.	Australasia.
1861	243	.....	243	28	.....	28
1862	373	.....	373	130	.....	130
1863	395	5	400	22	5	27
1864	469	5	474	74	.....	74
1865	490	5	495	21	.....	21
1866	519	5	524	29	.....	29
1867	711	7	718	192	2	194
1868	782	7	789	71	.....	71
1869	911	7	918	129	.....	129
1870	994	46	1,040	83	39	122
1871	1,030	105	1,135	36	59	95
1872	1,168	105	1,273	138	.....	138
1873	1,353	145	1,498	185	40	225
1874	1,491	209	1,700	138	64	202
1875	1,602	542	2,144	111	333	444
1876	1,961	718	2,679	359	176	535
1877	2,493	954	3,447	532	236	768
1878	2,906	1,070	3,976	413	116	529
1879	3,222	1,171	4,393	316	101	417
1880	3,675	1,258	4,933	453	87	540
1881	4,192	1,334	5,526	517	76	593
1882	4,704	1,465	6,169	512	131	643
1883	5,107	1,480	6,587	403	15	418
1884	5,855	1,570	7,425	748	90	838
1885	6,227	1,654	7,881	372	84	456
1886	6,859	1,810	8,669	632	156	788
1887	7,657	1,841	9,498	798	31	829
1888	8,365	1,865	10,230	708	24	732
1889	9,162	1,912	11,074	797	47	844
1890	9,757	1,956	11,713	595	44	639
1891	10,163	2,011	12,174	406	55	461
1892	10,394	2,011	12,405	231	.....	231
1893	10,688	2,108	12,796	294	97	391
1894	10,974	2,168	13,142	286	60	346
1895	11,600	2,190	13,790	626	22	648
1896	11,641	2,190	13,831	41	.....	41
1897	11,970	2,185	14,155	329	(-) 5	324
1898	12,170	2,222	14,392	200	37	237
1899	12,702	2,257	14,959	532	35	567
1900	12,995	2,271	15,266	293	14	307
1901	13,497	2,300	15,797	502	29	531
1902	13,821	2,323	16,144	324	23	347

It will be seen from the foregoing table that the lines opened in the Commonwealth and Australasia averaged 30 miles in length during each year from 1854 to 1861; from 1862 to 1871 the annual average was 82 miles in the Commonwealth and 89 in Australasia; from 1872 to 1881, 312 miles in the Commonwealth and 439 in Australasia; from 1882 to 1891, 597 miles in the Commonwealth and 665 in Australasia; and from 1892 to 1902, 332 miles in the Commonwealth and 361 in Australasia. It is now the established policy of each state to keep the railways under State control, and only in exceptional circumstances is that policy departed from. Excluding coal, timber, and other lines which are not open to general traffic, there are within the Commonwealth only  $640\frac{1}{4}$  miles of private lines, equal to but 4.75 per cent. of the total mileage open; and in Australasia only  $728\frac{1}{4}$  miles, or 4.61 per cent. of the total mileage open. In Victoria the railways are entirely in the hands of the Government; while in Western Australia there are 277 miles of private lines, or 16.92 per cent. of the total mileage of the state; in New South Wales,  $81\frac{1}{2}$  miles; in Tasmania,  $160\frac{1}{2}$  miles, and in South Australia, 20 miles. A departure from the ordinary policy of the State has also been made in Queensland, where the construction of the railway from Mareeba to Chillagoe, a distance of 102 miles, has been carried out by private persons. The private lines of New Zealand have a total length of 88 miles. Except in the case of Western Australia, none of these private railways are trunk lines, the most important of them being primarily intended to facilitate the development of important mines, and not for general traffic.

The divergence of the policy of Western Australia from that pursued by the other states was caused by the inability of the Government to construct lines when railway extension was urgently required in the interests of settlement. Private enterprise was therefore encouraged by liberal grants of land to undertake the work of construction; but the changing conditions of the state have modified its policy, and on the 1st January, 1897, the Government acquired the Great Southern Railway, 243 miles in length, one of the two trunk lines in private hands. This railway, which was owned by the West Australian Land Company, Limited, was built on the land-grant system, the State concession being 12,000 acres for every mile of line laid down, of which the original concessionaire retained 2,000 acres. The total price paid by the Government for the railway, with all the interests of the company and of the original concessionaire, was £1,100,000, of which £800,000 is set down as the capital sum on which the railway authorities are expected to provide interest, exclusive of the amount invested in rolling stock. The other trunk line is the Midland Railway, 277 miles in length, owned by the Midland Railway Company of Western Australia, Limited. In this case the land granted by the state was also 12,000 acres per mile of line. In 1891 the Government granted some slight assistance to the company, and in the following year guaranteed £500,000 of 4 per cent. debentures, the security being a first charge

upon the railway and its equipment, and 2,400,000 acres selected land. At three months' notice, the state may foreclose should the company be indebted to it to the amount of £20,000.

The following statement shows the gauge and length of the private railways of Australasia, excluding coal, timber, and other lines which are not open to general traffic :—

Line.	Gauge.	Length.
<b>New South Wales—</b>	<b>ft. in.</b>	<b>miles.</b>
Deniliquin-Moama .....	5 3	45
Cockburn-Broken Hill .....	3 6	35½
Warwick Farm .....	4 8½	¾
<b>Queensland—</b>		
Mareeba to Chillagoe.....	3 6	102
<b>South Australia—</b>		
Glenelg Railway Co.'s lines :		
Holdfast Bay .....	5 3	7
Victoria Square .....	5 3	7
Sidings, loops, &c. ....	5 3	6
<b>Western Australia—</b>		
Midland : Midland Junction-Walkaway Junction .....	3 6	277
<b>Tasmania—</b>		
Emu Bay-Waratah-Guildford Junction-Zeehan .....	3 6	98
Lyell-Strahan .....	3 6	22
Gormanston to Kelly's Basin .....	3 6	33
Dundas-Zeehan .....	3 6	7
<b>New Zealand—</b>		
Wellington-Manawatu .....	3 6	84
Kaitangata-Stirling .....	3 6	4

A proviso has been inserted in the charters of the companies owning the private lines in New South Wales, whereby after a certain date the Government can, if disposed, acquire the lines at a valuation. Similar conditions are found in most of the charters granted by the other states permitting the construction of private lines.

In the construction of railways during the last working year the state of New South Wales displayed most activity. Of the 347 miles thrown open to traffic in Australasia during the twelve months ended 30th June, 1902, 177 were opened in New South Wales, comprising The Rock to Lockhart, Clyde to Carlingford, Byrock to Brewarrina, Gravesend to Reedy Creek, Cobar to the Peak, Reedy Creek to Inverell, and Goulburn to Crookwell.

The following table shows the extension of the railway in each state since 1861 :—

State.	1861	1866	1871	1876	1881	1886	1891-2	1901-2
New South Wales .....	73	143	358	554	1,040	1,941	2,266	3,107
Victoria .....	114	270	276	718	1,247	1,754	2,903	3,302
Queensland .....	*	50	218	298	800	1,433	2,320	2,903
South Australia .....	56	56	133	308	845	1,226	1,823	1,901
Western Australia .....	*	*	*	38	92	202	657	1,990
Tasmania .....	*	*	45	45	168	303	425	618
Commonwealth .....	243	519	1,030	1,961	4,192	6,859	10,394	13,821
New Zealand .....	*	5	105	718	1,334	1,810	2,011	2,323
Australasia .....	243	524	1,135	2,679	5,526	8,669	12,405	16,144

\* Railways not in existence.

In 1883 a junction was effected between the New South Wales and Victorian lines at the river Murray ; three years later direct communication was established between Victoria and South Australia ; and in 1888 the last mile of line connecting Sydney with the northern state of Queensland was completed, thus placing the four capitals, Brisbane, Sydney, Melbourne, and Adelaide, in direct communication with each other. A few years ago proposals were made to the Government of Western Australia to construct a railway upon the land-grant system, connecting the eastern districts of the state with South Australia. It was proposed to extend the lines to Eucla, close to the South Australian border, and when that state had extended its railways to the same point, Perth would be connected with all the capitals of the Australian states. In June, 1897, the South Australian Railways Commissioner, in a report to the Commissioner of Public Works, estimated the cost of construction and equipment of a line to the Western Australian border, a distance of 553 miles, at £1,903,000. When the railways of the two states shall have been connected, as they will possibly be at no far distant date, the European mails will, in all likelihood, be landed at Fremantle, and sent overland to all parts of the continent.

The following table shows the length of Government railways in course of construction and authorised on the 30th June, 1902 :—

New South Wales .....	Miles. 426
Victoria .....	232
Queensland .....	244
Western Australia .....	159
Tasmania .....	4
Commonwealth .....	1,065
New Zealand .....	212
Australasia .....	1,277

Notwithstanding the energetic expansion of the railway systems throughout Australasia since 1871, there is still room for considerable extension. In the state of South Australia construction is entirely confined to the south-eastern corner and to the extension of the Northern Line, which has its present terminus at Oodnadatta, 686 miles from Adelaide. It is proposed eventually to extend this line as far north as Pine Creek, the southern terminus of the Port Darwin line. In the course of the year 1896 offers were made on behalf of various syndicates for the construction of the Transcontinental railway, with the acquisition of the section from Palmerston to Pine Creek; but the Government was not prepared to recommend to Parliament the acceptance of any offer based on the land grant or guarantee system. When this railway is completed, direct overland communication will be established between the northern and southern portions of the continent. The length of the gap between the terminus at Oodnadatta and that at Pine Creek is 1,140 miles on the telegraph route.

In New South Wales the railway extensions will be chiefly confined to perfecting the various systems already constructed. At the present time several lines of what is termed the "pioneer" class are in course of construction in level pastoral country. These are of a light and cheap kind, on which the produce of the settlers may be conveyed to the trunk lines at a reasonable speed and at a cheaper rate than carriage by road. In Queensland, with its vast expanse of partly-settled territory and extensive seaboard, the railways are being constructed in separate systems. The lines commence from each of the principal ports and run inland, but there is no doubt that not many years will elapse before these systems will become branches of a main trunk-line which, in all likelihood, will be the Brisbane-Charleville line extended as far as Normanton at the Gulf of Carpentaria. In this state a system has been introduced by which railways are constructed under a guarantee given by the local authority on behalf of the ratepayers of the district. Details of this system are given on a subsequent page. In Victoria, Tasmania, and New Zealand the railways are well developed compared with size of territory, and any future extensions will hardly be on so large a scale as in the other states. In Western Australia great activity now prevails in extending the lines to the gold-fields, and also to the south-western portion of the state.

#### CONTROL OF STATE RAILWAYS.

The states of Victoria, South Australia, New South Wales, and Queensland have found it expedient to place the management and maintenance of railways under the control of commissioners. Victoria, in 1883, was the first state to adopt this system; four years later South Australia made the change, while New South Wales and Queensland followed in 1888. Each of these states appointed three officials



as commissioners, and conferred upon them large executive powers, amounting to almost independent control, the object aimed at being to obtain economical management of the lines free from political interference. Subsequently Queensland, Victoria, and South Australia reduced the number of commissioners to one; but in New South Wales, where the administration has been most successful, no changes in the system have been made. The control of the New Zealand railways was also handed over to a body of three commissioners in 1887; but at the beginning of 1895 the Government resumed charge of the lines, a general manager being appointed, responsible to a Minister for Railways.

In New South Wales and Victoria an additional safeguard in railway construction prevails. All proposals for new lines are submitted to committees selected from Members of the Houses of Parliament. These committees take evidence regarding the suitability of the route proposed, the probable cost of construction, the financial prospects of the line, and the grades to be adopted; and thereupon advise Parliament to adopt or reject the schemes proposed. This supervision of railway development may be said to have been attended with success, although lines that are not likely to be commercially successful have been recommended by the committee and sanctioned by Parliament.

#### DIVERSITY OF GAUGE.

Unfortunately for interstate communication, railway construction in Australia has proceeded without uniformity of gauge, and the accomplishment of this work, which it is everywhere admitted must be secured, becomes more formidable to contemplate as the years roll on. In 1846 Mr. Gladstone advised that the 4-ft. 8½-in. gauge should be adopted for any lines constructed in New South Wales; and two years later this gauge was adopted as the standard by the Royal Commission appointed for the purpose of determining a uniform gauge for England and Scotland. In 1850, however, the Sydney Railroad and Tramway Company decided to adopt the 5-ft. 3-in. gauge, and in 1852 an Act was passed which provided that all railways in the state should be laid down to that gauge. But in 1853 the company mentioned, having changed their engineer, altered their views on the gauge question, and applied to have the 4-ft. 8½-in. gauge substituted for the 5-ft. 3-in., succeeding in repealing the Act and in passing another which made the narrower gauge imperative. This step was taken without the concurrence of the other states, and feeling ran very high in Victoria in consequence, as two of the railway companies in that state had already given large orders for rolling-stock on the 5-ft. 3-in. gauge. Until the lines of the two states met on the boundary no discomfort was, of course, experienced; but since then the break of gauge, with the consequent change of trains, has been a source of irritation and inconvenience. The South Australian Government adopted at the outset the 5-ft. 3-in. gauge of Victoria;

but finding that the construction of lines of this class involved a heavier expense than they were prepared to face, the more recent lines were built on a gauge of 3 ft. 6 in. In that state there are 507 miles laid to the 5-ft. 3-in. gauge, and 1,229 $\frac{1}{4}$  to that of 3-ft. 6-in., which is also the gauge of the 145 $\frac{1}{2}$  miles of railway in the Northern Territory. The line joining Adelaide with the Victorian border, as well as several of the other trunk-lines, has been constructed on the wide gauge, so that the line from Melbourne to Adelaide is uniform. The private line which prolongs the South Australian system into New South Wales as far as Broken Hill is on the 3-ft. 6-in. gauge. All the Queensland lines are built on the gauge of 3 ft. 6 in., so that transshipment is necessary on the boundary between that state and New South Wales. Tasmania, Western Australia, and New Zealand have adopted the 3-ft. 6-in. gauge. The first line laid down in Tasmania was on the 5-ft. 3-in. gauge, but it was soon altered to 3 ft. 6 in. On the west coast of that island an experiment is being made in the construction of a 2-ft. gauge line, at one-fourth the cost of a line laid down to the Tasmanian standard gauge. The advisability of constructing lines of this class is also being considered in Victoria. The total length of line in Australasia laid down to a gauge of 5 ft. 3 in. is 3,809 $\frac{1}{2}$  miles; there are 3,025 $\frac{3}{4}$  miles on the 4-ft. 8 $\frac{1}{2}$ -in. gauge, and 8,228 $\frac{1}{2}$  miles on the 3-ft. 6-in. gauge.

As far back as May, 1889, Mr. Eddy urged the Government of New South Wales to take action with the object of securing a uniform gauge for the states, and frequently since that date the Railway Commissioners have directed attention to the urgency of dealing with this important question before the states incur greater expenditure in railway construction. They have suggested that the settlement of the difficult question of the adoption of a standard gauge should be approached from the standpoint of which of the two gauges, 4 ft. 8 $\frac{1}{2}$  in. and 5 ft. 3 in., can be adopted at the least cost and with the smallest amount of inconvenience to the country; and that the whole of the railways of New South Wales and Victoria, with that part of the South Australian lines laid to the 5-ft. 3-in. gauge, as well as the line to Cockburn, and all the lines in Queensland south of Brisbane leading to New South Wales, shall be altered to the standard, the cost of altering the railways and the rolling stock necessary to work them to be a national charge.

#### COMPARISON OF RAILWAY FACILITIES.

The population and area of territory per mile of line open vary considerably in the different states and New Zealand. In comparison with population, Western Australia, Queensland, and South Australia—the most extensive states—have the greatest mileage; but in proportion to the area of territory, Victoria, Tasmania, and New Zealand take the lead. The annexed table shows the relation of the railway mileage

to population and to the area of each state and New Zealand for the year 1901-2 :—

State.	Per Mile of Line Open.	
	Population.	Area.
	No.	sq. miles.
New South Wales .....	449	100
Victoria .....	366	26
Queensland .....	177	230
South Australia* .....	190	475
Western Australia .....	105	490
Tasmania .....	284	43
Commonwealth .....	279	215
New Zealand .....	339	45
Australasia .....	288	190

\* Including Northern Territory.

In the following table are given the average population and area of territory per mile of line open in the principal countries of the world. Of course a comparison can only be made fairly between Australasia and other young countries in process of development :—

Countries.	Length of Railway.	Per Mile of Line Open.	
		Population.	Area.
	miles.	No.	sq. miles
United Kingdom .....	22,078	1,877	5·5
France .....	26,730	1,444	7·6
Germany .....	31,492	1,789	6·6
Austria-Hungary .....	22,327	2,031	10·8
Belgium .....	2,833	2,363	4·0
Netherlands .....	1,730	2,993	7·3
Switzerland.....	2,362	1,403	6·7
Sweden .....	6,649	772	26·0
Norway .....	1,231	1,819	101·1
Russia (exclusive of Finland) .....	31,711	2,987	56·3
Spain .....	8,068	2,240	24·5
Italy .....	9,810	3,308	11·3
India (inclusive of Native States) .....	24,633	9,381	31·0
Canada .....	17,657	317	175·1
Cape Colony .....	2,914	806	95·1
Argentine Republic .....	10,595	452	11·7
Brazil .....	8,718	1,644	369·1
Chili .....	2,880	1,086	97·2
United States of America .....	194,321	392	18·0
Commonwealth of Australia .....	13,821	279	215
Australasia .....	16,144	288	190

## COST OF CONSTRUCTION.

At the close of the year 1901-1902, the cost of construction and equipment of the State railways completed and open to traffic in the Commonwealth was, in round figures, £126,943,000, or 58·8 per cent. of the public debts of the states comprised in the Federation, after deducting sinking funds. The construction and equipment of the railways of Australasia cost £145,114,000, or 54 per cent. of the public debt of Australasia, after deducting sinking funds. To what extent the states have contributed to this expenditure will be apparent from the subjoined table, showing the total cost and the average per mile :—

State.	Year.	Length of line open.	Gauge.	Total cost of Construction and Equipment.	Average cost per mile.
		miles.	ft. in.	£	£
New South Wales .....	1902	3,025 $\frac{3}{4}$	4 8 $\frac{1}{2}$	40,565,073	13,407
Victoria .....	"	3,302 $\frac{1}{2}$	5 3	40,613,784	12,298
Queensland .....	"	2,801	3 6	20,119,143	7,182
South Australia .....	"	1,736 $\frac{1}{4}$	{ 5 3 } { 3 6 }	13,275,037	7,645
Northern Territory.....	"	145 $\frac{1}{2}$	3 6	1,160,757	7,977
Western Australia .....	"	1,360	3 6	7,410,426	5,449
Tasmania .....	1901	457 $\frac{1}{2}$	3 6	3,799,098	8,304
Commonwealth .....	.....	12,828 $\frac{1}{2}$	.....	126,943,318	9,895
New Zealand .....	1902	2,235	3 6	18,170,722	8,130
Australasia .....	.....	15,063 $\frac{1}{2}$	.....	145,114,040	9,633

It will be seen that the lines which have been constructed most cheaply are those of Western Australia, where the average cost per mile has only been £5,449, as compared with an average of £9,895 for the Commonwealth and £9,633 for the whole of Australasia. In that state there have been few engineering difficulties to contend with, and the lines laid down have been of a light kind. In New South Wales, the average cost, given as £13,407, has been somewhat reduced lately, in consequence of the construction of light "Pioneer" lines, built at an expenditure of £2,019 per mile. The Minister for Public Works

has constructed 10, and is constructing 7 new lines by day labour, as the Railway Construction Department has had a somewhat unfortunate experience in regard to claims for extras to contracts, and expensive litigation in resisting such claims. In Victoria the average cost has been reduced from £13,153 to £12,298 since 1891. At that date it was decided to apply the "butty-gang" system to the construction of railways in the state, and to build all new country lines as cheaply as possible, and this principle has been strictly adhered to. Fairly substantial permanent-way has been laid down, with reduced ballast; unless absolutely necessary, fencing and gatehouses have been dispensed with; and only a skeleton equipment for stations and water supplies has been provided. As settlement progresses and traffic is developed, it is intended to raise these lines to the requisite standard of efficiency.

It would hardly be fair to institute a comparison between the cost of construction per mile in Australasia and in the densely-populated countries of Europe, for while in Europe the resumption of valuable ground is perhaps the heaviest expense in connection with the building of railways, in the states and New Zealand this item of expenditure is not of leading importance. The cost per mile in certain sparsely-settled countries is as follows :—

Canada .....	£11,713
Cape Colony .....	10,524
United States .....	12,616
Argentina.....	10,213
Mexico .....	9,417
Chili .....	10,103
Brazil .....	14,355

while for the Commonwealth of Australia it is £9,895, and for New Zealand £8,130.

#### REVENUE AND WORKING EXPENSES.

The avowed object of State railway construction in Australasia has been to promote settlement, apart from considerations of the profitable working of the lines; but at the same time the principle has been kept in view that in the main the railways should be self-supporting, and some of the states have, with more or less success, handed them over to Commissioners to be worked according to commercial principles, free from political interference. With the exception of South Australia, so far as the Palmerston-Pine Creek line in the Northern Territory is

concerned, in all the states the revenue derived from the railway traffic exceeds the working expenses. During 1898-9 the states of New South Wales and Western Australia derived a profit from the working of the lines; and for the year ended 30th June, 1900, the states of South Australia proper and Western Australia were similarly favoured. During 1900-1, the lines of New South Wales and Western Australia, and for the year ended 30th June, 1902, those of Western Australia, not only paid working expenses and interest but left a slight margin of profit. Even in New South Wales, where the Commissioners have achieved most commendable results during the term of their administration, and claim to have at last made the lines self-supporting, there is still a deficiency for the year ended 30th June, 1902, when it is borne in mind that the average price received for the loans of the state is but £96·41 per £100 of stock, and the interest payable is calculated accordingly. The net sum available to meet interest charges during the last two working years will be found in the following table, showing the earnings and working expenses:—

State.	Working year, 1900-1901.			Working year, 1901-1902.		
	Gross Earnings.	Working Expenses.	Net Earnings.	Gross Earnings.	Working Expenses.	Net Earnings.
	£	£	£	£	£	£
New South Wales.....	3,573,779	2,043,201	1,530,578	3,068,686	2,267,369	1,401,317
Victoria .....	3,337,797	2,075,239	1,262,558	3,367,843	2,166,118	1,201,725
Queensland .....	1,316,936	1,057,981	258,955	1,382,170	992,751	389,428
South Australia .....	1,236,616	729,039	507,577	1,085,175	689,517	395,658
Northern Territory ...	13,345	25,280	(—) 11,435	12,522	34,049	(—) 22,127
Western Australia ...	1,353,704	1,044,920	308,784	1,521,429	1,256,370	265,059
Tasmania* .....	202,959	160,487	42,472	205,791	173,400	32,391
Commonwealth ..	11,035,636	7,136,147	3,899,489	11,243,625	7,580,174	3,663,451
New Zealand† .....	1,727,236	1,127,848	599,388	1,874,586	1,252,237	622,349
Australasia .....	12,762,872	8,263,995	4,498,877	13,118,211	8,832,411	4,285,800

\* Years ended 31st December, 1900 and 1901.

† Years ended 31st March, 1901 and 1902.

(—) Denotes deficiency in amount available to meet working expenses.

The proportion of gross earnings absorbed by working expenses during each of the last five years will be found below :—

State.	Percentage of Gross Earnings absorbed by Working Expenses.				
	1897-8.	1898-9.	1899-1900.	1900-01.	1901-02.
New South Wales .....	53·34	53·75	55·93	57·17	61·80
Victoria .....	63·24	62·55	62·89	62·17	64·31
Queensland .....	56·43	57·14	64·78	80·34	71·82
South Australia .....	61·31	58·33	56·37	58·95	63·54
Northern Territory .....	143·50	117·73	164·47	182·59	276·70
Western Australia ..	77·11	70·91	68·40	77·19	82·58
Tasmania* .....	77·04	79·23	79·10	79·07	84·26
Commonwealth .....	60·70	59·71	61·46	64·66	67·41
New Zealand† .....	62·30	63·26	64·80	65·30	66·80
Australasia .....	60·91	60·18	61·94	64·75	67·33

\* Years ended 31st December, 1897-1901.

† Years ended 31st March, 1898-1902.

It will be seen from this table that the percentage of working expenses for the states comprised in the Commonwealth has increased from 60·70 to 67·41 in the course of the five years; the increase for Australasia as a whole being from 60·91 to 67·33. In each state of the Commonwealth and New Zealand, the working expenses have increased during the quinquennial period. In New South Wales, the increase was 8·46 per cent.; in Victoria, 1·07 per cent.; in Queensland, 15·39 per cent.; in South Australia proper, 2·23 per cent.; in the Northern Territory, 133·20 per cent.; in Western Australia, 5·47 per cent.; in Tasmania, 7·22 per cent.; and in New Zealand, 4·50 per cent. At the present time the proportion of gross earnings absorbed by working expenses is smallest in New South Wales, and, setting aside the Northern Territory railway, highest in Tasmania.

The following statement gives an analysis of the working expenses of the railways of the various states, for the year 1902 for all the states except Western Australia and Tasmania, where the figures refer to the year 1901, distinguishing the expenditure on maintenance, locomotive

power, repairs and renewals, traffic expenses, and general charges. The distribution under the various heads is that made by the railway authorities, and, so far as can be seen, like charges have been grouped together in every case; for New South Wales and Victoria, there is an item "Pensions and Gratuities," which is absent from the returns of the other states. Where gratuities are given in those states the sum is included under general charges. The item of "Compensation" can be given for all the states with the exception of Queensland, Tasmania, and New Zealand; this item being also included, for those states, under the heading of "General Charges." The important distinction of repairs to carriages and waggons, and of maintenance of locomotive power is unfortunately not observed by Western Australia and Tasmania, the manner in which such repairs are carried out, it is said, does not admit of an exact distribution of the various charges. It is not proposed to enter into a comparison of the various branches of expenditure since the differences disclosed by the table arise not from exigencies of working, but from the needs of the Treasurers of the states, and the freedom of control, or otherwise, allowed to the managers. In a subsequent part of this chapter dealing with the railway systems of the states individually, an analysis is given of the working expenses for ten years.

Expenditure on—	New South Wales.	Victoria.	Queensland.	South Australia (Proper).	North-ern Territory.	Western Aus-tralia.	Tas-mania.	New Zealand.
Maintenance—								
Total.....£	521,983	501,938	348,185	166,691	29,001	221,451	59,897	436,847
Per train mile.....d.	10·75	10·68	14·75	9·53	229·90	12·88	16·1	20·09
Per mile open.....£	179·3	153·8	124·33	96·0	199·4	163·4	130·3	196·17
Locomotive Power—								
Total.....£	875,582	710,105	317,540	278,839	2,418	497,188	63,580	351,172
Per train mile.....d.	18·04	15·10	13·45	15·96	19·17	28·92	17·0	16·64
Per mile open.....£	300·6	217·5	113·39	160·6	16·6	366·9	138·4	157·69
Carriage and Waggon Re- pairs—								
Total.....£	184,232	145,350	67,314	64,733	792	Included under		99,522
Per train mile.....d.	3·79	3·09	2·85	3·70	6·28	Locomotive		4·71
Per mile open.....£	63·2	44·5	24·03	37·3	5·5	Power.		44·69
Traffic Expenses—								
Total.....£	588,938	640,442	223,321	162,626	2,108	296,045	41,138	333,211
Per train mile.....d.	12·13	13·62	9·46	9·30	16·71	17·22	11·0	15·79
Per mile open.....£	202·2	196·2	79·74	93·6	14·5	218·5	89·5	149·63
Compensation—								
Total.....£	20,234	31,145	....	1,394	2	6,926	....	....
Per train mile.....d.	0·42	0·66	....	0·08	0·01	0·40	....	....
Per mile open.....£	6·9	9·5	....	0·8	....	5·1	....	....
Pensions and Gratuities—								
Total.....£	6,296	93,744	....	....	....	....	....	....
Per train mile.....d.	0·13	1·99	....	....	....	....	....	....
Per mile open.....£	2·2	28·7	....	....	....	....	....	....
General Charges—								
Total.....£	70,104	43,385	36,391	15,234	323	23,310	3,785	31,485
Per train mile.....d.	1·45	0·92	1·54	0·87	2·60	1·36	2·3	1·49
Per mile open.....£	24·1	13·3	13·00	8·8	2·3	17·2	19·1	14·14
Total Expenses—								
Total.....£	2,267,369	2,166,118	992,751	659,517	34,649	1,044,920	173,400	1,252,237
Per train mile.....d.	46·71	46·06	42·05	30·44	274·67	60·78	46·4	50·32
Per mile open.....£	778·4	663·5	354·49	397·1	238·3	771·1	377·3	562·32



## INTEREST RETURNED ON CAPITAL.

In establishing the financial results of the working of the lines, it is the practice of the railway authorities to compare the net returns with the nominal rate of interest payable on the railway loans outstanding, ignoring the fact that many loans were floated below par and that the nominal is not the actual rate of interest. A true comparison, of course, is afforded by taking the rate of interest payable on the actual sum obtained by the state for its outstanding loans. This information is not obtainable for New Zealand; but for the states of the Commonwealth it is to be understood that the figures in the second column of the following table represent the actual rate of interest payable, ascertained in the manner last described. On this basis, the only state whose lines paid their way during the year ended 30th June, 1902, was Western Australia, where the activity in gold-mining has resulted in a net profit of 0·07 per cent. after defraying the interest charge on the capital expenditure on the railway lines of the state. In New South Wales, where the Commissioners have announced a profit after paying interest on the invested capital, there is still a deficiency of 0·23 per cent., but it may be expected that this will be extinguished at an early date:—

State.	Interest returned on Capital.	Actual rate of Interest payable on outstanding Loans.	Average Loss.
	per cent.	per cent.	per cent.
New South Wales .....	3·45	3·68	0·23
Victoria .....	2·96	3·72	0·76
Queensland .....	1·93	3·94	2·01
South Australia .....	2·98	3·81	0·83
Northern Territory ..	(—) 1·99	4·37	6·36
Western Australia.....	3·54	3·47	*0·07
Tasmania.....	0·85	3·76	2·91
Commonwealth ...	2·88	3·74	0·86
New Zealand .....	3·43	3·76	0·33
Australasia .....	2·95	3·75	0·80

\* Average gain.

The rate of return on capital which is shown in the foregoing table represents the interest on the gross cost of the lines. In some cases the nominal amount of outstanding debentures is less than the actual expenditure on construction and equipment, owing to the fact that some loans have been redeemed; but as the redemption has been effected by means of fresh loans charged to general services, or by payments from

the general revenue, and not out of railway earnings, no allowance on this account can reasonably be claimed.

The table given below shows the rate of interest returned on the capital expenditure for each of the last five years, with the sum which such return falls short of the actual rate of interest payable on cost of construction. In the case of New Zealand, only the nominal loss is shown; the actual loss was somewhat higher :—

State.	1897-8.	1898-9.	1899-1900.	1900-01.	1901-2.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.

INTEREST RETURNED ON CAPITAL EXPENDITURE.

New South Wales .....	3·74	3·83	3·62	3·93	3·45
Victoria .....	2·49	2·75	2·83	3·14	2·96
Queensland .....	2·92	3·15	2·67	1·31	1·93
South Australia .....	2·98	3·42	3·91	3·86	2·98
Northern Territory .....	(-)0·53	(-)0·22	(-)0·82	(-)0·98	(-)1·99
Western Australia .....	4·62	4·55	5·81	4·35	3·54
Tasmania* .....	1·09	1·03	1·12	1·16	0·85
Commonwealth .....	3·11	3·31	3·25	3·14	2·88
New Zealand .....	3·24	3·29	3·42	3·48	3·43
Australasia .....	3·12	3·31	3·27	3·18	2·95

NET LOSS ON WORKING LINES.

New South Wales .....	0·04	+0·08	0·14	+0·19	0·23
Victoria .....	1·44	1·08	1·06	0·62	0·76
Queensland .....	1·12	0·85	1·35	2·67	2·01
South Australia .....	1·05	0·53	+0·02	0·01	0·83
Northern Territory .....	4·56	4·17	4·86	5·03	6·36
Western Australia .....	+1·03	+1·01	+2·29	+0·83	+0·07
Tasmania* .....	2·76	2·79	2·69	2·62	2·91
Commonwealth .....	0·79	0·53	0·59	0·65	0·86
New Zealand .....	0·65	0·52	0·37	0·30	0·33
Australasia .....	0·77	0·52	0·55	0·60	0·80

\* Years 1897 to 1901.

† Net profit.

In 1881 the New South Wales railways yielded 5·31 per cent.—a higher rate of interest on the capital cost than was ever reached before or since. In the same year the Victorian lines yielded a return of 4·04

per cent., which is the highest on record in that state, with the exception of 4.18 in the year 1886. The decline in the net profits was largely due to the extension of the lines in sparsely-populated districts; but with the adoption of a more prudent policy in the matter of construction, rendered necessary by the severe financial pressure to which the states were subjected, and with more careful management, the returns, as will be evident from the foregoing table, are again showing improvement.

## EARNINGS AND EXPENSES PER MILE.

The gross earnings, expenditure, and net earnings per average mile worked during the last two years were as follow :—

State.	Gross Earnings.		Expenditure.		Net Earnings.	
	1900-01.	1901-2.	1900-01.	1901-2.	1900-01.	1901-2.
	£	£	£	£	£	£
New South Wales..	1,286	1,259	735	778	551	481
Victoria .....	1,034	1,031	643	663	391	368
Queensland .....	470	493	378	354	92	139
South Australia ...	712	625	420	397	292	228
Northern Territory	95	86	174	238	(—) 79	(—)152
Western Australia.	999	1,122	771	927	228	195
Tasmania* .....	456	448	360	377	96	71
Commonwealth	883	887	571	598	312	289
New Zealand .....	794	842	519	562	275	280
Australasia...	870	880	563	592	307	288

\* 1900 and 1901.

For the states comprised in the Commonwealth the gross earnings per average mile worked during 1901-2 were £4 more than in the the previous year, and the working expenses were increased by £27, leaving the net earnings at £289 in 1901-2, as compared with £312 in 1900-1. For the whole of Australasia the gross earnings per average mile worked during 1901-2 were £10 more than in the previous year, and the working expenses were increased by £29, leaving the net earnings at £288 in 1901-2 as against £307 in 1900-1. On the next page will be found a table giving the returns per train mile. The states with the

exception of Queensland, South Australia proper, and Western Australia, show an increase in the train mileage run during 1901-2:—

State.	Gross Earnings.		Expenditure.		Net Earnings.	
	1900-01.	1901-2.	1900-01.	1901-2.	1900-01.	1901-2.
	d.	d.	d.	d.	d.	d.
New South Wales.....	79·69	75·58	45·56	46·71	34·13	28·87
Victoria .....	72·39	71·63	45·01	46·06	27·38	25·57
Queensland .....	54·61	58·54	43·87	42·05	10·74	16·49
South Australia .....	67·56	62·06	39·83	39·44	27·73	22·62
Northern Territory.....	109·75	99·26	200·39	274·67	(-)90·64	(-)175·41
Western Australia.....	78·74	81·00	60·78	66·89	17·96	14·11
Tasmania* .....	59·70	55·14	47·20	46·46	12·50	8·68
Commonwealth.....	74·61	70·59	46·32	47·59	25·29	23·00
New Zealand.....	89·75	88·80	58·58	59·32	31·17	29·48
Australasia .....	73·60	72·72	47·66	48·96	25·94	23·76

\* 1900 and 1901.

#### FINANCIAL RESULTS OF FOREIGN RAILWAYS.

The interest on capital cost, the proportion of working expenses to the gross revenue, and the return per train mile for the railways of some of the principal countries of the world are given below. The figures for the countries other than Australasia refer either to the year 1901 or to 1899:—

Country.	Capital Cost.			Working Expenses: Proportion to Gross Revenue.	Per Train Mile.		
	Total.	Per Mile Open.	Return Per Cent.		Gross Revenue.	Working Expenses.	Net Revenue.
	£	£	p. cent.	per cent.	d.	d.	d.
United Kingdom .....	1,195,564,478	54,151	3·27	63·33	64·1	40·6	23·5
France .....	648,760,000	27,697	4·27	51·31	67·1	34·5	32·6
Germany .....	606,700,000	20,257	6·06	60·69	76·7	45·6	31·1
Belgium .....	75,361,324	26,591	4·85	59·60	56·0	33·4	22·6
United States .....	2,298,741,000	12,616	4·08	65·24	75·0	49·0	26·0
Canada .....	214,278,339	11,713	2·16	69·06	67·4	46·6	10·8
Cape Colony .....	22,409,389	10,524	4·35	74·63	89·0	66·4	22·6
Commonwealth of Australia .....	126,943,318	9,895	2·88	67·41	70·6	47·6	23·0
Australasia .....	145,114,040	9,633	2·95	67·33	72·7	49·0	23·7

The figures given above for Cape Colony are for State lines only.

## COACHING AND GOODS TRAFFIC.

The following table shows the number of passengers carried on the lines of the various states during the years 1881, 1891-2, and 1901-2. The number of journeys on the Victorian lines during the year ended 30th June, 1902, approximates to those of 1888-9, 1889-90, and 1890-91, and though, in common with the rest of the states, a great reduction occurred in 1893-94, the traffic, since the latter year, has manifested an upward movement. All the states have experienced the effects of the diminished spending power of the people, following on the financial crisis, but in every case a recovery has taken place. The number of passenger journeys in Tasmania in 1901 shows a small increase compared with the 1891 returns:—

State.	Passengers carried.		
	1881.	1891-2.	1901-2.
New South Wales .....	6,907,312	19,918,916	30,885,214
Victoria .....	18,964,214	55,148,122	57,465,077
Queensland* .....	247,284	2,370,219	4,636,174
South Australia .....	3,032,714	5,744,487	9,497,222
Northern Territory .....	.....	4,541	3,755
Western Australia.....	67,144	456,631	8,158,299
Tasmania.....	102,495	704,531	777,445
Commonwealth .....	29,321,163	84,347,447	111,423,186
New Zealand .....	2,911,477	3,555,764	7,356,136
Australasia .....	32,232,640	87,903,211	118,779,322

\* Exclusive of journeys of season ticket-holders.

The amount of goods tonnage is shown in the subjoined table. In the period from 1881 to 1891 there was an increase of about 102 per cent., varying from 44 per cent. in New Zealand to 747 per cent. in Tasmania. During the decennial period 1891-2-1901-2, the increase in tonnage has varied from 4 per cent. in South Australia to 1,401 per

cent. in Western Australia, with an average increase of nearly 63 per cent. for the Commonwealth, and 64 per cent. for the whole of Australasia.

State.	1881.	1891-2.	1901-2.
	tons.	tons.	tons.
New South Wales .....	2,033,850	4,296,713	6,467,552
Victoria .....	1,366,603	2,720,886	3,433,627
Queensland .....	161,008	768,527	1,725,520
South Australia .....	646,625	1,337,859	1,392,257
Northern Territory .....	.....	2,633	2,436
Western Australia.....	27,816	135,890	2,040,092
Tasmania.....	21,043	178,224	314,628
Commonwealth .....	4,256,945	9,440,732	15,376,112
New Zealand .....	1,437,714	2,066,791	3,529,177
Australasia .....	5,694,659	11,507,523	18,905,289

The percentage of receipts from coaching traffic to the total receipts is somewhat less in the states of the Commonwealth and New Zealand than in the United Kingdom, where for the year 1901 the coaching receipts formed 46·82 per cent. of the total obtained from goods and passenger traffic. The figures for each state are given below :—

State.	Coaching Traffic.	Goods Traffic.
	per cent.	per cent.
New South Wales .....	38·26	61·74
Victoria .....	48·94	51·06
Queensland .....	37·13	62·87
South Australia .....	35·19	64·81
Northern Territory .....	27·49	72·51
Western Australia .....	30·73	69·27
Tasmania .....	47·22	52·78
Commonwealth .....	40·26	59·74
New Zealand .....	38·68	61·32
Australasia .....	40·04	59·96

#### AVERAGE WEIGHT OF TRAIN LOAD.

The useful comparisons that may be made between the railway systems of the various states are very limited, and greater uniformity in the presentation of the railway reports is extremely desirable in view of the provisions in the Commonwealth Act for the possible

control of the railway systems by the central government. An example of want of uniformity in an important particular is the absence of information which would enable the average train load to be ascertained. This information can only be given for two states—South Australia and New South Wales—and for the latter state, complete returns are available for three years only. The figures for South Australia show a considerable variation in the average weight during the last seven years; but, for the years 1899, 1900, and 1901, the average is uniformly high when compared with that for each of the preceding three years. In 1902 a considerable fall occurred, consequent on a falling off in tonnage carried without a commensurate reduction in mileage. The figures quoted do not include the business of the Northern Territory:—

Year.	Goods mileage.	Ton mileage.	Average weight of train.
			tons.
1896	2,089,911	134,846,696	64·52
1897	2,265,277	159,454,588	70·34
1898	2,273,537	157,143,651	69·11
1899	2,426,477	191,041,569	78·73
1900	2,569,958	197,079,956	76·68
1901	2,686,789	202,649,157	75·42
1902	2,468,326	170,523,167	69·08

The average tonnage for goods trains is, therefore, 72 tons, which is 4 tons higher than in New South Wales, the only other system with which a comparison can be made. The New South Wales figures, with the exception of those for the years 1900, 1901, and 1902, are unsatisfactory, inasmuch as the goods mileage relates to the year ended 30th June, while the ton mileage is for the year ending 31st December following. No figures can be quoted for 1899:—

Year.	Goods mileage.	Ton mileage.	Average weight of train.
			tons.
1896	4,001,164	255,621,932	63·9
1897	4,244,385	273,400,624	64·4
1898	4,260,368	314,996,969	73·9
1900	4,610,343	320,364,852	69·5
1901	5,836,587	404,740,360	69·4
1902	6,586,032	436,814,308	66·3

The average for the period was 68 tons. The figures for New South Wales and for South Australia compare very favourably with the

returns of the British railways, but are very far behind those of some of the great American lines, as the following figures show :—

## BRITISH RAILWAYS, 1900.

Company.	Goods mileage.	Ton mileage.	Average weight of train.
			tons.
Lond. North-Western .....	22,668,940	1,311,000,000	57
Midland .....	27,270,791	1,377,000,000	50
Great Western .....	23,096,578	1,056,000,000	46
North-Eastern .....	17,565,768	1,055,000,000	60
Great Northern .....	12,027,759	534,000,000	44½
Lancashire and Yorkshire	6,681,695	450,000,000	67
Great Eastern .....	8,564,851	322,000,000	37½
Great Central .....	8,328,551	360,000,000	43
Total .....	126,204,933	6,465,000,000	51

The New York Central shows to great advantage compared with the British lines ; the average weight of train for the years quoted was :—

	tons.		tons.
1894 .....	249	1897 .....	270
1895 .....	252	1898 .....	299
1896 .....	268	1899 .....	322

## ROLLING STOCK.

The following table gives the different classes of rolling stock in the possession of the several Australasian Governments at the end of the year 1901-2, and, considerable as are the numbers of each class, they could with advantage be largely increased in most of the states :—

State.	Engines.	Coaching Stock.	Goods Stock.
New South Wales .. .....	518	1,073	11,183
Victoria .....	536	1,482	9,716
Queensland .....	362	419	6,943
South Australia .....	345	431	6,122
Northern Territory .....	6	7	134
Western Australia .....	274	260	5,285
Tasmania .....	71	190	1,170
Commonwealth ...	2,112	3,862	40,553
New Zealand .....	362	701	12,444
Australasia .....	2,474	4,563	52,997

## RAILWAY ACCIDENTS.

The persons meeting with accidents on railway lines may be grouped under three heads—passengers, servants of the railways, and trespassers ; and the accidents themselves might be classified into those arising from



causes beyond the control of the person injured, and those due to misconduct or want of caution. The following table shows the number of persons killed and injured on the Government railways during 1901-1902 in those states for which returns are available :—

State.	Passengers.		Railway Employés.		Trespassers, &c.		Total.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
New South Wales .....	2	40	14	750	18	32	34	822
Victoria .....	4	355	10	398	26	85	40	838
South Australia .....	...	2	4	31	8	3	12	36.
Northern Territory .....	...	.....	...	.....	1	.....	1	.....
New Zealand .....	6	17	8	447	11	175	25	639.

The railways of Australasia have been as free from accidents of a serious character as the lines of most other countries. In order to obtain a common basis of comparison it is usual to find the proportion which the number of persons killed or injured bears to the total passengers carried. There is, however, no necessary connection between the two, for it is obvious that accidents may occur on lines chiefly devoted to goods traffic, and a more reasonable basis would be the accidents to passengers only compared with the number of passengers carried. The data from which such a comparison could be made are wanting for some countries. As far as the figures can be given they are shown in the following table, which exhibits the number of passengers killed and injured per million carried. The figures are calculated over a period of ten years and brought down to the latest available dates :—

Country.	Number of Passengers.		Average per million passengers carried.	
	Killed.	Injured.	Killed.	Injured..
Germany.....	582	2,341	0·1	0·4
Austria-Hungary.....	191	1,896	0·1	1·3
Belgium .....	139	1,518	0·1	1·5
Sweden .....	24	41	0·1	0·2
France.....	744	3,545	0·2	1·1
Norway .....	8	10	0·1	0·1
Holland .....	21	93	0·1	0·4
Switzerland .....	177	669	0·4	1·5
Russia.....	541	2,090	0·9	3·6
United Kingdom.....	142	5,606	0·01	0·6
Spain .....	155	924	0·6	3·3
Canada .....	109	767	0·7	4·8
New South Wales.....	62	471	0·26	2·0
Victoria .....	27	1,447	0·06	3·1
South Australia.....	11	20	0·17	0·31
New Zealand.....	46	191	0·94	3·90

## NEW SOUTH WALES.

The progress of railway construction during the twenty years which followed the opening of the first line was very slow, for in 1875 the length of line in operation had only reached 435 miles. From 1876 to 1889, greater activity prevailed, no less than 1,748 miles being constructed during this period, but this rate of increase was not continued, inasmuch as only 14 miles were opened during the next three years. Subsequently there was renewed activity, and the length of line opened to 30th June, 1902, was 3,025 $\frac{3}{4}$  miles, the amount expended thereon for construction and equipment being £40,565,073, or at the rate of £13,407 per mile.

The railways of the State are divided into three branches, each representing a system of its own. The southern system, which is the most important, serving as it does the richest and most thickly-populated districts, and placing Sydney, Melbourne, and Adelaide in direct communication, has several offshoots. From Culcairn, a line connects with Corowa on the Murray River; from The Rock a line extends to Lockhart; from Junee a branch extends as far as the town of Hay in one direction, and Finley in another, and places the important district of Riverina in direct communication with Sydney. From Cootamundra a line branches off in a southerly direction to Gundagai, and another in a north-westerly direction to Temora; while from Murrumburrah a line has been constructed to Blayney, on the western line, thus connecting the southern and western systems of the state. From Koorawatha a branch has been laid down to connect Grenfell with the railway system. Nearer the metropolis, the important town of Goulburn is connected with Cooma, bringing the rich pastoral district of Monaro into direct communication with Sydney. From Goulburn, a branch line has also been opened to Crookwell. Another line that forms part of the southern system has been constructed to Nowra, connecting the metropolis with the coastal district of Illawarra, which is rich alike in coal and in the produce of agriculture. The western system of railways extends from Sydney over the Blue Mountains, and has its terminus at Bourke, a distance of 503 miles from the metropolis. Leaving the mountains, the western line, after throwing out a branch from Wallerawang to Mudgee, enters the Bathurst Plains, and connects with the metropolis the rich agricultural lands of the Bathurst, Orange, and Wellington districts. Beyond Dubbo it enters the pastoral country. At Blayney, as before stated, the western line is connected with the southern system by a branch line to Murrumburrah; at Orange a branch connects that town with Forbes on the Lachlan River, and from Parkes, one of the stations on this branch line, an extension to Condobolin on the Lachlan River has been constructed. Further west, on the main line at Nevertire, a short

line extends to the town of Warren, and at Nyngan a branch line connects the important mining district of Cobar with Sydney. From Byrock a line branches off to Brewarrina. The western system also includes a short line from Blacktown to Richmond on the Hawkesbury River; and a branch line is in course of construction from Dubbo to Coonamble. The northern system originally commenced at Newcastle, but a connecting line has been constructed, making Sydney the head of the whole of the railway systems of the state. This connecting line permits of direct communication between Adelaide, Melbourne, Sydney, and Brisbane, a distance from end to end of 1,808 miles, or altogether between the terminus of Oodnadatta, in South Australia, and Cunnamulla, in Queensland, there is one continuous line of railway, 3,100 miles in length. The northern system comprises a branch from Werris Creek, *via* Narrabri and Moree, to Inverell, thus placing the Namoi and Gwydir districts in direct communication with the ports of Newcastle and Sydney. A portion of the North Coast railway has also been constructed from Murwillumbah, on the Tweed River, to Lismore on the Richmond River. A short line branches off the main northern line at Hornsby, and connects with the north shore of Port Jackson at Milson's Point.

Up to October, 1888, the control of the railways was vested in the Minister for Works, the direct management being undertaken by an officer under the title of Commissioner. It was, however, recognised that political influence entered unduly into the management of this large public asset, and, as a consequence, the "Government Railways Act of 1888" was passed, with the object of removing the control and management of the railways from the political arena, and vesting them in three railway Commissioners, who were required to prepare for presentation to Parliament an annual report of their proceedings, and an account of all moneys received and expended during the preceding year. While the avowed object of state railway construction has been to promote settlement, apart from consideration of the profitable working of the lines, still the principle has been kept in view that in the main the railways should be self-supporting. It will be seen, from the subsequent pages, that the present management, despite the fact that they are hampered by a large number of unprofitable lines, have succeeded in placing the railways of the state in a satisfactory financial position.

#### *Revenue and Working Expenses.*

The net sum available to meet interest charges during the last decennial period is set forth in the following table, and the returns show that the Commissioners have achieved most important results during their term of administration, and may reasonably claim to have at last made the lines almost self-supporting, as during the year ended 30th June, 1902, there was only a matter of £91,000 between the net-

earnings and the interest charge, despite the exceptional conditions that had to be contended with:—

Year.	Gross Earnings.	Working Expenses.	Net Earnings.	Proportion of Working Expenses to Gross Earnings.
	£	£	£	Per cent.
1893	2,927,056	1,738,516	1,188,540	59·39
1894	2,813,541	1,591,842	1,221,699	56·58
1895	2,878,204	1,567,589	1,310,615	54·46
1896	2,820,417	1,551,888	1,268,529	55·02
1897	3,014,742	1,601,218	1,413,524	53·11
1898	3,026,748	1,614,605	1,412,143	53·34
1899	3,145,273	1,690,442	1,454,831	53·75
1900	3,163,572	1,769,520	1,394,052	55·93
1901	3,573,779	2,043,261	1,530,578	57·17
1902	3,668,686	2,267,369	1,401,317	61·80

In the foregoing table will be found ample evidence of the economical working of the State railways under their present management, inasmuch as the net earnings for the financial year ended 30th June, 1902, were 38·20 per cent. of the total earnings, as against 33·31 per cent. when the Commissioners took office. The net earnings, exhibited in the last year of the table, show a considerable improvement on those for the first year. The financial depression of 1893, which brought about a great change in the character of the coaching traffic, and the continued unfavourable character of the seasons, adversely affected the earnings of several years; the fall in earnings, however, was met by a reduction in working expenses, so that the financial result of the railway management was not greatly affected. The year 1900 compares somewhat unfavourably with the three years immediately preceding. This is due to the fact that, notwithstanding a much larger tonnage carried, the merchandise and live stock traffic showed a decrease in freight earned, clearly indicating that the traffic from these sources had been carried at less profitable rates than hitherto. The traffic in wool and hay also showed a large falling off, but there was no further diminution in the net earnings for the year 1901, the total, £1,530,578, being the largest for the period shown in the table. The revenue exceeded that of the previous year by £410,207, towards which all classes of traffic contributed. The increased traffic, the greater cost of coal and materials, and the more liberal advances granted to the wages staff, were responsible for the rise of £273,681 in the working expenses. For the year ended 30th June, 1902, however, a considerable falling off in the net earnings occurred. The rise from 57·17 to 61·80 in the percentage of working expenses to gross earnings was due to the increased volume of traffic carried at exceptionally low rates, largely contributed to by the concessions made in the carriage of starving stock and fodder.

The increased cost of fuel, the additional repairs to the rolling stock and permanent way, the necessity for hauling water for locomotive and other purposes, and the increments granted to the staff, also contributed to the reduction in net earnings. No appreciable reduction in the percentage of expenditure to earnings is practicable, inasmuch as the Commissioners have provided for concessions in connection with the carriage of starving stock and fodder, and they will have to face a considerable shortage in the carriage of agricultural and pastoral produce, as well as other lines of general traffic for the present year. It may also be mentioned that considerable expense is being incurred in connection with the haulage of water to far-distant points. The proportion of working expenses to earnings is less in New South Wales than in any other part of Australia, as the following figures, which are the average of the five years 1898-1902, will show:—

	Per cent.
New South Wales .....	56·61
Victoria.....	63·04
Queensland .....	66·16
South Australia .....	61·04
Western Australia .....	75·68
Tasmania .....	79·88
New Zealand .....	64·66

An analysis is given hereunder of the working expenses of the New South Wales railways for the ten years, 1893-1902; in this statement the total expenses as well as the expenses per train mile and per mile of line in operation, are given. It will be seen that there has been a general reduction in the expenditure per train mile, and this reduction is visible in all the details included in the total, with the exception of the expenditure upon locomotive power, which has slightly increased during the ten years. In regard to the working expenses generally, it may be said that the condition of affairs revealed by the table is satisfactory. When the Commissioners took over the management of the railways in 1888, large renewals of rolling stock were needed, while additional expenditure had to be incurred on permanent way and buildings. The result of this will be seen in the high outlay per train mile and per mile open in the earlier years of the decade. By the year 1896, the lines were in thorough working order, and have been so maintained since that date. The rolling stock has been very greatly improved; the tractive power of the engines has been increased, and types of locomotives adapted to the special and general needs of the traffic introduced.

Year ended 30th June.	Maintenance of Way, Works, and Buildings.	Locomotive Power.	Carriage and Waggon Repairs and Renewals.	Traffic Expenses.	Compensation.	Pensions and Gratuities.	General Charges.	Total.
1893	£ 474,142	£ 557,574	£ 129,188	£ 503,137	£ 3,590	£ . . . .	£ 70,885	£ 1,738,516
1894	418,989	507,649	127,221	458,011	5,186	10,744	64,042	1,591,842
1895	399,679	494,657	130,776	441,798	33,232	8,446	59,001	1,567,589
1896	350,964	533,255	150,073	437,591	15,248	3,878	60,879	1,551,888
1897	358,057	574,255	152,885	444,857	2,894	5,203	63,067	1,601,218
1898	353,969	597,455	139,161	455,545	3,296	4,504	60,675	1,614,605
1899	370,197	635,145	141,942	471,532	5,451	2,652	63,523	1,690,442
1900	406,044	648,767	159,630	478,818	4,164	4,250	67,847	1,769,520
1901	484,750	761,625	174,478	537,227	11,111	4,764	69,246	2,043,201
1902	521,983	875,582	184,232	588,938	20,234	6,296	70,104	2,267,369

## PER TRAIN MILE.

	d.	d.	d.	d.	d.	d.	d.	d.
1893	15·16	17·83	4·13	16·09	·11	· . . .	2·27	55·59
1894	14·03	16·99	4·26	15·33	·18	·36	2·14	53·29
1895	12·63	15·63	4·13	13·96	1·05	·27	1·87	49·54
1896	10·91	16·58	4·67	13·60	·47	·12	1·89	48·24
1897	10·57	16·95	4·51	13·13	·09	·15	1·86	47·26
1898	10·13	17·19	4·00	13·11	·10	·13	1·75	46·46
1899	10·09	17·32	3·87	12·85	·14	·07	1·73	46·07
1900	10·96	17·51	4·31	12·92	·11	·11	1·83	47·75
1901	10·81	16·98	3·89	11·98	·25	·10	1·55	45·56
1902	10·75	18·04	3·79	12·13	·42	·13	1·45	46·71

## PER MILE OPEN.

	£	£	£	£	£	£	£	£
1893	204·7	240·8	55·8	217·2	1·5	· . . .	30·6	750·6
1894	172·6	209·1	52·4	188·7	2·1	4·4	26·4	655·7
1895	158·9	198·6	52·0	175·6	13·2	3·4	23·4	623·1
1896	138·6	210·6	59·3	172·9	6·0	1·5	24·1	613·9
1897	139·0	223·0	59·4	172·7	1·1	2·0	24·5	621·7
1898	133·1	224·7	52·3	171·3	1·3	1·7	22·8	607·2
1899	136·9	234·9	52·5	174·4	2·0	1·0	23·5	625·2
1900	147·9	230·4	58·1	174·5	1·5	1·7	24·7	644·8
1901	174·5	274·2	62·8	193·2	4·1	1·7	25·0	735·5
1902	179·2	300·6	63·2	202·2	6·9	2·2	24·1	778·4

*Interest returned on Capital.*

In establishing the financial results of the working of the lines it is the practice of railway authorities to compare the net returns with the nominal rate of interest payable on the railway loans or on the public debt of the state. An accurate comparison can only be made by taking the average rate of interest payable on the actual sum obtained by the state for its outstanding loans. On this basis, the lines of the state have met the interest on construction and equipment during five years only, viz., 1881, 1882, 1883, 1899, and 1901. In 1901 the lines yielded a net sum of £74,000 after paying working expenses, interest, and all charges, but the year 1902 showed a loss of £91,000:

The following table shows the average loss for each year during the period 1893-1902 :—

Year.	Interest returned on Capital.	Actual Rate of Interest payable on Outstanding Loans.	Average Loss.
	per cent.	per cent.	per cent.
1893	3·48	3·88	0·40
1894	3·46	3·89	0·43
1895	3·58	3·94	0·36
1896	3·44	3·86	0·42
1897	3·78	3·81	0·03
1898	3·74	3·78	0·04
1899	3·83	3·75	*0·08
1900	3·62	3·76	0·14
1901	3·93	3·74	*0·19
1902	3·45	3·68	0·23

\* Average gain.

The fluctuation of the profits is partly owing to the extension of the lines in sparsely-populated districts ; but as a result of more economical working the returns are showing improvement. In this connection it is worth noting that there are sixteen branch lines on which over twelve millions sterling have been expended which do not pay their way, the loss on these lines being about £250,000 per annum.

#### *Earnings and Expenses per Mile.*

Two important facts which demonstrate the financial position of the railways and the character of the management are the earnings per train mile and per average mile open. Although the returns now being realised cannot be compared with those of 1875, when the net earnings per train mile fell little short of 52d., and per mile open of £775, the earnings, with the exception of those for the year 1902, are in every way encouraging. The falling off in 1902 was largely due to the increased volume of traffic carried at exceptionally low rates, the average revenue derived from all descriptions of merchandise and live stock traffic, exclusive of terminal charges, having decreased from 1·13d. to 1·07d. per ton per mile. Under the control of the Commissioners the net return per train mile has increased from 27·4d. to 28·9d., or 5·5 per cent. ; while per mile of line open for traffic the advance has been from £374 to £481, or 28·6 per cent. The gross earnings, expenditure,

and net earnings per train mile for the past ten years are shown in the following table:—

Year.	Gross Earnings per train mile.	Expenditure per train mile.	Net Earnings per train mile.
	d.	d.	d.
1893	93·60	55·59	38·01
1894	94·18	53·29	40·89
1895	90·96	49·54	41·42
1896	87·68	48·24	39·44
1897	88·99	47·26	41·73
1898	87·10	46·46	40·64
1899	85·72	46·07	39·65
1900	85·36	47·75	37·61
1901	79·69	45·56	34·13
1902	75·58	46·71	28·87

The gross earnings, expenditure, and net earnings per average mile per for the past ten years, were as follow:—

Year.	Gross Earnings per average mile open.	Expenditure per average mile open.	Net Earnings per average mile open.
	£	£	£
1893	1,264	750	514
1894	1,159	656	503
1895	1,144	623	521
1896	1,114	613	501
1897	1,171	622	549
1898	1,138	607	531
1899	1,163	625	538
1900	1,153	645	508
1901	1,286	735	551
1902	1,259	778	481

In many cases the railways of the state pass through heavy and mountainous country, involving steep gradients. For the more expeditious and economical working of the traffic, important deviations have been and are being carried out to secure better grades and to ease the curves. While much has been done in this direction, much more remains to be done, as many of the lines have been constructed with an unusual proportion of steep gradients, of which the worst are on the trunk lines, and are so situated that the whole of the traffic must pass over them. In the southern system, the line at Cooma reaches an altitude of 2,659 feet above the sea level; in the western, at the Clarence station, Blue Mountains, a height of 3,658 feet is attained; while on the northern line the highest point, 4,471 feet, is reached at



Ben Lomond. In no other state of the Commonwealth or New Zealand do the lines attain such an altitude. In Queensland the maximum height is 3,008 feet; in Victoria, 2,452 feet; in South Australia, 2,024 feet; in Western Australia, 1,522 feet; and in New Zealand, 1,252 feet. Where heavy gradients prevail, the working expenditure must necessarily be heavier than in the states where the surface configuration is more level.

*Coaching and Goods Traffic.*

The following table shows the number of passengers carried on the lines of the state during the year 1881, and for the last ten years, together with the receipts from the traffic, and the average receipts per journey:—

Year.	Passengers carried.	Receipts from Coaching Traffic.	Average Receipts per journey.
	No.	£	
1881	6,907,312	488,675	16·97
1893	19,932,703	1,115,042	13·43
1894	19,265,732	1,047,029	13·04
1895	19,725,418	1,022,901	12·45
1896	21,005,048	1,043,922	11·93
1897	22,672,924	1,098,696	11·63
1898	23,233,206	1,126,257	11·63
1899	24,726,067	1,158,198	11·22
1900	26,486,873	1,227,355	11·12
1901	29,261,324	1,370,530	11·23
1902	30,885,214	1,403,744	10·91

It will be seen that the years 1896 to 1902 show far larger numbers of passenger journeys than preceding years, but less satisfactory results in the way of average receipts per journey. This does not so much arise from curtailment of long-distance travelling as from the change of a large body of travellers from first to second class—a result due to diminished means, and doubtless to some extent to the more comfortable carriages now provided for second-class passengers. A return to prosperous times should show an increase in first-class travellers, but it frequently happens that the removal of the original impelling cause is not followed by a return to previous habits, so that the railways may not altogether recover the revenue lost by the change on the part of the travelling public.

The amount of goods tonnage for the year 1881, and from 1893 to 1902 is shown in the following table:—

Year.	Tonnage of Goods and Live Stock.	Earnings.
	tons.	£
1881	2,033,850	955,551
1893	3,773,843	1,812,014
1894	3,493,919	1,766,512
1895	4,075,093	1,855,303
1896	3,953,575	1,776,495
1897	4,567,041	1,916,046
1898	4,630,564	1,900,491
1899	5,248,320	1,987,075
1900	5,531,511	1,936,217
1901	6,398,227	2,203,249
1902	6,467,552	2,264,942

The subdivision of the tonnage of goods and live stock for the year ended 30th June, 1902, into a general classification is set forth in the subjoined statement. Particulars of the tonnage are given under nine broad classes, while the table also shows the average distance goods of each class were carried, and the average earnings per ton per mile. The last figure, however, does not include the terminal charges, which would probably increase the revenue per ton per mile by about 0·20d., from 1·07d. to 1·27d. The "miscellaneous" traffic comprises timber, bark, agricultural and vegetable seeds, in 5-ton lots; firewood, in 5 ton lots; bricks, drain pipes, and various other goods. "A" and "B" classes consist of lime, fruit, vegetables, hides, tobacco leaf, lead and silver ore, caustic soda and potash, cement, copper ingots, fat and tallow, mining machinery, ore tailings, leather, agricultural implements in 5 ton lots; and various other goods.

Description of Traffic.	Tons carried.	Average number of miles each ton of traffic is carried.	Earnings per ton per mile.
		miles.	d.
Coal, coke, and shale .....	3,520,027	21·93	0·51
Firewood .....	215,655	27·03	0·76
Grain, flour, &c. ....	387,720	233·89	0·44
Hay, straw, and chaff .....	245,574	201·83	0·36
Miscellaneous .....	613,125	62·02	0·72
Wool .....	105,252	261·53	1·98
Live stock .....	238,668	228·43	1·66
"A" and "B" classes.....	572,497	96·67	1·16
All other goods .....	265,459	143·66	3·39
	6,163,977	70·87	1·07
Terminal charges .....	.....	.....	0·20
Total .....	6,163,977	70·87	1·27

The charge for carrying goods one mile along the lines of the state in 1872 was 3·6d. per ton, while after an interval of thirty years, it has fallen to 1·27d. The decrease, however, is to some extent more apparent than real, inasmuch as it represents a more extensive development of the mineral traffic than of the carriage of general merchandise; but, when due allowance has been made on this score, it will be found that the benefit to the general producer and consumer has been very substantial, and it may safely be taken as indicating generally the lessened cost of carriage to persons forwarding goods by rail.

#### VICTORIA.

Railway operations in Victoria began with the opening of the line from Flinders-street, Melbourne, to Port Melbourne. In the early years the lines constructed were chiefly in the vicinity of the metropolis, and up to the year 1865, that is in ten years, only 274 miles were laid down; during the next decennial period a further length of 312 miles was constructed. As in the case of other states, more energy was manifested during the decade ended 1885, when no less than 1,092 miles were constructed; during the next ten years the rate of progress was maintained, and a further length of 1,444 miles was opened. The length of line open for traffic on 30th June, 1902, was 3,302½ miles, upon which the sum of £40,613,784 has been expended for construction and equipment, or an average of £12,298 per mile.

The railways of the state are grouped under seven systems—the Northern, North-Eastern, Eastern, South-Eastern, North-Western, South-Western, and Suburban lines. The Northern system extends from Melbourne to Echuca; the North-Eastern stretches from Kensington to Wodonga, and is the main line connecting Melbourne with Sydney; the Eastern connects Prince's Bridge, Melbourne, with Bairnsdale; the South-Eastern runs from Lyndhurst to Port Albert; the North-Western, joining Laverton with Serviceton, is the main line connecting Melbourne with Adelaide; the South-Western runs from Breakwater to Port Fairy; and the suburban system makes provision for the requirements of the population within a distance of about twenty miles from the metropolis. Included in the seven systems are no less than ninety main, branch, and connecting lines. With the exception of the eastern and extreme north-western portions of the state, where settlement is sparse, the railway facilities provided are in advance of those of any other state, in so far as the length of the line open for traffic is concerned.

Victoria, in 1883, was the first state of the group to adopt the system of placing the management and maintenance of the railways under the control of three Commissioners. From the 1st February, 1884, to the end of 1891 the construction as well as the working of the lines was vested in this body; but on the 1st January, 1892, the duty of construction was transferred to the Board of Land and Works under

the provisions of the "Railways Act, 1891." During 1896 the number of commissioners was reduced to one.

*Revenue and Working Expenses.*

The net earnings, that is the sum available to meet interest charges during the last decennial period, are shown in the following table:—

Year.	Gross Earnings.	Working Expenses.	Net Earnings.	Proportion of Working Expenses to Gross Earnings.
	£	£	£	per cent.
1893	2,925,948	1,857,291	1,068,657	63·48
1894	2,726,159	1,651,186	1,074,973	60·57
1895	2,581,591	1,547,698	1,033,893	59·95
1896	2,401,392	1,551,433	849,959	64·61
1897	2,615,935	1,568,365	1,047,570	59·95
1898	2,608,896	1,649,793	959,103	63·24
1899	2,873,729	1,797,725	1,076,004	62·55
1900	3,025,162	1,902,540	1,122,622	62·89
1901	3,337,797	2,075,239	1,262,558	62·17
1902	3,367,843	2,166,118	1,201,725	64·31

It will be observed that the gross earnings for the closing year of the decade are larger than those of the opening year, and the net earnings for 1902 show a decided improvement over those of the year 1893, while the proportion of working expenses to gross earnings was also slightly larger during the former year. The intervening years show similar fluctuations to those of the other states comprised within the Commonwealth, due to a variety of causes, among the principal of which are—the financial crisis, the drought that has uniformly affected the whole of Australasia for some years past, and the fact that Victoria adopted the construction of a number of branch "cockspur" lines, which had to be worked at absolute loss. In many instances the lines did not even pay working expenses, apart from interest. Continued losses resulted in the closing to traffic of some of these lines during 1896 and subsequent years, and the Report for the year ended 30th June, 1902, shows that the average loss per annum on non-paying lines is £294,697. Notwithstanding the fall in 1902, the net revenue shows a gradual tendency to improvement during the last seven years, the fall in 1898 in comparison with the previous year being due to the fact that in 1897 the receipts were swollen by the exceptional traffic occasioned by the Jubilee celebrations. In 1898 additional expenditure, arising from increases of pay to the lower-grade employees, and from improvements and renewals of permanent-way works and rolling stock caused a large inflation in working expenses. The proportion of working expenses to gross earnings shows a decided improvement with the exception of 1902; and notwithstanding extensive renewals of way, repairs and renewals of stock, the payment of increments to employees, the heavy

compensation for settlement of claims for personal injury, and the extra price paid for coal under new contracts, this figure now stands only slightly higher than it did at the commencement of the decennial period.

The necessity for reducing expenditure has received serious consideration, and, as a consequence, it has been determined to bring about a considerable reduction in train mileage, a curtailment in the amount of leave allowed to the staff, payment for overtime at ordinary rates, reduction of travelling expenses, diminution of expenditure on general stores, and placing the whole of the daily paid employees on short time. It is estimated that an approximate saving of £180,000 will thereby result.

Great care seems to have been taken to keep down the working expenses during the first four years of the decade shown in the following analysis of the working expenditure of Victorian railways, and a reduction of over £200,000 per annum was made in spite of an addition of 200 miles to the length of line in operation. After 1896 concessions in the way of salary or wages were made to the staff, amounting to £35,000 in 1897, and £66,312 in the following year. In 1899 and 1900 additional concessions were made, involving an annual expenditure of £41,000.

The following analysis, which is on the same basis as that already given for New South Wales, gives the details of the expenditure during the ten years. It will be observed that there is an expenditure of £93,744 per annum on pensions and gratuities. The charges for this service for New South Wales amount to £6,296, and in none of the other railway systems is there any like expenditure.

Year ended 30th June.	Maintenance of Way, Works, and Buildings.	Locomotive Power.	Carriage and Waggon Repairs and Renewals.	Traffic Expenses.	Compensation.	Pensions and Gratuities.	General Charges.	Total.
	£	£	£	£	£	£	£	£
1893	327,959	607,702	127,551	683,717	6,433	67,629	51,270	1,857,291
1894	320,981	528,309	104,050	562,226	4,316	93,620	37,684	1,651,136
1895	331,198	478,439	89,129	514,131	6,806	84,509	43,486	1,547,038
1896	365,848	450,489	97,353	486,433	7,321	94,695	49,294	1,551,433
1897	381,293	451,548	101,946	497,030	4,639	83,958	47,901	1,568,365
1898	408,837	459,992	111,113	526,958	7,892	83,720	51,251	1,649,793
1899	498,792	502,763	130,659	546,754	3,611	81,284	51,362	1,797,725
1900	498,459	537,340	142,639	564,908	6,862	95,239	57,093	1,902,540
1901	518,483	646,192	147,153	609,090	7,945	90,443	56,013	2,075,239
1902	501,938	710,105	145,359	640,442	31,145	93,744	43,355	2,166,118

## PER TRAIN MILE.

	d.	d.	d.	d.	d.	d.	d.	d.
1893	7.30	13.54	2.84	14.89	.14	1.51	1.14	41.36
1894	7.59	12.50	2.46	13.30	.10	2.21	.89	39.95
1895	8.31	12.00	2.24	12.90	.17	2.11	1.09	38.82
1896	9.77	12.03	2.60	12.99	.19	2.53	1.32	41.43
1897	9.92	11.74	2.65	12.93	.12	2.18	1.25	40.79
1898	10.62	11.95	2.89	13.69	.20	2.17	1.33	42.35
1899	11.88	12.42	3.23	13.51	.09	2.01	1.33	44.42
1900	11.81	12.76	3.39	13.41	.16	2.26	1.35	45.17
1901	11.25	14.02	3.19	13.21	.17	1.96	1.21	45.01
1902	10.63	15.10	3.09	13.62	.60	1.99	.92	46.06

Year ended 30th June.	Maintenance of Way, Works, and Buildings.	Locomotive Power.	Carriage and Waggon Repairs and Renewals.	Traffic Expenses.	Compensation.	Pensions and Gratuities.	General Charges.	Total.
PER MILE OPEN.								
1893	£ 111·8	£ 207·5	£ 43·4	£ 227·9	£ 2·2	£ 23·1	£ 17·4	£ 633·3
1894	107·7	177·2	34·9	188·6	1·5	31·1	12·6	553·6
1895	107·4	155·1	28·9	160·8	2·2	27·5	14·1	502·0
1896	117·2	144·3	31·2	155·9	2·4	30·3	15·3	497·1
1897	122·0	144·4	32·6	159·0	1·5	26·9	15·3	501·7
1898	130·9	147·2	35·6	168·7	2·5	20·8	16·4	528·1
1899	154·0	161·0	41·9	175·1	1·2	20·0	16·6	575·8
1900	156·5	163·7	44·8	177·3	2·1	20·9	17·0	597·2
1901	160·6	200·2	45·6	188·6	2·2	28·0	17·4	642·6
1902	153·3	217·5	44·5	190·2	9·5	28·7	13·3	663·6

*Interest returned on Capital.*

Continuing the basis adopted in the case of New South Wales of taking into consideration the absolute interest paid on the loans of the state and comparing this with the net earnings, the following table furnishes a review for the past ten years, and shows the average loss for each year of the period :—

Year.	Interest returned on Capital.	Actual Rate of Interest payable on Outstanding Loans.	Average Loss.
	per cent.	per cent.	per cent.
1893	2·87	4·01	1·14
1894	2·88	4·04	1·16
1895	2·73	3·96	1·23
1896	2·24	3·98	1·74
1897	2·74	3·96	1·22
1898	2·49	3·93	1·44
1899	2·75	3·83	1·08
1900	2·83	3·89	1·06
1901	3·14	3·76	0·62
1902	2·96	3·72	0·76

The earnings of the Victorian lines are largely reduced by the necessity of working fifty-two of the lines upon which there is an annual loss of £294,697. The fluctuations in net profits are due to the opening of new lines in sparsely-settled districts and the effect of the drought upon the traffic. A gradual improvement is, however, manifest in the returns of the past seven years, and the concluding year shows a slight increase over the opening one of the period.

*Earnings and Expenses per Mile.*

While the present returns bear no comparison with those of 1872, when the net earnings per train mile were 73·29d. and per mile open £1,342, they show a decided improvement per train mile on the figures for 1893, and the net earnings per mile open are a trifle higher than those shown for that year. The gross earnings, expenditure, and net earnings per train mile for the past ten years are set forth in the following table :—

Year.	Gross Earnings per train mile.	Expenditure per train mile.	Net Earnings per train mile.
	d.	d.	d.
1893	65·17	41·36	23·81
1894	64·49	39·05	25·44
1895	64·76	38·82	25·94
1896	64·11	41·43	22·68
1897	68·03	40·79	27·24
1898	67·77	42·85	24·92
1899	71·00	44·42	26·58
1900	71·83	45·17	26·66
1901	72·39	45·01	27·38
1902	71·63	46·06	25·57

The gross earnings, expenditure, and net earnings per average mile open for the past ten years were as follow :—

Year.	Gross Earnings per average mile open.	Expenditure per average mile open.	Net Earnings per average mile open.
	£	£	£
1893	998	633	365
1894	914	553	361
1895	837	502	335
1896	769	497	272
1897	837	501	336
1898	835	528	307
1899	920	576	344
1900	949	597	352
1901	1,034	642	392
1902	1,031	663	368

The tables indicate that while the gross earnings are gradually improving, the strictest economy will be necessary in the matter of expenditure, for the improvement in the revenue has so far been almost wholly neutralized by an increase in the working expenses.

*Coaching and Goods Traffic.*

The following table shows the number of passengers carried on the lines of the state during the year 1881, and for each of the last ten years, with the receipts from coaching traffic and the average receipts per journey :—

Year.	Passengers carried.	Receipts from Coaching Traffic.	Average Receipts per journey.
	No.	£	d.
1881	18,964,214	770,617	9·75
1893	46,520,784	1,508,867	7·78
1894	40,880,378	1,359,675	7·98
1895	40,210,733	1,259,609	7·51
1896	40,993,798	1,264,219	7·40
1897	42,263,638	1,328,687	7·55
1898	43,090,749	1,325,062	7·38
1899	45,805,043	1,372,000	7·19
1900	49,332,899	1,469,910	7·15
1901	54,704,062	1,625,903	7·13
1902	57,465,077	1,648,381	6·89

The number of passengers carried on the railways of Victoria reached its maximum in 1890, when no less than 58,951,796 persons made use of the lines. The reaction following on the banking crises of 1893 considerably affected the traffic, and in 1895 the number of passengers was reduced to 40,210,733; a gradual improvement has since, however, been manifest in the returns. Victoria occupies the leading position among the states as regards the number of passengers carried, the latest figures being as follow :—New South Wales, 30,885,214; Victoria, 57,465,077; Queensland, 4,636,174; South Australia, including the Northern Territory, 9,500,977; Western Australia, 8,158,299; Tasmania, 777,445; and New Zealand, 7,356,136. The superiority of the Victorian figures results from the large number of passengers carried on the suburban railways, the Melbourne system effectively serving the population within a distance of twenty miles from the centre, and carrying upwards of 90 per cent. of the total passengers. The magnitude of the suburban traffic is evidenced by the fact that the average receipts per journey during the last year are shown to be 6·89d., as against 10·91d. in New South Wales; 26·59d. in Queensland; 9·41d. in South Australia, including Northern Territory; 12·65d. in Western Australia; 24·18d. in Tasmania; and 18·78d. in New Zealand.



The amount of goods and live stock tonnage in 1881, and for each of the ten years from 1893 to 1902, with the earnings therefrom, is shown in the following table :—

Year.	Tonnage of Goods and Live Stock.	Earnings.
	Tons.	£
1881	1,366,603	894,592
1893	2,558,378	1,417,081
1894	2,455,811	1,366,484
1895	2,435,857	1,321,982
1896	2,163,722	1,137,173
1897	2,383,445	1,287,248
1898	2,408,665	1,283,834
1899	2,779,748	1,501,729
1900	2,998,303	1,555,252
1901	3,381,860	1,711,894
1902	3,433,627	1,719,462

The table indicates a gradual increase in the tonnage carried and earnings therefrom during the last seven years. The figures for 1902 must be considered highly satisfactory, especially when it is remembered that the harvest conditions generally were not so good as in the preceding year. Particulars of the subdivision of the tonnage of goods and live stock into a general classification are not available, and no information is furnished that will admit of a comparison being made in order to determine how far the cost of carriage per mile has been reduced during the period under review.

#### QUEENSLAND.

The progress of railway construction in Queensland for the first ten years after the opening of the Ipswich to Grandchester line was somewhat slow, only 268 miles having been constructed. In the decade ending in 1885, more energy was displayed, inasmuch as a further length of 1,167½ miles was constructed, and during the quinquennial periods ending in 1890 and 1895, further lengths of 712 and 250 miles were constructed. The length of line open on 30th June, 1902, was 2,801 miles, and the amount expended thereon for construction and equipment was £20,119,143, or at the rate of £7,182 per mile.

The railways of the state may be grouped into three divisions, comprising eight systems. The southern division extends from Brisbane to Wallangarra in a southerly direction, to Cunnamulla in a westerly direction, and to Gladstone northerly along the coast, and has fifteen branch lines connected with it. The central division extends from Archer Park to Longreach, and has five branch lines connected with it. The northern division comprises the line from Mackay to Eton and Mirani; the line from Bowen to Wangaratta; the line from Townsville

to Winton, with a branch to Ravenswood; the line from Cairns to Mareeba; the line from Cooktown to Laura; and the line from Norman-ton to Croydon.

For many years the construction, maintenance, and control of the railways were carried out by a branch of the Public Works Office, and subsequently by a separate Ministerial Department with a Secretary responsible to Parliament and administering the details of the office in a manner similar to any other Crown Minister. The "Railways Act of 1888," however, while leaving the Minister in charge of the Department, vested the construction, management, and control of all Government railways in three Commissioners, of whom one was to be Chief Commissioner. The number was subsequently reduced to two, and later a single commissioner was appointed holding the authority formerly vested in the three. In undertaking railway construction the State is guided by other considerations than those which would direct the action of private investors, and is content, for a time at least, to recoup the expenditure in an indirect form. The disastrous result of the continued drought has operated against successful management during recent years, and in consequence of the fact that the rate of interest returned on capital expenditure during the past two years does not compare favourably with the previous years, a policy of stringent economy is to be pursued in the management of the railways, and the rates and fares have been increased with the object of reducing the deficit.

*Revenue and Working Expenses.*

The net sum available to meet interest charges during the last decennial period is shown in the following table:—

Year.	Gross Earnings.	Working Expenses.	Net Earnings.	Proportion of Working Expenses to Gross Earnings.
	£	£	£	per cent.
1893	1,022,677	638,889	383,788	62·47
1894	955,747	598,403	357,344	62·61
1895	1,025,512	581,973	443,539	56·75
1896	1,085,494	644,362	441,132	59·36
1897	1,179,273	684,146	495,127	58·01
1898	1,215,811	686,066	529,745	56·43
1899	1,373,475	784,811	588,664	57·14
1900	1,464,399	948,691	515,708	64·78
1901	1,316,936	1,057,981	258,955	80·34
1902	1,382,179	992,751	389,428	71·82

With the exception of the last two years the foregoing table shows a gradual tendency for earnings to increase, but there have been considerable fluctuations in the proportion of working expenses to gross earnings. The net earnings for the year ended 30th June, 1900, were 35·22 per cent. of the total earnings, as against 36·33 per cent. when the railways were placed under their present control. It will be observed that the result secured for that year is considerably lower than those of the preceding two years, and is due to the fact that the railways were compelled to carry very large numbers of starving stock and large quantities of fodder at unremunerative rates. There were also heavy disbursements to replace and increase the stock of locomotives, and in carrying out works which, though improving the equipment of the railways and ensuring safe running, have not been of a reproductive character, while during the year substantial increases in pay were conceded to all classes of railway employees. There was consequently a large increase in expenditure which was not accompanied by a corresponding improvement in the earnings. For the year ended 30th June, 1901, the revenue from passenger traffic showed a substantial increase; the decrease in earnings shown in the preceding table was entirely due to the loss of live stock by drought and consequent stoppage of station improvements, and to the necessity of carrying starving stock and fodder at merely nominal rates. The net earnings for the year were thus reduced to 19·66 per cent. of the total earnings. A slight improvement in the net earnings was manifested in the year ended 30th June, 1902, the percentage gained being 28·18 of the total earnings. Despite a shrinkage in the traffic the receipts show a slight improvement consequent on the increase of rates and fares. Working expenses have been curtailed by a reduction in the train mileage, and by the exercise of stringent economy in administration, and with the return of favourable seasons it is hoped that more satisfactory results will be secured.

An analysis of the working expenses of the Queensland railways for the ten years, 1893–1902, is given below. Taking the first year with the last it will be seen that there has been a substantial increase in the total cost, as well as in the rate per train mile and per mile of line open. In 1899 the expenditure per train mile had been reduced to 32·35d., as compared with 40·82d. in 1893 and 42·05d. in 1902. There can be no doubt that the expenditure for 1899 had been reduced below the point of safety and some services had been starved, and this necessitated in the following years an abnormal expenditure in regard to improvements of the locomotive, carriage and waggon stock, and for bringing the equipment generally up to a better standard to ensure the safe working of the lines. In 1901 there was a considerable amount of money expended on relaying and other heavy works, similar expenditure, or, at least, expenditure on so large a scale, will not, of course, be needed for some little time.

## RAILWAYS.

Year ended 30th June.	Maintenance of Way, Works, and Buildings.	Locomotive Power.	Carriage and Waggon Repairs and Renewals.	Traffic Expenses.	General Charges.	Total.
	£	£	£	£	£	£
1893	273,403	149,892	31,783	157,806	26,005	638,889
1894	251,946	139,231	31,201	150,045	25,980	598,403
1895	233,772	141,568	33,702	144,483	28,448	581,973
1896	248,468	172,373	34,936	161,656	26,929	644,362
1897	271,602	184,817	37,714	164,097	25,916	684,146
1898	261,706	186,226	38,719	172,503	26,912	686,066
1899	289,005	225,033	45,462	196,680	28,631	784,811
1900	335,777	302,752	56,256	221,640	32,266	948,691
1901	401,013	322,879	68,088	229,902	36,099	1,057,981
1902	348,185	317,540	67,314	223,321	36,391	992,751

## PER TRAIN MILE.

	d.	d.	d.	d.	d.	d.
1893	17·47	9·58	2·03	10·08	1·66	40·82
1894	16·89	9·33	2·10	10·06	1·74	40·12
1895	14·32	8·67	2·07	8·85	1·74	35·65
1896	12·57	8·72	1·77	8·18	1·36	32·60
1897	13·20	8·98	1·83	7·97	1·26	33·24
1898	12·54	8·92	1·86	8·27	1·29	32·88
1899	11·91	9·28	1·87	8·11	1·18	32·35
1900	12·54	11·31	2·10	8·28	1·20	35·43
1901	16·63	13·39	2·82	9·53	1·50	43·87
1902	14·75	13·45	2·85	9·46	1·54	42·05

## PER MILE OPEN.

	£	£	£	£	£	£
1893	115·8	63·5	13·4	66·8	11·0	270·5
1894	106·0	58·6	13·1	63·1	10·9	251·7
1895	98·3	59·5	14·2	60·7	11·9	244·6
1896	104·3	72·3	14·7	67·8	11·3	270·4
1897	111·9	76·2	15·5	67·6	10·7	281·9
1898	101·2	72·0	15·0	66·7	10·4	265·3
1899	106·5	82·9	16·8	72·5	10·6	289·3
1900	120·1	108·3	20·1	79·3	11·5	339·3
1901	143·1	115·3	24·3	82·1	12·9	377·7
1902	124·3	113·4	24·0	79·8	13·0	354·5

*Interest returned on Capital.*

The financial results of the working of the lines are exhibited in the following table which covers a period of ten years :—

Year.	Interest returned on Capital.	Actual Rate of Interest payable on Outstanding Loans.	Average Loss.
	per cent.	per cent.	per cent.
1893	2.37	4.17	1.80
1894	2.18	4.17	1.99
1895	2.68	4.16	1.48
1896	2.63	4.09	1.46
1897	2.87	4.04	1.17
1898	2.92	4.04	1.12
1899	3.15	4.00	0.85
1900	2.67	4.02	1.35
1901	1.31	3.98	2.67
1902	1.93	3.94	2.01

A fair proportion of the railway construction of recent years has been in country of a purely pastoral character, and it is manifest that a sufficient traffic to prove remunerative cannot be looked for immediately from localities possessed of only a scattered and limited population ; but it is confidently expected that these lines will ultimately pay interest on cost of construction. Unfortunately, Queensland in common with the other provinces, suffers from the construction of lines of railway not warranted by existing or prospective traffic, and which will always be a handicap to successful management.

*Earnings and Expenses per Mile.*

While the results now secured cannot be compared with those of 1880, when the net earnings per train mile were a little over 43d., and per mile open £222, a satisfactory state of affairs is disclosed by a review of the figures shown for earnings in the subjoined tables. It will be seen that the net earnings per train mile, as well as the net return for each mile of line open, have, except in the last three years, been fairly well sustained. The fall in 1900, 1901, and 1902, as compared with

the previous three years, is due to the fact that the continuance of the drought and the consequent loss in sheep have operated against the revenue from the carriage of wool, while the increased traffic which was obtained consisted largely of the removal of starving stock from and the carriage of fodder to drought-stricken districts, a class of traffic which had to be undertaken at unremunerative rates. The gross earnings, expenditure, and net earnings per train mile for the past ten years are shown in the following table:—

Year.	Gross Earnings per train mile.	Expenditure per train mlle.	Net Earnings per train mile.
	d.	d.	d.
1893	65·35	40·82	24·53
1894	64·18	40·12	24·06
1895	62·82	35·65	27·17
1896	54·91	32·60	22·31
1897	57·30	33·24	24·06
1898	58·27	32·88	25·39
1899	56·62	32·35	24·27
1900	54·69	35·43	19·26
1901	54·61	43·87	10·74
1902	58·54	42·05	16·49

The gross earnings, expenditure, and net earnings per average mile open for the past ten years were as follow:—

Year.	Gross Earnings per average mile open.	Expenditure per average mile open.	Net Earnings per average mile open.
	£	£	£
1893	428	270	158
1894	402	251	151
1895	431	244	187
1896	455	270	185
1897	486	281	205
1898	470	265	205
1899	506	289	217
1900	523	339	184
1901	470	377	93
1902	493	354	139

*Coaching and Goods Traffic.*

The number of passengers carried on the lines of the state during the year 1881, and for the last ten years, together with the receipts from the traffic, and the average receipts per journey, are set forth in the following table :—

Year.	Passengers carried.	Receipts from Coaching traffic.	Average Receipts per Journey.
	No.	£	d.
1881	247,284	113,490	110·14
1893	2,120,163	318,730	36·08
1894	2,024,450	307,430	36·44
1895	2,054,416	308,025	35·98
1896	2,274,219	324,790	34·27
1897	2,633,556	359,811	32·79
1898	2,742,108	391,270	34·24
1899	3,716,425	447,123	28·87
1900	4,395,841	505,536	27·60
1901	4,760,559	536,462	27·05
1902	4,636,174	513,257	26·59

It will be seen that the years 1899, 1900, 1901, and 1902 show a far larger number of passenger journeys than preceding years; this was largely due to an extraordinary expansion in the suburban traffic. The average receipts per journey showed a decline, which may be expected to continue as the suburban traffic expands, so that in a few years the receipts per person carried will approximate closely to the average for the rest of Australia, viz., one shilling per journey.

The amount of goods tonnage for a similar period is shown in the following table :—

Year.	Tonnage of Goods.	Earnings.
		£
1881	161,008	235,100
1893	720,587	703,947
1894	785,475	648,317
1895	900,591	717,487
1896	1,026,889	760,704
1897	1,243,603	819,462
1898	1,323,782	824,541
1899	1,684,858	926,352
1900	1,688,635	958,863
1901	1,530,440	780,474
1902	1,725,520	868,922

In the foregoing statement the tonnage of live stock is not included, inasmuch as particulars in respect thereof are not available, but the earnings shown include the revenue derived from this class of traffic. The general traffic is divided into eight classes, particulars of which, for the year ended 30th June, 1902, together with the receipts for each class, are shown in the subjoined table. No information is available as to the average number of miles each ton of traffic is carried, or the earnings per ton per mile.

Description of Traffic.	Tons carried.	Receipts from traffic.
		£
General merchandise .....	264,445	339,345
Agricultural produce .....	401,393	126,582
Wool .....	23,549	76,896
Coal .....	415,834	56,509
Minerals other than coal .....	188,579	24,394
Timber .....	431,720	88,175
Live stock .....	.....	150,333
Non-paying .....	.....	6,688
<b>Total.....</b>	<b>1,725,520</b>	<b>868,922</b>

*Guaranteed Railways.*

Four railways, having a total length of 36 miles 55 chains, have been constructed to 30th June, 1902, under "The Railways Guarantee Act of 1895," by which the local authority, representing the ratepayers of a district, agrees to pay up to one-half of the deficiency in working expenses with interest at the rate of 4 per cent. on the capital cost during the first fourteen years after opening, the sum to be raised by means of a rate not exceeding 3d. in the £ of value of ratable lands. Should the operations of any year provide a surplus, half of this is retained by the Government and the other half paid to the Local Authority for distribution among the ratepayers in return for the payments made on account of the deficiency in previous years. When the line has been payable for three years, the Government may cancel the agreement. The results of the working of three out of the four railways do not afford much encouragement to apply the provisions of the Act to other lines which may be projected in the future. The working of the Pialba branch showed a loss, in the year 1898, of £2,451; in 1899, of £2,038;



in 1900, of £1,589; in 1901, of £1,595; and in 1902, of £1,361. In the first two years the receipts were not sufficient to cover working expenses; in the last three, however, there was a margin of £172 in 1900; £196 in 1901; and £459 in 1902. As this line has shown an improvement during each of the last three years, it may be reasonably anticipated that eventually the guarantors will be relieved of all responsibility. The Allora branch shows a loss of £617 in 1898; £308 in 1899; £630 in 1900; £959 in 1901; and £345 in 1902. The Enoggera branch exhibits a loss of £2,158 in 1899; £3,468 in 1900; £3,218 in 1901; and £2,889 in 1902. The Mount Morgan branch, which up to the 30th June, 1902, had involved a capital expenditure of £84,059, has given satisfactory results, though the margin of profit after the payment of working expenses and statutory interest has been considerably reduced during the past three years. The net profit for 1899 was £3,973; for 1900, £5,785; for 1901, £2,952; and for 1902, £1,510.

#### SOUTH AUSTRALIA.

While the beginning of railway construction in South Australia dates as far back as 1854, very little progress was made in the subsequent twenty years, and in 1874 the total length of line in operation was only 234 miles; in 1880 this had increased to 627 miles; in 1890 to 1,610 miles; and in 1895 to 1,722 miles. The length of line in operation on the 30th June, 1902, was 1,736 $\frac{1}{4}$  miles, and the amount expended thereon for construction and equipment, £13,275,037, or at the rate of £7,645 per mile.

The railways of South Australia proper are divided for the purposes of management into five systems. The Midland system, constructed on the 5ft. 3in. gauge, has a length of 236 $\frac{3}{4}$  miles, and extends from Adelaide to Terowie in a northerly direction, and to Morgan, on the Murray River, in a north-easterly direction. The Northern system has a total length of 1,008 $\frac{1}{4}$  miles, 1,003 of which are 3ft. 6in. gauge and 5 $\frac{1}{4}$  miles 5ft. 3in. gauge. This system includes that portion of the transcontinental line which extends to Oodnadatta, a distance of 550 miles from Adelaide; the line to Cockburn, which provides for the requirements of the Broken Hill district of New South Wales; and branches to Port Augusta, Port Pirie, Wallaroo, and Port Wakefield. The Southern system comprises a length of 265 $\frac{1}{4}$  miles on a gauge of 5ft. 3in., and includes the main line connecting Adelaide with Melbourne, and branches—Wolseley to Naracoorte and from Naracoorte to Kingston, Mount Gambier, and Beechport. The line from Port Broughton to Barunga has a length of 10 miles.

During 1887 the control of the railways was entrusted to three commissioners; in 1895, however, the number was reduced to one, who is responsible to Parliament.

*Revenue and Working Expenses.*

The net sum available to meet interest charges is set forth in the following table:—

Year.	Gross Earnings.	Working Expenses.	Net Earnings.	Proportion of Working Expenses to Gross Earnings.
	£	£	£	£
1893	1,007,059	610,122	366,937	63·56
1894	999,707	569,592	430,115	56·98
1895	960,155	568,973	391,182	59·26
1896	986,500	583,022	403,478	59·10
1897	1,025,035	614,254	410,781	59·92
1898	984,228	603,474	380,754	61·31
1899	1,058,397	617,380	441,017	58·33
1900	1,166,987	657,841	509,146	56·37
1901	1,236,616	729,039	507,577	58·95
1902	1,085,175	689,517	395,658	63·54

The foregoing table shows that the gross earnings in 1901 were the largest during the decade, while the proportion of working expenses to gross earnings was lowest in 1900, the net earnings in the latter year being the highest for the period. The failure of the harvest and the succession of adverse seasons which South Australia laboured under during part of the decennial period are the causes of the falling off in the revenue for several years. No other railway system in Australia depends so much upon the carriage of agricultural produce for its traffic, and years of shrinkage in the railway revenue are coincident with years of harvest failure. The increase in working expenses during the years 1899 and 1900 was due to the renewal of rolling stock, the relaying of portion of the permanent way, and other outlay expended from the improved revenue. The further increase during 1901 is explained by the rise in the price of coal and materials; by the increased train mileage; and by the fact that opportunity was taken of a fairly good year's revenue to debit working expenses with an unusual outlay under the head of "replacements." The operations of the year ended 30th June, 1902, show a considerable reduction in the gross earnings, which is attributable to the shrinkage in the Barrier traffic caused by the fall in the price of lead reducing the output of the mines. Moreover, consequent on the decrease in mining profits, the department was compelled to carry ore and concentrates at much lower rates, so that there was a diminished receipt from every ton of a smaller volume of traffic, and an increase in the proportion of working expenses to gross earnings.

The results secured may be looked on as satisfactory, having regard to the fact that the management is burdened with some very unproductive lines, notably that from Hergott Springs to Oodnadatta, which barely pays working expenses, and entails an annual payment of about £44,000 in interest.

The working expenditure of the South Australian lines, an analysis of which is given below, does not show very much variation from year to year. The working expenses touched their lowest point in the year 1900 with 37·78d. per train mile; since then there has been a rise of about 2d. per train mile, which the railway managers attribute to the increased price of coal and materials, to larger expenditure on repairs and rolling stock, and to increases in the wages of the employees.

Year ended 30th June.	Maintenance of Way, Works, and Buildings.	Locomotive Power.	Carriage and Waggon Repairs and Renewals.	Traffic Expenses.	Compensation.	General Charges.	Total.
	£	£	£	£	£	£	£
1893	159,390	256,370	46,492	158,785	260	18,825	640,122
1894	141,625	225,871	37,292	147,755	166	16,883	569,592
1895	138,983	214,271	51,956	147,173	73	16,517	563,973
1896	137,855	221,706	62,882	146,127	162	14,290	533,022
1897	159,798	244,235	50,546	144,935	713	14,027	614,254
1898	152,091	234,233	52,323	150,033	826	13,963	603,474
1899	160,514	236,604	58,754	146,962	645	13,901	617,330
1900	163,851	255,582	62,832	160,641	637	14,293	657,541
1901	185,292	293,913	68,654	164,589	1,562	15,029	729,039
1902	166,691	278,839	64,733	162,626	1,394	15,234	639,517

## PER TRAIN MILE.

	d.	d.	d.	d.	d.	d.	d.
1893	10·42	16·77	3·04	10·83	0·02	1·23	41·86
1894	9·80	15·61	2·58	10·22	0·01	1·17	39·39
1895	9·83	15·15	3·67	10·41	0·01	1·17	40·24
1896	9·58	15·42	4·37	10·16	0·01	0·99	40·53
1897	10·44	15·94	3·30	9·47	0·05	0·92	40·12
1898	9·82	15·14	3·33	9·69	0·05	0·90	38·98
1899	9·88	14·55	3·62	9·05	0·04	0·85	38·00
1900	9·41	14·67	3·61	9·23	0·04	0·82	37·78
1901	10·12	16·06	3·75	8·99	0·09	0·82	39·33
1902	9·58	15·96	3·70	9·30	0·08	0·87	39·44

## PER MILE OPEN.

	£	£	£	£	£	£	£
1893	95·9	154·2	28·0	95·5	0·2	11·3	385·1
1894	85·1	135·7	22·4	83·8	...	10·1	342·1
1895	80·7	124·4	30·2	85·5	...	9·6	330·4
1896	80·1	123·7	36·5	84·9	...	8·3	333·5
1897	92·8	141·8	29·3	84·1	0·4	8·1	356·5
1898	88·2	135·9	30·4	87·0	0·5	8·1	350·1
1899	93·1	137·3	34·1	85·3	0·4	8·0	358·2
1900	94·7	147·7	36·3	92·8	0·4	8·2	380·1
1901	106·7	169·3	39·5	94·8	0·9	8·7	419·9
1902	96·0	160·6	37·3	93·6	0·8	8·8	397·1

*Interest returned on Capital.*

The following table exhibits the financial results of the working of the lines during the last ten years :—

Year.	Interest returned on Capital.	Actual rate of Interest payable on Outstanding Loans.	Average Loss.
	per cent.	per cent.	per cent.
1893	3·07	4·28	1·21
1894	3·54	4·27	0·73
1895	3·12	4·22	1·10
1896	3·21	4·12	0·91
1897	3·26	4·05	0·79
1898	2·98	4·03	1·05
1899	3·42	3·95	0·53
1900	3·91	3·89	0·02 <sup>a</sup>
1901	3·86	3·87	0·01
1902	2·98	3·81	0·83

\* Represents profit.

The interest returned on capital during 1900 was the highest secured since 1892, when the railways returned 4·78 per cent. on capital expenditure, and exceeded by a slight amount the interest rate on the debt of the province. South Australia possesses one advantage not shared by any other province, namely, a large and steady long-distance traffic from a neighbouring state. The Broken Hill traffic is a very important factor in the railway revenue, as the greater portion of the line connecting the mines with the seaports runs through South Australian territory. The extent of the Broken Hill traffic will be found mentioned on page 894.

*Earnings and Expenses per Mile.*

The net earnings now secured are very much below those of 1891 when the net earnings per train mile were 38·64d., and £370 per mile open; a gradual improvement is, however, noticeable up to 1900, the fall in 1901 and 1902 being due to the reasons already adverted to on the previous page. The gross earnings, expenditure, and net earnings per train mile for the past ten years are shown in the following table :—

Year.	Gross Earnings per train mile.	Expenditure per train mile.	Net Earnings per train mile.
	d.	d.	d.
1893	65·85	41·86	23·99
1894	69·14	39·39	29·75
1895	67·90	40·24	27·66
1896	68·57	40·53	28·04
1897	66·95	40·12	26·83
1898	63·57	38·98	24·59
1899	65·14	38·00	27·14
1900	67·02	37·78	29·24
1901	67·56	39·83	27·73
1902	62·06	39·44	22·62

The gross earnings, expenditure, and net earnings per average mile open for the past ten years are set forth in the following table :—

Year.	Gross Earnings per average mile open.	Expenditure per average mile open.	Net Earnings per average mile open.
	£	£	£
1893	606	385	221
1894	601	342	259
1895	558	330	228
1896	573	338	235
1897	595	356	239
1898	571	350	221
1899	614	358	256
1900	674	330	294
1901	712	419	293
1902	625	397	228

In comparison with 1891 and 1892 there was a substantial fall in the net earnings per train mile for 1893. An improvement was, however, manifest in the succeeding year, for while the gross revenue was smaller than that of 1893, the proportion of working expenses was considerably reduced. The results for the year 1900 may be viewed as satisfactory, taking into consideration the fact that the number of train miles run during that year was higher than in any previous year during the period. It will be seen that there was a substantial fall in the net earnings per train mile for the past year, due to the reasons already referred to. The present earnings per train mile are slightly above the average of the Commonwealth as a whole, although the return per mile of line does not compare so favourably.

#### *Coaching and Goods Traffic.*

The following table shows the number of passengers carried on the lines of the State during the year 1881, and for each of the last ten years, together with the receipts from the traffic, and the average receipts per journey :—

Year.	Passengers carried.	Receipts from Coaching Traffic.	Average Receipts per Journey.
	No.	£	d.
1881	3,032,714	151,867	12·01
1893	5,434,047	299,128	13·21
1894	5,260,079	274,243	12·51
1895	5,224,854	263,448	12·09
1896	5,435,956	288,594	12·73
1897	5,789,297	297,026	12·31
1898	6,050,189	291,411	11·56
1899	6,171,081	297,207	11·56
1900	7,416,506	337,723	10·93
1901	8,858,470	359,172	9·74
1902	9,497,222	369,677	9·34

The table indicates an improvement each year in the number of passengers carried; the average receipts per journey have, however, gradually lessened—the year 1893 showing the highest rate.

The amount of goods tonnage for the same period is shown in the following table :—

Year.	Tonnage of Goods and Live Stock.	Earnings.
	No.	£
1881	646,625	222,184
1893	970,865	660,371
1894	1,014,010	694,724
1895	1,000,408	666,600
1896	1,056,963	670,961
1897	1,146,293	700,629
1898	1,189,095	664,348
1899	1,403,727	731,156
1900	1,485,976	798,231
1901	1,623,444	843,019
1902	1,392,257	681,045

Fluctuation in the tonnage of goods carried is presented by the figures in the foregoing table, and the considerable decrease manifested in the past year, in comparison with 1901, is due to the continuous fall in the metal market not only reducing the output but leading to a general slackness of business on the Barrier; while, in addition, ore and concentrates were carried at lower rates. The volume of traffic secured by South Australia from the Barrier District of New South Wales amounted to 504,850 tons out of the total of 1,392,257 tons, and the receipts from all traffic passing through Cockburn to £337,011 out of a revenue of £1,085,175.

The following table shows a classification of the goods carried during 1902, and the amount received for carriage. It would have been interesting to have also shown the charge for haulage of each description of goods during the last ten years, but no information is available which will enable such particulars to be compiled. There has been a general reduction in freight charges, and the average charge per ton per mile for all goods has fallen from 1·05d. in 1897 to 0·96d. in 1902 :—

Description of Traffic.	Tons Carried.	Receipts from Traffic.
		£
Minerals .....	602,106	247,383
Grain .....	143,350	40,020
Wool .....	15,927	18,047
Goods other than above .....	597,828	310,976
Live stock .....	33,046	64,619

## NORTHERN TERRITORY.

Railway construction in the Northern Territory has been confined to the line from Palmerston to Pine Creek, opened on the 1st October, 1889, and the returns for the past seven years show that the traffic does not even pay working expenses.

*Revenue and Working Expenses.*

The gross earnings, expenditure, and net earnings, with the proportion of working expenses to gross earnings of the line are set forth in the following table, which covers a period of ten years :—

Year.	Gross Earnings.	Working Expenses.	Net Earnings.	Proportion of Working Expenses to Gross Earnings.
	£	£	£	per cent.
1893	15,668	11,704	3,964	74·90
1894	16,193	11,403	4,790	70·42
1895	14,722	11,477	3,245	77·96
1896	15,105	15,289	(—) 184	101·22
1897	17,908	18,966	(—) 1,058	105·91
1898	14,124	20,268	(—) 6,144	143·50
1899	14,758	17,375	(—) 2,617	117·73
1900	14,799	24,340	(—) 9,541	164·47
1901	13,845	25,280	(—) 11,435	182·59
1902	12,522	34,649	(—) 22,127	276·70

(—) Denotes loss.

The experience of the past seven years offers no encouragement to any further extension of railways in the Northern Territory. The actual results of working have not been quite so unfavourable as would appear from the foregoing table, as each of the two years 1900 and 1901 was charged with the payment of an instalment of £10,000, and 1902 with the final instalment of £21,931, towards the reconstruction of the jetty destroyed in 1896, and on this account each of these years shows a much larger deficit than any of the previous years.

The expenditure on working for 1902 may be divided as follows :—

	£
Maintenance of Permanent Way Buildings, &c.....	29,001
Locomotive Power.....	2,418
Carriage and Waggon Repairs .....	792
Traffic Expenses.....	2,108
General Charges.....	330
Total.....	34,649

The total shows a great increase on previous years, although the mileage open for traffic, and the train miles run have not changed. The final payment in connection with the Palmerston jetty was made in 1902, and it is anticipated that no further expenditure will be required under this head for some time. The expenditure for 1903 will probably fall to about £15,000, or about 115d. per train mile, and slightly over £100 per mile of line open for traffic.

*Interest returned on Capital.*

The following table shows the average loss for each year during the last ten years, after the interest on cost of construction has been deducted from the net earnings :—

Year.	Interest returned on Capital.	Actual Rate of Interest payable on Outstanding Loans.	Average Loss.
	per cent.	per cent.	per cent.
1893	0·34	4·08	3·74
1894	0·42	4·08	3·66
1895	0·28	4·22	3·94
1896	(—) 0·02	4·12	4·14
1897	(—) 0·09	4·05	4·14
1898	(—) 0·53	4·03	4·56
1899	(—) 0·22	3·95	4·17
1900	(—) 0·82	4·04	4·86
1901	(—) 0·98	4·05	5·03
1902	(—) 1·99	4·37	6·36

(—) Denotes loss.

From the outset there was very little prospect that the traffic on this line would meet the interest on the cost of construction and equipment ; and although for the first five years there was a margin after paying working expenses, the results of the past seven years show that even working expenses have not been met. The deficiency is in part due to heavy expenditure necessitated by the ravages of the teredo in the sub-structure of the jetty at Palmerston, and the heavy outlay to repair damages caused by the cyclone which struck Port Darwin in the early part of 1897. Fluctuations in the volume of traffic are also partly responsible for the deficiency.

*Earnings and Expenses per Mile.*

The gross earnings, expenditure, and net earnings per train mile for a period of ten years are shown in the following table :—

Year.	Gross Earnings per Train Mile.	Expenditure per Train Mile.	Net Earnings per Train Mile.
	d.	d.	d.
1893	121·93	91·08	30·85
1894	125·14	88·12	37·02
1895	115·10	89·73	25·37
1896	114·28	115·67	(—) 1·39
1897	137·28	145·38	(—) 8·10
1898	112·97	162·12	(—) 49·15
1899	115·53	136·02	(—) 20·49
1900	114·53	188·37	(—) 73·84
1901	109·75	200·39	(—) 90·64
1902	99·26	274·65	(—) 175·39

(—) Denotes loss.



The gross earnings, expenditure, and net earnings per average mile open for the last decennial period were as follow :—

Year.	Gross Earnings per average mile open.	Expenditure per average mile open.	Net Earnings per average mile open.
	£	£	£
1893	108	80	28
1894	111	78	33
1895	101	79	22
1896	104	105	(—) 1
1897	123	130	(—) 7
1898	97	139	(—) 42
1899	102	119	(—) 17
1900	102	167	(—) 65
1901	95	174	(—) 79
1902	86	238	(—) 152

(—) Denotes loss.

The gross earnings show little variation from year to year, but the expenditure was increased through the series of accidents at the terminal port, to which reference has already been made.

#### *Coaching and Goods Traffic.*

The following table shows the number of passengers carried on the Palmerston to Pine Creek Line since its opening, together with the receipts from the traffic and the average receipts per journey :—

Year.	Passengers carried.	Receipts from Coaching Traffic.	Average Receipts per journey.
	No.	£	d.
1890 (nine months) .....	4,567	4,330	227·54
1891 .....	4,515	4,693	249·45
1892 .....	4,541	4,159	219·80
1893 .....	6,169	4,007	155·89
1894 .....	4,076	3,820	224·91
1895 .....	2,950	3,755	305·48
1896 .....	2,901	3,772	312·04
1897 .....	3,080	4,055	315·97
1898 .....	3,126	3,556	273·01
1899 .....	3,191	3,173	238·64
1900 .....	3,374	3,556	260·48
1901 .....	4,097	3,415	200·05
1902 .....	3,755	3,032	193·80

The table shows an increase in the number of passengers carried during 1893 ; but the promise of the year was not sustained, and the

traffic fell away by more than one-half during 1895, 1896, and 1897 although the earnings did not decline in anything like the same proportion. Since the year last mentioned there has been a steady, though small, increase in the number of passengers; but without a corresponding addition to the revenue. The receipts per journey indicate that a large proportion of the traffic is of a long-distance character.

The amount of goods tonnage for a similar period is shown in the following table :—

Year.	Tonnage of Goods and Live Stock.	Earnings.
	Tons.	£
1890 (nine months) .....	2,114	7,499
1891 .....	2,426	9,035
1892 .....	2,633	9,267
1893 .....	2,328	9,470
1894 .....	2,524	10,260
1895 .....	2,053	8,643
1896 .....	2,493	9,149
1897 .....	3,150	11,222
1898 .....	2,678	8,570
1899 .....	3,187	10,091
1900 .....	3,009	9,626
1901 .....	2,981	8,852
1902 .....	2,436	7,996

The average receipts per ton per mile during the year 1902 were 7·36d., as against 8·43d. in 1896.

#### WESTERN AUSTRALIA.

The first railway constructed in Western Australia was that from Geraldton to Northampton, a length of 34 miles 17 chains, opened for traffic on the 26th July, 1879. Between that date and the close of 1885, a further length of 91 miles 55 chains was constructed. To the end of 1890, only 200½ miles were constructed, and on the 30th June, 1895, there were 57½ miles open for traffic. Railway construction received a considerable impetus subsequent to 1895, and on the 30th June, 1902, there were 1,360 miles open for traffic, at a cost of £7,410,426 for construction and equipment, or at the rate of £5,449 per mile.

The State railways of Western Australia are comprised in five systems. The Eastern system has a length of 167 miles, and includes the line from Fremantle to Northam, with branches to Newcastle, Beverley, Greenhills, Perth Racecourse, and Owen's Anchorage, and the Mahogany Creek deviation; the Eastern Gold Fields system

extends eastward from Northam, and includes the Kanowna, Menzies, and Boulder branches, the total length being 411 miles; the South-western system comprises the line from East Perth to Bunbury, with branches to Colliefields, Bridgetown, Busselton, and Canning and Bunbury Racecourses, and has a length of 234 miles 22 chains; the Northern system includes the line from Geraldton to Cue, with branches to Walkaway, Mullewa, and Northampton, the total length being 305 miles 45 chains; and the Great Southern system, from Beverley to Albany, is 243 miles in length.

The control of the State railways is vested in the Commissioner for Railways, as member of the Government, but the active management is undertaken by an officer with the title of General Manager.

*Revenue and Working Expenses.*

The net sum available to meet interest charges during the last ten years is shown in the following table:—

Year.	Gross Earnings.	Working Expenses.	Net Earnings.	Proportion of Working Expenses to Gross Earnings.
	£	£	£	per cent.
1892 .....	94,201	90,654	3,547	96·23
1893 (half-year).....	54,668	47,069	7,599	86·10
1894 .....	140,564	103,973	36,591	73·96
1895 .....	296,000	182,046	113,954	61·50
1896 .....	529,616	263,704	265,912	49·79
1897 .....	915,483	577,655	337,828	63·00
1898 .....	1,019,677	786,318	233,359	77·11
1899 .....	1,004,620	712,329	292,291	70·91
1900 .....	1,259,512	861,470	398,042	68·40
1901 .....	1,353,704	1,044,920	308,784	77·19
1902 .....	1,521,429	1,256,370	265,059	82·58

From the foregoing statement it will be seen that the gross earnings have increased from £94,201 in 1892 to £1,521,429 in 1902. The rush to the gold-fields of Western Australia has brought an enormous amount of traffic to the railways of that State, and the lines stand in

a position which it is impossible for those of any other province to attain, except under similar circumstances. The proportion of working expenses to gross earnings during the ten and a half years has been reduced from 96.23 per cent. to 82.58 per cent., the intervening years showing considerable irregularity. The rates for the carriage of merchandise are so low that the revenue derived from the traffic is hardly sufficient to pay for working it, and with a view to economy during 1899 the train service was considerably curtailed, and trains previously confined to passenger traffic were converted into mixed trains, conveying both passengers and goods, the result being a substantial reduction in working expenses proportionately to the gross earnings.

The relation of working expenses to gross earnings for 1901 showed a percentage of 77.19, as compared with 68.40 and 70.91 during the two preceding years. The increase of 8.79 per cent. for the year is attributed to many circumstances. There was a substantial addition to the tonnage of coal, timber, and goods hauled at low rates, but no profit was returned therefrom, the receipts only about equalling the working expenses in connection therewith. A heavy expenditure was incurred on locomotive repairs, and among other contributing causes were the rise in price of coal and stores, and increased rates of wages.

Western Australian lines show much greater variation from year to year than the lines of any other State. During the ten years 1892-1901, the lowest expenditure was in 1894 with 38.92d. per train mile, which rose to 60.78d. in 1901. The conditions, however, in the earlier years of the decade, when little more than 200 miles of line were open for traffic, and the train miles run amounted only to 234,000, were entirely different from those of 1901 with 1,355 miles open for traffic and an aggregate train mileage of 4,126,000. In 1899 there was a reduction in the total working expenses, brought about mainly by the curtailment of the mileage; this was accomplished by reducing the number of passenger trains and adopting a system of mixed trains. In the year 1900 there was a large increase in the number of locomotives, and in the repairs to carriages, waggons, &c. This increase, so far as can be seen, was attributable, partly to the natural development of the traffic, and chiefly to the inadequate workshop accommodation and to the fact that the water supply for railways was both inferior and expensive. The want of proper workshop accommodation was a serious drawback, and had the effect of causing an increase in the expenditure on repairs. The year 1901 showed a great advance in the cost of the railways, the expenditure per train mile rising from 49.04d. to 60.78d., every branch participating in the increase. It was in this year that the fifty-four hours per week system was introduced, involving the employment of an increased wages staff, and in addition thereto there was a general increase in the rates of wages. The conditions of working at Fremantle locomotive shops entailed a large outlay, and, in addition, there was an increased expenditure on locomotives due to the compulsory use of bad water, and the overwork of rolling stock owing to a shortage of

hauling power and waggons. There can be no question that in the year named the railways were worked at a very great disadvantage.

Year.	Maintenance of Way, Works, and Buildings.	Locomotive Power, Carriage and Waggon Repairs.	Traffic Expenses.	Compensation.	General Charges.	Total.
	£	£	£	£	£	£
1892, 31st Dec. ...	12,746	49,115	23,839	.....	4,954	90,654
1893, 30th June*	7,732	22,434	14,170	.....	2,733	47,069
1894 .....	20,493	47,129	31,250	.....	5,101	103,973
1895 .....	36,202	86,453	50,725	.....	8,666	182,046
1896 .....	56,036	101,692	94,388	.....	11,588	263,704
1897 .....	97,184	221,884	225,615	11,651	21,321	577,655
1898 .....	176,741	315,066	266,167	9,803	18,541	786,318
1899 .....	165,277	297,500	227,225	3,568	18,759	712,329
1900 .....	183,096	406,565	252,750	4,455	14,604	861,470
1901 .....	221,451	497,188	296,045	6,926	23,310	1,044,920

## PER TRAIN MILE.

	d.	d.	d.	d.	d.	d.
1892, 31st Dec. ...	7.53	29.00	14.08	.....	2.93	53.54
1893, 30th June*	7.91	22.94	14.49	.....	2.79	48.13
1894 .....	7.67	17.64	11.70	.....	1.91	38.92
1895 .....	8.71	20.80	12.21	.....	2.08	43.80
1896 .....	8.72	15.83	14.69	.....	1.81	41.05
1897 .....	9.19	20.99	21.34	1.10	2.02	54.64
1898 .....	11.74	20.92	17.68	0.65	1.23	52.22
1899 .....	12.18	21.92	16.74	0.26	1.38	52.48
1900 .....	10.42	23.15	14.39	0.25	0.83	49.04
1901 .....	12.88	28.92	17.22	0.40	1.36	60.78

## PER MILE OPEN.

	£	£	£	£	£	£
1892, 31st Dec. ...	62.8	241.9	117.4	.....	24.4	446.5
1893, 30th June*	38.1	110.5	69.8	.....	13.5	231.9
1894 .....	63.8	146.8	97.4	.....	15.9	323.9
1895 .....	65.8	157.2	92.2	.....	15.8	331.0
1896 .....	96.6	175.3	162.7	.....	20.0	454.6
1897 .....	117.1	267.3	271.8	14.0	25.7	695.9
1898 .....	181.5	323.5	273.3	10.0	19.0	807.3
1899 .....	130.1	234.3	178.9	2.8	14.8	560.9
1900 .....	135.1	300.0	186.5	3.3	10.8	635.7
1901 .....	163.4	366.9	218.5	5.1	17.2	771.1

\* Half year only.

*Interest returned on Capital.*

The following is a statement of the average interest earned by the railways on the money invested in them, and affords a comparison with the interest paid on the public debt of the state :—

Year.	Interest returned on Capital.	Actual Rate of Interest payable on Outstanding Loans.	Average gain.
	per cent.	per cent.	per cent.
1892 .....	0·37	4·09	*3·72
1893 (half-year) .....	0·79	4·09	*3·30
1894 .....	3·12	4·09	*0·97
1895 .....	5·45	4·57	0·88
1896 .....	11·48	3·84	7·64
1897 .....	9·05	3·61	5·44
1898 .....	4·62	3·59	1·03
1899 .....	4·55	3·54	1·01
1900 .....	5·81	3·52	2·29
1901 .....	4·35	3·52	0·83
1902 .....	3·54	3·47	0·07

\* Average loss.

The railways of Western Australia have not only met working expenses during the past eight years, but have left a margin after making provision for the payment of interest on capital expenditure. In the construction of these railways, few engineering difficulties were met with, and the lines, which are of a light character, were constructed at a cheaper rate than those of any other State. This fact, together with the enormous increase in coaching and goods traffic, due to the development of the gold-fields, has been instrumental in securing such a favourable return.

*Earnings and Expenses per Mile.*

The gross earnings, expenditure, and net earnings per train mile for the last ten and a half years are shown in the following table :—

Year.	Gross Earnings per train mile.	Expenditure per train mile.	Net Earnings per train mile.
	d.	d.	d.
1892 .....	55·62	53·54	2·08
1893 (half-year) .....	55·87	48·13	7·74
1894 .....	52·59	38·92	13·67
1895 .....	71·22	43·80	27·42
1896 .....	82·44	41·05	41·39
1897 .....	86·59	54·64	31·95
1898 .....	67·72	52·22	15·50
1899 .....	74·01	52·48	21·53
1900 .....	71·70	49·04	22·66
1901 .....	78·74	60·78	17·96
1902 .....	81·00	66·89	14·11

The gross earnings, expenditure, and net earnings per average mile open for the past ten and a half years were as follow :—

Year.	Gross Earnings per average mile open.	Expenditure per average mile open.	Net Earnings per average mile open.
	£	£	£
1892 .....	464	446	18
1893 (half-year) .....	269	232	37
1894 .....	438	324	114
1895 .....	538	331	207
1896 .....	913	454	459
1897 .....	1,103	696	407
1898 .....	1,047	807	240
1899 .....	791	561	230
1900 .....	930	636	294
1901 .....	999	771	228
1902 .....	1,122	927	195

While the gross earnings per train mile have increased from 55·62d. in 1892 to 81·00d. in 1902, the net earnings show a great improvement during the period, having risen from 2·10d. in the former year to 14·11d. in the latter. The causes that have led up to this have already been indicated. It will be observed that the expenses per train mile for 1902 are the highest for the period. From 1898 to 1900 inclusive a reduction was secured by the adoption of mixed trains. The volume of coaching and goods traffic carried during 1898 was larger than in previous years, but the net earnings per average mile open show a marked reduction. The increased traffic, of course, necessitated extra expenditure; and being accompanied by a reduction in rates, had the temporary effect of reducing the net earnings. It is estimated that the adoption of the new rates, as compared with the old, involved a loss during 1898 of at least £232,000 in the working of the Northam, Southern Cross, Coolgardie, and Kalgoorlie railways, but the wisdom of the railway policy of the country was justified by the results of the following two years. The abnormal rise in the expenditure for 1901 has already been explained.

*Coaching and Goods Traffic.*

The following table shows the number of passengers carried on the lines of the state during the year 1887, the earliest for which particulars are available, and for the last ten and a half years, together with the receipts for the traffic, and the average receipts per journey :—

Year.	Passengers carried.	Receipts from Coaching Traffic.	Average Receipts per Journey.
	No.	£	d.
1887 .....	173,656	19,032	26·29
1892 .....	456,631	39,499	20·76
1893 (half-year) .....	286,520	20,921	17·52
1894 .....	617,080	64,409	25·05
1895 .....	1,022,248	122,051	28·65
1896 .....	1,679,816	188,765	26·97
1897 .....	3,607,486	410,750	27·33
1898 .....	5,669,444	458,402	19·41
1899 .....	5,872,200	364,687	14·90
1900 .....	6,225,068	402,500	15·52
1901 .....	6,823,453	407,319	14·33
1902 .....	8,158,299	430,093	12·65

The statement shows a large increase in the number of passengers carried each year; the gradual reduction in the average receipts per journey indicates the expansion of the suburban and local traffic.

The amount of goods tonnage for a similar period is shown in the following table :—

Year.	Tonnage of Goods.	Earnings.
		£
1887 .....	52,151	20,380
1892 .....	135,890	54,702
1893 (half-year) .....	86,004	33,747
1894 .....	204,686	76,155
1895 .....	255,839	173,949
1896 .....	435,855	340,850
1897 .....	858,748	494,733
1898 .....	1,203,911	561,275
1899 .....	1,132,246	639,933
1900 .....	1,384,040	857,012
1901 .....	1,719,720	946,385
1902 .....	2,040,092	970,684

It will be seen that the increase in the goods traffic has been considerable since 1897, while the tonnage in 1902 was nearly two and a half times that of 1897. Owing to reduction in the charges for carriage, the earnings have not shown so considerable an expansion.



## TASMANIA. .

The progress of railway construction in Tasmania has been somewhat slow, for owing to the fact that the island is small and possesses numerous harbours, the railways have had to face severe competition with sea-borne traffic. As stated earlier in the chapter, the line from Launceston to Deloraine, 45 miles in length, was opened on 10th February, 1871, and though an agitation long existed for the construction of a railway between the principal centres, Hobart and Launceston, it was not till the 1st November, 1876, that it was opened for traffic. No further extension was carried out until 1884, when an increase of 48 miles was made, and up to 1890 the total mileage opened was only 398, of which 48, opened in 1884, were constructed by a private company. The length of State railways opened to 31st December, 1901, was 457½ miles, at a cost of £3,799,098 for construction and equipment, or at the rate of £8,304 per mile.

The lines of State railway in operation in Tasmania are the Western, from Launceston to Burnie, with branch to Chudleigh; the Main line from Hobart to Launceston, with branches from Launceston to Scottsdale, Parattah to Oatlands, Conara Junction to St. Mary's, Bridgewater to Glenora, and Brighton Junction to Apsley; the Sorell line, from Bellerive to Sorell; and the West Coast line, from Strahan Wharf to Maestris.

The control of the railways is vested in the Department of Lands and Works, the active management being undertaken by an officer with the title of General Manager.

*Revenue and Working Expenses.*

The net sum available to meet interest charges in connection with the railways of the state for each of the years during the last decennial period was as follows:—

Year.	Gross Earnings.	Working Expenses.	Net Earnings.	Proportion of Working Expenses to Gross Earnings.
	£	£	£	£
1892 .....	176,926	161,586	15,340	91·32
1893 .....	152,083	136,468	15,615	89·73
1894 .....	144,488	122,850	21,638	85·02
1895 .....	149,642	120,351	29,291	80·42
1896 .....	162,932	122,171	40,761	74·98
1897 .....	166,834	128,544	38,290	77·04
1898 .....	178,180	141,179	37,001	79·23
1899 .....	193,158	152,798	40,360	79·10
1900 .....	202,959	160,487	42,472	79·07
1901 .....	205,791	173,400	32,391	84·26

The cost of working the Tasmanian railways is comparatively high, and, as in New Zealand, the lines have to face severe competition with sea-borne traffic, while there are no large inland centres that could support railways. There is a marked decrease year by year in the Australian traffic *via* Launceston, which is attributed to the great improvement in the direct steamer service between Melbourne and Hobart.

The following analysis of the working expenses of Tasmanian railways for the ten years 1892-1901 does not call for special comment. There has, of late years, been a slight upward tendency in the cost of train mileage, partly due to the enhanced price of coal. In the years 1895, 1896, and 1897 it is evident that necessary expenditure on rolling stock was not carried out, thus throwing the burthen of repairs on to later years—this was especially the case in regard to locomotive repairs. In 1901 there were extensive renewals of locomotive boilers, but a portion of the expenditure in connection therewith might have been saved by earlier attention:—

Year ended 31st December.	Maintenance of Way, Works, and Buildings.	Locomotive Power, Carriage and Waggon Repairs and Renewals.	Traffic Expenses.	General Charges.	Total.
	£	£	£	£	£
1892	61,642	55,277	37,110	7,557	161,586
1893	50,191	48,623	31,152	6,502	136,468
1894	44,762	42,483	29,507	6,098	122,850
1895	46,548	38,381	29,424	5,998	120,351
1896	46,813	35,326	30,909	6,123	122,171
1897	48,561	40,683	32,989	6,311	128,544
1898	54,927	45,180	33,765	7,307	141,179
1899	56,238	51,662	37,370	7,528	152,798
1900	58,862	53,865	39,300	8,460	160,487
1901	59,897	63,580	41,138	8,785	173,400

## PER TRAIN MILE.

	d.	d.	d.	d.	d.
1892	16·2	14·6	9·8	2·0	42·6
1893	15·1	14·6	9·3	1·9	40·9
1894	14·2	13·5	9·3	1·9	38·9
1895	15·4	12·6	9·7	2·0	39·7
1896	15·2	12·4	10·0	2·0	39·6
1897	15·2	12·8	10·3	2·0	40·3
1898	17·3	14·2	10·7	2·3	44·5
1899	16·7	15·4	11·1	2·2	45·4
1900	17·3	15·8	11·6	2·5	47·2
1901	16·1	17·0	11·0	2·3	46·4

Year ended 31st December.	Maintenance of Way, Works, and Buildings.	Locomotive Power, Carriage and Waggon Repairs and Renewals.	Traffic Expenses.	General Charges.	Total.
PER MILE OPEN.					
	£	£	£	£	£
1892	147·7	132·4	89·0	18·1	387·2
1893	117·5	113·8	72·9	15·2	319·4
1894	104·8	99·4	69·0	14·3	287·5
1895	109·0	89·8	68·8	14·0	281·6
1896	109·6	89·7	72·3	14·3	285·9
1897	112·4	94·1	76·3	14·5	297·3
1898	123·3	101·5	75·8	16·4	317·0
1899	126·3	116·0	83·9	16·9	343·1
1900	132·1	120·9	88·2	19·0	360·2
1901	130·3	138·4	89·5	19·1	377·3

*Interest returned on Capital.*

The following table shows the average loss on the working of the Tasmanian railways for each year during the last ten years :—

Year.	Interest returned on Capital.	Actual rate of Interest payable on Outstanding Loans.	Average Loss.
	per cent.	per cent.	per cent.
1892	0·43	4·09	3·66
1893	0·44	4·11	3·67
1894	0·61	3·96	3·35
1895	0·83	3·88	3·05
1896	1·16	3·87	2·71
1897	1·09	3·85	2·76
1898	1·03	3·82	2·79
1899	1·12	3·81	2·69
1900	1·16	3·78	2·62
1901	0·85	3·76	2·91

The foregoing table shows that there was a slight improvement in the condition of the railway revenue during the five years preceding 1901. During 1901 the interest returned on capital expenditure fell to nearly that of the year 1895. Among the causes leading to this was the reduction in passenger fares, in the case of single fares by 45 per cent., and return fares by 27½ per cent. These large reductions did not result in the fulfilment of anticipations, and on the 1st December, 1901, a revised scale was adopted, which is still 20 per cent. below that in force

in 1900. The competition of the Emu Bay Company and the low prices ruling for lead and silver have brought about a decrease in revenue on the Government West Coast line. Working expenses have absorbed 84·26 per cent. of total revenue, and the large increase over the previous five years is due to increased mileage, more extensive renewals of locomotive boilers paid for out of working expenses, and the increased price of coal. The competition already referred to, together with the heavy initial cost of the railways themselves, especially of the main line connecting Hobart with Launceston, for which the price paid by the Government on its resumption was at the rate of £9,069 per mile, as against an average of £8,304 per mile for the lines of the state generally, render it extremely difficult, even with the most careful management, to effect any considerable diminution in the average loss. Even in the case of the Western line from Launceston to Burnie, which passes through the finest agricultural land in the State, the return, after paying working expenses for the year ended 31st December, 1901, was only 1·17 per cent. on the cost of construction and equipment.

*Earnings and Expenses per Mile.*

The following tables indicate the gross earnings, expenditure, and net earnings per train mile and per mile of line open. It will be observed that the net earnings per train mile reached 13d. in 1896, a point beyond which it does not seem likely there will be much expansion. The considerable reduction in net earnings during 1901, in comparison with the previous five years, is due to the shrinkage of revenue consequent on the reduction of fares, and the contraction in revenue from goods traffic already referred to. This compares very unfavourably with the results for other parts of Australia.

Year.	Gross Earnings per train mile.	Expenditure per train mile.	Net Earnings. per train mile.
	d.	d.	d.
1892	46·73	42·68	4·05
1893	45·63	40·94	4·69
1894	45·83	38·96	6·87
1895	49·36	39·69	9·67
1896	52·85	39·63	13·22
1897	52·34	40·33	12·01
1898	56·17	44·50	11·67
1899	57·50	45·49	12·01
1900	59·70	47·20	12·50
1901	55·14	46·46	8·68

The earnings and expenditure per average mile open were as follows :—

Year.	Gross Earnings per average mile open.	Expenditure per average mile open.	Net Earnings per average mile open.
	£	£	£
1892	424	387	37
1893	356	319	37
1894	338	287	51
1895	350	281	69
1896	381	286	95
1897	386	297	89
1898	400	317	83
1899	434	343	91
1900	456	360	96
1901	448	377	71

The peculiar position of Tasmania has already been referred to. The portions of the lines at first constructed were within the more densely populated districts, and the later extensions were projected into the more thinly-peopled areas, which were without sufficient production to afford a payable traffic. In comparison with the other States the proportion of expenses to gross earnings is extremely high, and while for the five years ended 1900 an improvement was shown, the increase in 1901 indicates that it is not possible under present conditions to reduce expenditure.

#### *Coaching and Goods Traffic.*

Particulars in respect of the number of passengers carried on the State lines of Tasmania during the year 1881, and for the last ten years, together with receipts from the traffic and the average receipts per journey, are set forth in the following table :—

Year.	Passengers carried.	Receipts from Coaching Traffic.	Average Receipts per Journey.
	No.	£	d.
1881	102,495	10,396	24·34
1892	704,531	87,506	29·80
1893	546,671	64,428	28·28
1894	514,461	58,070	27·09
1895	526,814	57,947	26·39
1896	542,825	59,771	26·43
1897	603,530	62,447	24·88
1898	617,643	68,317	26·54
1899	640,587	73,147	27·40
1900	683,015	76,184	26·77
1901	777,445	78,328	24·18

It will be seen that during the year 1892 there was a comparatively large number of passengers carried. This was due to the resumption of the main line connecting Hobart with Launceston, the returns for the years in question being swollen by the traffic over the increased length of line. The traffic, however, was not sustained, for in the subsequent year a large diminution in the number of persons making use of the lines was recorded. There has since been a revival, and there are good grounds for supposing that this improvement will be continued. The average receipts per journey do not vary to any considerable extent, the amount of suburban traffic properly so-called being very small. The fall in the average receipts per journey during 1901 is largely due to the considerable reduction in fares already alluded to.

The amount of goods tonnage for a similar period is shown in the following table:—

Year.	Tonnage of Goods and Live Stock.	Earnings.
		£
1881	21,043	8,332
1892	178,224	76,182
1893	164,982	73,490
1894	174,457	73,639
1895	204,480	78,797
1896	229,707	85,780
1897	229,620	86,941
1898	235,096	93,620
1899	312,446	107,661
1900	308,453	111,904
1901	314,628	108,698

No information is available showing the subdivision of the tonnage of goods and live stock for the year into a general classification. The average distance each ton of goods was carried was 40·93 miles, and the average receipts per ton per mile 1·73d.

#### NEW ZEALAND.

The continuance of the native war in New Zealand, militated against the rapid extension of the railways, and at the close of the war in 1870 there were only 46 miles in operation. In 1875 the length of line opened for traffic had increased to 542 miles; in 1885, to 1,613 miles; in 1890, to 1,842 miles; and in 1895 to 2,014 miles. The length of line opened to 31st March, 1902, was 2,235 miles, at a cost of £18,170,722 for construction and equipment, or at the rate of £8,130 per mile.

The railway system of the colony is divided into ten sections. The Kawakawa and Whangarei sections, in the extreme north of the North Island, are short lines to coal-fields, and the Kaihu section was built for the purpose of tapping large timber areas inland. The Auckland

section forms the northern portion of the North Island main trunk railway, which, when complete, will terminate at Wellington, on the shores of Cook's Strait. The Wellington-Napier-New Plymouth section comprises the group of lines which serve the southern portion of North Island. In the northern portion of Middle Island, the Westland, Westport, Nelson, and Picton sections form only the first link in the chain of through communication. On the East Coast of Middle Island, the actual working portion of the main trunk line is to be found. The present terminus is at Culverden, from whence extension will be made northward. This is known as the Hurunui-Bluff section, and includes the service to Christchurch, Dunedin, Invercargill, and the Bluff.

During the year ended March, 1901, the whole of the Midland railways were formally taken possession of by the Government, and incorporated with the Westland section of the Government railways. They had previously been worked by the Government as a trust. The total length of these lines was about 83 miles.

The management of the railways of New Zealand was placed in the hands of three Commissioners in 1887, but early in 1895 the Government resumed charge of the lines, the active control being vested in an officer with the title of General Manager, who is responsible to the Minister for Railways.

*Revenue and Working Expenses.*

The net sum available to meet interest charges during each year of the last decennial period is set forth in the following table:—

Year.	Gross Earnings.	Working Expenses.	Net Earnings.	Proportion of Working Expenses to Gross Earnings.
	£	£	£	£
1893	1,181,522	732,142	449,380	61·97
1894	1,172,793	735,360	437,433	62·70
1895	1,150,851	732,161	418,690	63·62
1896	1,183,041	751,368	431,673	63·51
1897	1,286,158	789,054	497,104	61·35
1898	1,376,008	857,191	518,817	62·30
1899	1,469,665	929,738	539,927	63·26
1900	1,623,891	1,052,358	571,533	64·80
1901	1,727,236	1,127,848	599,388	65·30
1902	1,874,586	1,252,237	622,349	66·80

The foregoing table shows that the serious fluctuations that at times characterise the returns of the states on the mainland of Australia are absent from those of New Zealand, the configuration of the islands and their higher latitude rendering them to a very great extent immune from the periodical droughts to which the Australian states are so subject. The proportion of working expenses to gross earnings does not vary to

any considerable extent, and the rise during the past four years is attributed to the payment of an increased rate of wages to employees, replacing old engines with new, heavy repairs due to the increased age of the stock, and the relaying of a portion of the permanent way with heavier rails. The traffic has, in many places, practically outgrown the carrying capacity of the lines, which were originally intended as the pioneers of settlement, and were not built to cope with a business such as still exists in many parts of the colony. The traffic over the railways has now assumed dimensions which render the employment of the heaviest type of locomotive a matter of the utmost importance in the interests of economy, and the running of trains at frequent intervals and high speeds a matter of necessity. There are, however, considerable portions of main line still laid with light rails, and until such time as these can be replaced with rails of a heavier type, and the bridges strengthened to carry the heavier class of engine, it is impossible to obtain the best results of working.

The analysis of the working expenses of the New Zealand railways for the ten years, 1893-1902, which is here presented, shows that there has been a regular increase since 1895, in which year the expenditure amounted to £732,161, equal to 54·54d. per train mile compared with 59·32d. per train mile in 1902.

The New Zealand railways were not originally constructed to carry the present traffic, and during the period under review there has been continued expenditure due to the necessity of increasing the weight of rails and strengthening the bridges and aqueducts. In the year 1902 the Minister for Railways speaks of the increasing age of the lines, the necessity for employing heavier rolling stock, and of the accelerated speed which render the efficient maintenance of the track an imperative necessity; if the Minister's ideas are fully carried out an increased expenditure may be looked for. The advance in the cost of working from £372 to £562 per mile of line open is of no significance, such expenditure being due merely to the continued growth of the traffic.

Year ended 31st March.	Maintenance of Way, Works, and Buildings.	Locomotive Power.	Carriage and Waggon Repairs and Renewals.	Traffic Expenses.	General Charges.	Total.
	£	£	£	£	£	£
1893	262,600	183,774	53,962	202,153	29,653	732,142
1894	268,451	177,833	56,470	201,166	31,440	735,360
1895	272,718	175,758	50,949	201,641	31,095	732,161
1896	282,593	185,669	54,692	207,253	21,161	751,368
1897	301,981	190,543	65,825	213,914	16,791	789,054
1898	327,987	209,289	65,344	232,646	21,925	857,191
1899	357,189	231,532	73,680	244,932	22,405	929,738
1900	394,619	295,542	76,555	262,552	23,090	1,052,358
1901	426,405	293,383	91,532	296,159	20,369	1,127,848
1902	436,847	351,172	99,522	333,211	31,485	1,252,237



Year ended 31st March.	Maintenance of Way, Works, and Buildings.	Locomotive Power.	Carriage and Waggon Repairs and Renewals.	Traffic Expenses.	General Charges.	Total.
PER TRAIN MILE.						
	d.	d.	d.	d.	d.	d.
1893	20·99	14·69	4·32	16·16	2·37	58·53
1894	20·70	13·71	4·35	15·51	2·42	56·69
1895	20·32	13·09	3·79	15·02	2·32	54·54
1896	20·51	13·47	3·97	15·04	1·54	54·53
1897	21·26	13·41	4·64	15·06	1·18	55·55
1898	21·47	13·70	4·27	15·23	1·44	56·11
1899	21·60	14·00	4·46	14·81	1·35	56·22
1900	22·61	16·93	4·39	15·05	1·33	60·31
1901	22·15	15·24	4·75	15·38	1·06	58·58
1902	20·69	16·64	4·71	15·79	1·49	59·32

PER MILE OPEN.						
	£	£	£	£	£	£
1893	140·18	98·12	28·82	107·94	15·83	390·89
1894	140·35	92·96	29·52	105·15	16·43	384·41
1895	138·57	89·31	25·89	102·45	15·80	372·02
1896	141·45	92·93	27·37	103·74	10·59	376·08
1897	149·77	94·50	32·65	106·09	8·33	391·34
1898	160·53	102·43	31·98	113·86	10·73	419·53
1899	172·92	112·09	35·67	118·56	10·85	450·09
1900	187·99	140·80	36·47	125·08	11·00	501·34
1901	196·14	134·95	42·11	136·23	9·37	518·80
1902	196·17	157·69	44·69	149·63	14·14	562·32

*Interest Returned on Capital.*

The basis employed in the case of the states comprised within the Commonwealth for ascertaining the net interest payable on the railway debts cannot be adopted for New Zealand, the necessary data not being available. The nominal loss is, therefore, shown in the following statement, the actual loss being somewhat higher:—

Year.	Interest Returned on Capital.	Average rate of Interest payable on Out- standing Loans.	Average Loss.
	Per cent.	Per cent.	Per cent.
1893	3·05	4·57	1·52
1894	2·88	4·59	1·71
1895	2·73	4·00	1·27
1896	2·80	3·94	1·14
1897	3·19	3·92	0·73
1898	3·24	3·89	0·65
1899	3·29	3·81	0·52
1900	3·42	3·79	0·37
1901	3·48	3·78	0·30
1902	3·43	3·76	0·33

The foregoing table indicates that the railways are approaching the stage of being self-supporting, the interest returned on capital cost for the past eight years showing an improvement each year.

*Earnings and Expenses per Mile.*

The gross earnings, expenditure, and net earnings per train mile for the past ten years are shown in the following table :—

Year.	Gross Earnings per train mile.	Expenditure per train mile.	Net Earnings per train mile.
	d.	d.	d.
1893	94·50	58·53	35·97
1894	90·25	56·69	33·56
1895	85·75	54·54	31·21
1896	85·75	54·53	31·22
1897	90·50	55·55	34·95
1898	90·00	56·11	33·89
1899	89·00	56·22	32·78
1900	93·00	60·31	32·69
1901	89·75	58·58	31·17
1902	88·80	59·32	29·48

The gross earnings per train mile have varied very little during the ten years, the lowest point touched being 85½d., and the highest, 94½d., while the expenditure has varied even less. The expenditure during 1900 was higher than in any other year during the decennial period. The gross earnings per train mile for the past two years were less than those of 1900, and the net earnings show a slight but gradual reduction during the past five years. The results, however, compare very favourably with the other states, and are only exceeded by those of New South Wales, with the exception of the year just closed, when New Zealand showed a slightly higher net return.

¶ The gross earnings, expenditure, and net earnings per average mile open for the past ten years are as follow :—

Year.	Gross Earnings per average mile open.	Expenditure per average mile open.	Net Earnings per average mile open.
	£	£	£
1893	626	391	235
1894	613	384	229
1895	585	372	213
1896	592	376	216
1897	638	391	247
1898	673	419	254
1899	712	450	262
1900	774	501	273
1901	794	519	276
1902	842	562	280

The foregoing table indicates that the gross earnings have increased from £626 per average mile open to £842, and the net earnings from £235 to £280, the return for last year being the highest secured during the decennial period—evidence of the fact that the extensions in recent years have been judicious, and that the volume of traffic has been maintained.

*Coaching and Goods Traffic.*

The following table shows the number of passengers carried on the lines of the Colony during the year ended 31st March, 1882, and for the last ten years, together with the receipts from the traffic, and the average receipts per journey :—

Year.	Passengers carried.	Receipts from Coaching traffic.	Average Receipts per Journey.
	No.	£	d.
1882	2,911,477	329,492	27·16
1893	3,759,044	367,594	23·47
1894	3,972,701	378,480	22·89
1895	3,905,578	360,243	22·14
1896	4,162,426	359,822	20·74
1897	4,439,387	378,684	20·47
1898	4,672,264	399,262	20·51
1899	4,955,553	438,367	21·23
1900	5,468,284	474,793	20·83
1901	6,243,593	503,051	19·34
1902	7,356,136	575,697	18·78

It will be observed that there was a falling off during the decennial period in the average receipts per journey. The continued increase in the number of passengers carried is, however, very marked, the advance for the closing year of the period being upwards of 1,112,000, while the receipts from the traffic rose by over £72,000. Taking the returns for the year ended 31st March, 1884, as a basis, it has been found that those for 1902 show an increase of only 29 per cent. in the number of passengers who travelled first-class, while the increase in those who travelled second-class was not less than 108 per cent. While the marked prosperity of the past four years has induced more passengers to travel first-class, it is none the less evident that the tendency is towards one class of carriage, as already exists in the case of tramways.

The amount of goods tonnage for a similar period is shown in the following table:—

Year.	Tonnage of Goods exclusive of Live Stock.	Earnings.
		£
1882	1,437,714	491,057
1893	2,193,330	707,786
1894	2,060,645	686,469
1895	2,048,391	683,726
1896	2,087,798	698,115
1897	2,368,927	774,163
1898	2,518,367	837,590
1899	2,624,059	882,077
1900	3,127,874	985,723
1901	3,339,687	1,051,695
1902	3,529,177	1,110,575

The large increase in the tonnage of goods carried during 1900 over preceding years was caused by the bountiful harvest in the Middle Island, which was carried at freight rates averaging 20 per cent. below those ruling in the previous year. The further increase of 211,813 tons for 1901, was contributed to by all descriptions of goods, with the exception of wool. The grain traffic for 1901 compared with that of 1899 shows an increase of 84 per cent. The increase during 1902 over the traffic of 1901 was 189,490 tons. Increases occur under all the various headings, the largest being in grain and timber, the traffic in each class, with the exception of wool, being the largest on record.

The subdivision of the tonnage of goods and live stock for the year ended 31st March, 1902, is shown in the following table. Particulars of the goods traffic are set forth in seven classes, but the average distance for which goods of each class were carried cannot be given, and there are no data available showing the average earnings per ton per mile.

Description of Traffic.	Tons carried.	Number carried.
Lime and Chaff .....	86,378	.....
Wool.....	101,878	.....
Firewood .....	100,236	.....
Timber .....	427,153	.....
Grain .....	813,345	.....
Merchandise .....	556,395	.....
Minerals .....	1,443,792	.....
Cattle .....	.....	83,458
Sheep .....	.....	2,724,860
Pigs .....	.....	55,159

## TRAMWAYS.

In all the Australasian states tramways are in operation, but it is chiefly in Sydney and Melbourne, the inhabitants of which numbered at the latest date 496,990 and 501,580 respectively, that the density of settlement has necessitated the general adoption of this mode of transit.

In New South Wales the three systems of electric, cable, and steam traction are in vogue. Within the metropolitan area, however, the electric is being substituted for steam power. The length of line under electric traction on the 30th September, 1902, was 45 miles 15 chains, comprising 11 miles 67½ chains at North Sydney; 2 miles 27 chains, Ocean-street, Woollahra, to Dover Road; 3 miles 36 chains, George-street-Harris-street tramway; 4 miles 11 chains, Glebe Junction to Newtown, Marrickville, and Dulwich Hill; 2 miles 73 chains, Forest Lodge Junction to Leichhardt; 2 miles 57½ chains, Newtown to St. Peters and Cook's River; 1 mile 53 chains, Railway to Bridge-street; 5 miles 55 chains, Waverley and Bondi; 2 miles 28 chains, Railway to Glebe and Forest Lodge; 2 miles 66 chains, Forest Lodge to Balmain; 1 mile 26 chains, Redfern to Moore Park; 3 miles 20 chains, Pitt and Castlereagh streets to Fort Macquarie; and 55 chains, George-street to Miller's Point. The only line worked by cable traction is that from King-street, Sydney, to Ocean-street, in the suburb of Woollahra, a distance of 2 miles 32 chains. On the remaining lines steam motors are still used. The length of Government tram lines open to 30th June, 1902, was 104 miles, which had cost for construction and equipment £2,829,363. The receipts for the year were £631,757, and the working expenses £541,984, leaving a profit of £89,773, or 3·17 per cent. on the invested capital. The number of passengers carried during 1902 was 108,135,111.

In Victoria the cable system is in operation in the metropolitan area, the lines having been constructed by a municipal trust at a cost of £1,705,794. The tramways are leased to a company, and the receipts for the year ended 30th June, 1902, were £474,835. The number of passengers carried during the year was 47,261,571. The miles of track operated on were 43¾ cable and 3¾ horse lines, or 47½ miles of double track. Besides the lines of the Tramway Trust, there are additional suburban systems worked by limited liability companies, as follows:—Horse, 8½ miles; electric, 4 miles; and cable, 2¼ miles.

In Queensland there is a system of electric trams controlled by a private company. The only information available shows that the capital of the company is £750,000 fully paid up, and that there are also debentures to the amount of £400,000. Particulars as to receipts and disbursements are not available, but the report presented to the shareholders in London during May, 1902, showed a net profit of £42,815 for the period from 20th November, 1900, to 31st December, 1901. The length of the tramways is 25 miles, or 43 miles of single line.

The company owned seventy-nine electric cars, and during the year 1901, 16,183,801 passengers were carried.

In South Australia there are no Government tramways, but horse trams are run in the principal streets of Adelaide by private companies. No particulars have been collected respecting the length of the lines, nor of the returns therefrom. A proposal is under consideration for the substitution of electric traction on these lines.

The Western Australian Government owns a line of horse tramway on a 2-foot gauge between Roeburne and Cossack, a length of  $8\frac{1}{2}$  miles, constructed at a cost of £23,467. For the year ended 30th June, 1901, the gross earnings were £1,981, and the working expenses £2,285, leaving the loss on working expenses at £304.

In Tasmania there is an electric tramway from Hobart railway station, about 9 miles in length, owned by a private company. The cost of construction and equipment was £90,000; and the company possesses 20 cars. For the year ended 31st December, 1901, the receipts amounted to £16,097, and the working expenses, to £12,342. The passengers carried during the twelve months numbered 1,284,552. There is also a steam system at Zeehan, 2 miles in length, constructed at a cost of £3,212. No information is available as to the receipts, but the working expenses for the year ended 31st December, 1899, were £1,948. The number of passengers carried during the twelve months was 24,219.

There are also tramways in existence in New Zealand under municipal and private management, but no particulars in regard to them are at present available.