

## RAILWAYS.

IN a country such as Australasia, ill supplied with navigable rivers, the furtherance of railway construction is absolutely necessary to its proper development. The question of establishing railway communication with the interior from Sydney was agitated as far back as 1846, but it was not until the enormous accession to the population of these lands, which was brought about by the discoveries of gold, that the matter was carried to a successful issue. The earliest railways were begun almost at the same time in New South Wales and Victoria. The works were, indeed, actually first commenced in New South Wales, but the first railway line opened for traffic was the Melbourne and Hobson's Bay line in 1854. In the first instance in both Colonies the construction of the lines was undertaken by private enterprise; but the companies that pioneered the way in regard to railway construction soon found that the magnitude of the undertaking was beyond the scope of their funds, and it was apparent that only the Government could hope to keep pace with the needs of the country in this direction. The private works already begun in New South Wales were, therefore, bought up by the Government in 1854, and all private lines fell into Government hands in Victoria one year later, except the Hobson's Bay railway, which was not acquired till 1878.

Introduction of  
Railways.

From 1855 the Governments of the two Colonies undertook and carried on the work of railway extension. The first Govern-

History of  
Railway  
construction.

ment railway-works in South Australia were undertaken in 1857; they were begun in New Zealand in 1863; in Queensland in 1864; in Tasmania in 1868; and in Western Australia in 1874.

Main Inter-colonial lines.

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 colony was completed, thus placing the four Capitals, Brisbane, Sydney, Melbourne, and Adelaide in direct communication with each other. Unfortunately no prior agreement was arrived at between the Colonies as to the adoption of an uniform gauge. The Government of New South Wales constructed all their lines upon the English standard gauge of 4 ft. 8½ in., while the Victorian Government adopted the 5 ft. 3 in. gauge. Until the lines of the two Colonies met on the boundary no discomfort was of course experienced; but since then the break of gauge, and the consequent transshipment, 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 gauge involved a heavier expense than they were prepared to face, the more recent lines were built on a gauge of 3 ft. 6 in. The line joining Adelaide with the Victorian border was, however, constructed on the wider 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 Colony and New South Wales. The difficulty caused by this diversity of gauge is already found to be troublesome. It is admitted on all hands that the trouble can be got over only by establishing uniformity of gauge, and every year in which action is delayed will make the establishment of that uniformity more costly. Tasmania, Western Australia, and New Zealand have adopted the 3 ft. 6 in.

Evils of diversity of gauge.

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. By the purchase of the Main Line Company's property the Tasmanian Government now controls a system of 351 miles of railway open for traffic, together with a further 71 miles in course of construction.

The population and area of territory per mile of line open varies considerably. As regards population per mile of line open, Western Australia, South Australia, and Queensland—the most extensive Colonies—show most favourably; but, in comparison to the area of the territory, Victoria, New Zealand, and Tasmania take the lead. The annexed table shows the relation of the railway mileage to population and to the area of each Colony for the year 1890-91 :—

Proportion of miles of line to population and area.

Colony.	Per mile of line open.	
	Population.	Square miles of territory
New South Wales .....	514	137
Victoria .....	410	32
Queensland .....	179	305
South Australia .....	175	494
Western Australia .....	83	1,812
Tasmania .....	364	66
New Zealand .....	320	53
Australasia .....	316	264

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

Proportion in other countries.

Length of Railway in various Countries, with Population and  
Area per Mile of Line.

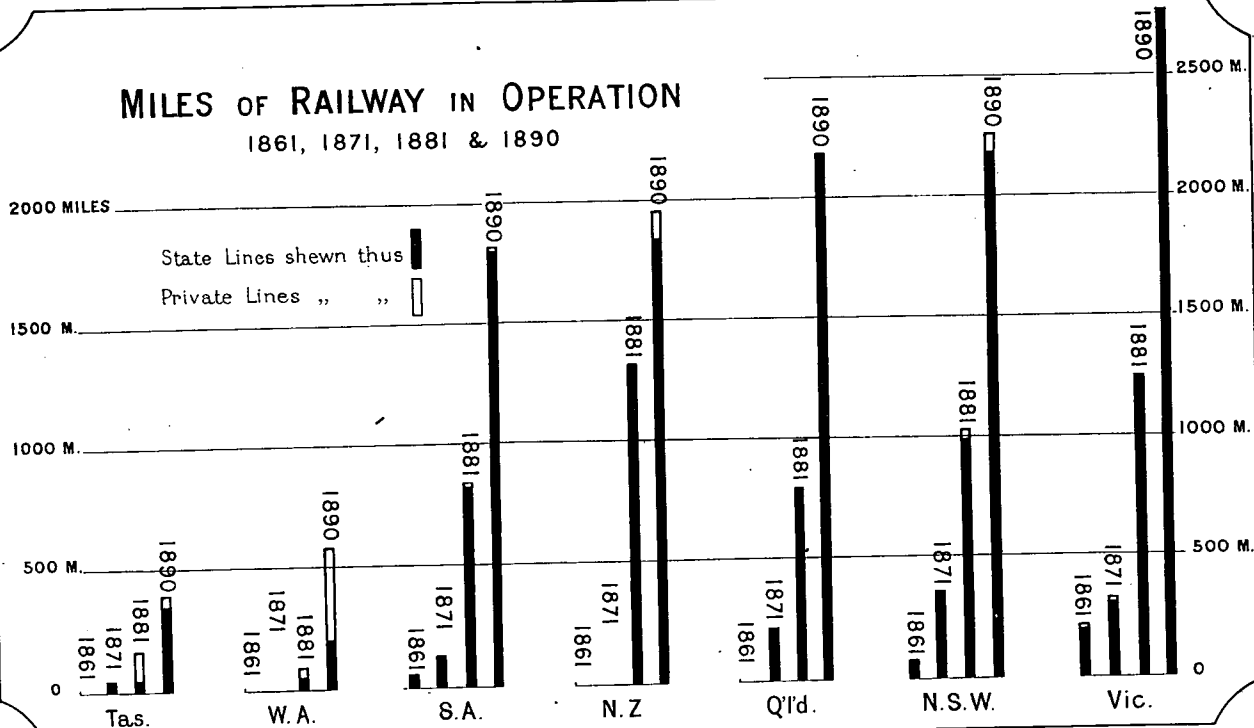
Countries.	Length of Railway.	Population per Miles of Line.	Area per Mile of Line.
Argentine Republic .....	3,035	825	319
Austria-Hungary .....	15,267	2,481	16
Belgium .....	2,762	1,999	4
Brazil .....	4,625	3,027	696
Canada, Dominion of.....	12,628	402	270
Chili .....	1,649	1,533	176
Denmark .....	1,217	1,617	12
France .....	21,899	1,745	9
Germany .....	24,270	1,931	9
Great Britain and Ireland .....	19,943	1,896	6
Greece .....	371	4,634	67
India (British) .....	16,095	13,037	54
Italy .....	7,830	3,635	14
Japan .....	534	74,171	276
Mexico .....	3,388	3,391	219
Netherlands .....	1,616	2,483	8
Portugal .....	1,188	3,625	29
Roumania .....	1,460	3,543	34
Russia (in Europe).....	17,363	5,291	120
Spain .....	5,929	2,959	33
Sweden and Norway .....	5,644	1,194	52
Switzerland.....	1,869	1,569	8
Turkey (in Europe) .....	865	5,538	74
United States of America.....	154,276	398	19
Australasia .....	11,990	316	264

Progress of  
railway con-  
struction.

The progress of railway construction, except, perhaps, in the case 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 income would not justify the expense of widely extended lines. It was also due in some degree 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. The initial difficulties attendant on railway construction may be said to have ended about 1871, for since that year progress has been made by all the colonies, as the following figures show :—

# MILES OF RAILWAY IN OPERATION

1861, 1871, 1881 & 1890



## Miles of Railway—Government and Private—open for Traffic.

Colony.	1861.	1871.	1881.	1890-01.
New South Wales.....	73	358	1,041	2,263
Victoria .....	214	329	1,247	2,763
Queensland.....	.....	218	800	2,195
South Australia.....	56	132	849	1,829
Western Australia.....	.....	.....	92	585
Tasmania .....	.....	45	167	399
New Zealand .....	.....	.....	1,333	1,956
Australasia.....	343	1,082	5,529	11,990

NOTE.—In 1872 there were 145 miles of Railway open in New Zealand.

Notwithstanding the energetic expansion of the railway systems throughout Australasia since 1881, there is room for considerable extension. In South Australia railway 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 to eventually extend this line as far north as Pine Creek, the southern terminus of the Port Darwin line. 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. An English syndicate has lately offered to complete this railway on the land grant system, but it is doubtful if the South Australian Government will entertain the idea. In New South Wales the railway extensions will be chiefly confined to perfecting the various systems now constructed. 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.

South Australian  
Railways.

Queensland  
Railways.

In Victoria, Tasmania, and New Zealand, the railways are well developed compared with size of territory, and any future extensions in these colonies will hardly be on as large a scale as those of the other colonies. It is the established policy of each colony to keep the railways under State control, and only in extreme circumstances is that policy departed from. In two of the colonies—Victoria and Queensland—the lines are entirely in the hands of the Government, although such was not the case always in the former colony, and in none of the colonies except Western Australia is the extent of private lines considerable when compared with that administered by the State.

Private lines in  
New South  
Wales.

The private lines in New South Wales are the Deniliquin to Moama, 45 miles in length, and Broken Hill to Cockburn, 36 miles long. A proviso has been inserted in the charters of the companies owning these lines that after a certain date the Government can, if disposed, acquire the lines at a valuation. The following table shows the mileage of Government and private lines, and the capital cost of the former at the middle of the year 1891 :—

Colony.	Length of lines open.			Gauge.	Government lines open for traffic for 1890-91.	
	Government.	Private.	Total.		Total cost of construction and equipment.	Average cost per mile.
	miles.	miles.	miles.	ft. in.	£	£
New South Wales ...	2,182	81	2,263	4 8½	31,768,617	14,559
Victoria ...	2,763	...	2,763	5 3	36,341,626	13,153
Queensland .....	2,195	...	2,195	3 6	15,101,617	6,487
South Australia .....	1,812	17	1,829	{ 5 3 } 3 6	12,544,733	6,923
Western Australia...	198	387	585	3 6	832,497	4,204
Tasmania .....	351	48	399	3 6	2,900,362	8,269
New Zealand .....	1,842	114	1,956	3 6	14,278,586	7,752
Australasia .....	11,343	647	11,990	.....	113,768,038	10,030

It will be seen that the capital cost per mile in New South Wales and Victoria is about double that of any other Colony.

In most of the other Colonies a large proportion of the extensions is made into sparsely populated districts, and the lines are what may be termed pioneer railways.

It would hardly be fair to institute comparisons 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 colonies this item of expenditure is not of leading importance. The cost per mile is given thus :—

India.....	£13,010
Canada.....	12,182
Cape Colony .....	8,604
United States.....	11,157

while for Australasia it is £10,030.

Every Colony except Western Australia shows a surplus of revenue over working expenditure, notwithstanding that the avowed object of railway construction in the colonies has been to promote settlement, apart from considerations of profitably working the lines. At the same time the principle has been kept in view that in the main the Railways should be self-supporting.

The particulars of traffic receipts for 1890-91 were :—

Colony.	Gross Revenue.	Working Expenses.	Net Revenue.
	£	£	£
New South Wales .....	2,974,421	1,831,371	1,143,050
Victoria .....	3,298,567	2,310,645	987,922
Queensland .....	908,704	645,597	263,107
South Australia .....	1,239,309	631,089	608,220
Western Australia.....	45,814	60,244	- 14,430
Tasmania .....	106,232	86,220	20,012
New Zealand .....	1,121,701	700,703	420,998
Australasia .....	9,694,748	6,265,869	3,428,879

— Denotes excess of working expenses over receipts.

The returns for the first four Colonies are for the year ending 30th June, 1891; New Zealand for 31st March, 1891; and Western Australia and Tasmania for 31st December, 1890.



## RETURNS YIELDED BY RAILWAYS.

Proportion of  
expenses to  
revenue.

The following table shows the proportion of working expenses to gross revenue for each Colony in 1891. In South Australia, New South Wales, and New Zealand the proportion of the working expenses to gross revenue was below the average for Australasia, while all the other Colonies are largely in excess of that figure. In South Australia the lines are now worked at a cost of a little more than one half the receipts, while in Western Australia for every £100 earned the working expenses amount to £131 :—

Colony.	Working expenses— Proportion to gross revenue. 1890-91.
New South Wales .....	61·6
Victoria .....	70·0
Queensland .....	71·0
South Australia .....	50·9
Western Australia .....	131·5
Tasmania .....	81·2
New Zealand .....	62·5
Australasia .....	64·6

Returns yielded  
by railways.

The average interest payable on all Australasian loans is 4·02 per cent., and the returns yielded by the railways is 3·01 per cent., showing a loss in working of 1·01 per cent., equivalent to £1,149,150. The figures are :—

Colony.	Interest returned on Capital.	Average interest payable on Loan Expenditure.	Average loss.
	per cent.	per cent.	per cent.
New South Wales .....	3·60	3·81	0·21
Victoria .....	2·72	4·00	1·28
Queensland .....	1·74	4·05	2·31
South Australia† .....	4·85	4·08	0·77†
Western Australia .....	1·74*	4·21	5·95
Tasmania .....	0·69	4·11	3·42
New Zealand .....	2·95	4·22	1·27
Australasia .....	3·01	4·03	1·01

\* Represents loss. † Represents profit. ‡ Includes Northern Territory.

South Australia is the only colony showing a net profit after paying for interest on construction, while the loss in the other colonies ranges from 0·21 per cent. in New South Wales to 5·95 in Western Australia. The Victorian railways in 1886 yielded 4·18 per cent., but through the extension of unprofitable lines the rate for the year ending June, 1891, had declined to 2·72 per cent. It is expected by the Victorian Commissioners that, with a rest in construction for three years, the equilibrium between net revenue and the interest payable would be accomplished.

With the exception of Western Australia and Tasmania, the State railways in each colony are under the management of three Commissioners, appointed by the Government, who wield large executive powers, amounting almost to independent control, the object aimed at being to secure economic management free from political interference. So far this system has been productive of good results. Victoria was the first colony to place her railway administration under Commissioners, which took place in 1883, and it was not till four or five years later that the other colonies mentioned above adopted a similar management. The following table shows interest on capital since 1886 for those colonies where the management is under the administration of Commissioners:—

Colony.	1885-6.	1886-7.	1887-8.	1888-9.	1889-90.	1890-91.
New South Wales .....	2·90	2·96	2·85	3·14	3·18	3·60
Victoria .....	4·18	3·92	3·56	3·73	2·91	2·72
Queensland .....	2·13	2·15	2·75	0·84	1·70	1·74
South Australia .....	2·37	2·52	4·80	4·05	5·03	5·32
New Zealand .....	2·86	2·30	2·30	2·60	2·97	2·95

The following table shows the gross earnings, expenditure, and net profit per average mile open. In 1881 the New South Wales and Victorian railways yielded a higher rate of interest on the capital cost than was ever reached before or since, 5·31 and 4·04 per cent. respectively. The decline in the net profits is largely

## AVERAGE PROFITS PER MILE.

Returns per  
mile open.

due to the extension of the lines in sparsely populated districts. There is no doubt that with more limited extensions of this class, before long the Colonies will equalise the difference between net revenue and the interest on capital cost :—

Per Average Mile open.

Colony.	Gross Earnings.		Expenditure.		Net Profit per Average Mile open.	
	1886.	1891.	1886.	1891.	1886.	1891.
	£	£	£	£	£	£
New South Wales .....	1,207	1,363	834	839	373	524
Victoria .....	1,377	1,245	775	872	602	373
Queensland .....	447	424	308	301	139	123
South Australia .....	505	747	341	377	164	370
Western Australia .....	238	229	295	315	- 57	- 86
Tasmania .....	433	425	358	345	75	80
New Zealand .....	649	609	428	380	221	229
Australasia .....	859	888	517	574	342	314

NOTE. — denotes loss.

Returns per  
train mile.

The following is a co-relative table showing the returns per train mile :—

Per Train Mile.

Colony.	Gross Earnings.		Expenditure.		Net Profit per Train Mile.	
	1886.	1891.	1886.	1891.	1886.	1891.
	d.	d.	d.	d.	d.	d.
New South Wales .....	80·01	84·88	55·30	52·26	24·71	32·62
Victoria .....	77·03	64·63	33·69	45·27	43·34	19·36
Queensland .....	62·50	57·75	43·00	41·00	19·50	16·75
South Australia .....	67·52	77·94	45·57	39·30	21·95	38·64
Western Australia .....	30·52	22·24	37·90	30·45	7·38	- 8·21
Tasmania .....	49·10	46·13	40·60	37·44	8·50	8·69
New Zealand .....	83·22	70·86	54·85	44·26	28·37	26·60
Australasia .....	75·26	72·25	45·33	46·75	29·93	25·50

NOTE. — denotes loss.

The interest on capital cost, the proportion of working expenses to the gross revenue, and the returns per train mile for some of

PASSENGER TRAFFIC.

the principal countries, is given below. The figures refer either to the years 1889 or 1890 :—

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.	s. d.	s. d.	s. d.
United Kingdom.	897,472,020	44,710	4.1	54.0	5 1	2 9	2 4
France .....	562,105,081	27,295	4.0	51.0	6 3½	3 3	3 0½
Germany .....	503,771,000	20,282	5.4	54.2	6 5½	3 5½	3 0½
Austro-Hungary.	305,042,000	19,156	3.4	53.1	6 2½	3 3½	2 11½
Belgium .....	55,058,765	28,081	4.4	54.9	4 6½	2 6	2 0½
United States ..	1,765,519,810	11,157	3.7	67.9	5 8½	3 10½	1 10
Canada .....	101,488,257	12,182	1.8	70.0	4 7	3 3	1 4
Cape Colony .....	16,201,846	8,604	5.2	55.2	6 9	3 9	3 0
Australasia .....	113,768,038	10,030	3.0	64.6	6 0½	3 10½	2 1½

The number of passengers carried on the Victorian lines is largely in excess of that of New South Wales, due in a large measure to the complete suburban system prevailing in the former Colony, which places the principal suburbs in direct communication with the metropolis. In the year ending June, 1891, the number of passengers carried on the suburban lines was 35,546,000, while for the corresponding service in New South Wales for the same period it was only 9,384,000.

The following table shows the number of passengers carried on the Government lines of each of the colonies in 1881 and 1890-91 :—

Colony.	Passengers carried.	
	1881.	1890-01.
	Number.	Number.
New South Wales .....	6,907,312	19,037,760
Victoria .....	18,973,070	71,970,885
Queensland .....	247,284	2,730,860
South Australia .....	3,032,714	5,300,506
Western Australia .....	67,144	253,694
Tasmania .....	102,495	464,064
New Zealand .....	3,362,266*	3,433,629
Australasia .....	32,692,285	103,191,398

\* 1885-6. The Queensland and New Zealand returns do not include passengers with season tickets.

## RECEIPTS FROM PASSENGERS.

Proportion of  
goods traffic.

The amount of goods tonnage is shown in the subjoined table. In the period from 1881 to 1890 there was an increase of about 170 per cent., varying from 82 per cent. in South Australia to 453 per cent. in Queensland :—

Colony.	1881.	1890.
	Tons.	Tons.
New South Wales .....	2,033,850	3,802,849
Victoria .....	1,249,049	4,425,609
Queensland .....	161,009	890,973
South Australia .....	646,625	1,176,540
Western Australia .....		60,690
Tasmania .....	44,396	141,327
New Zealand .....	523,099	2,134,023
Australasia .....	*4,658,028	12,632,011

\* Exclusive of Western Australia.

Receipts from  
passenger  
traffic.

The percentage of receipts from coaching traffic to the total receipts is about the same in the Australasian Colonies as in Europe. The proportion in the United Kingdom for 1890 was 42·9 per cent. for coaching traffic to 52·8 per cent. for goods traffic, besides which there was 4·3 per cent. for miscellaneous receipts, which could not properly be classed under either of the above heads; so that the proportion of coaching traffic to goods traffic was 44·8 per cent. against 55·2 per cent. The figures for the various colonies are given below :—

Colony.	Coaching Traffic.	Goods Traffic.
	Per cent.	Per cent.
New South Wales .....	39·6	60·4
Victoria .....	51·7	48·3
Queensland .....	27·6	72·4
South Australia .....	27·9	72·1
Western Australia .....	50·3	49·7
Tasmania .....	49·6	50·4
New Zealand .....	35·0	65·0
Australasia .....	40·7	59·3

The following table gives the different classes of rolling stock in the possession of the Australasian Governments; and, considerable as are the numbers of each class, they could with advantage be largely increased :—

## Rolling Stock, 1890-91.

Colony.	Locomotives.	Passenger Carriages.	Goods Waggon.
New South Wales .....	439	1,023	9,940
Victoria .....	455	1,085	8,472
Queensland .....	239	307	3,688
South Australia .....	222	332	5,517
Western Australia.....	24	37	264
Tasmania .....	42	135	864
New Zealand .....	270	501	8,181
Australasia .....	1,691	3,420	36,926

## 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 may be classified into those arising from causes beyond the control of the person injured, and those due to misconduct or want of caution. Adopting this classification the accidents in those Colonies for which returns are available are given below :—

## Persons Killed or Injured.

Colony.	Passengers.		Railway Employees.		Trespassers, &c.		Total.	
	Killed.	Injured.	Kil.ed.	Injured.	Killed.	Injured.	Killed.	Injured.
New South Wales	7	42	32	114	21	14	60	170
Victoria .....	3	101	21	193	48	51	72	345
South Australia ...	1	4	1	15	7	4	9	23
New Zealand .....	3	7	3	94	5	46	11	147

Freedom from accidents.

The railways of the Colonies 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 number killed and injured per million passengers carried during the last available quinquennial period for some of the principal countries is as follows :—

Passengers Killed or Injured.

Years over which figures extend.	Countries.	Average per Million Passengers carried.	
		Killed.	Injured.
1886-90	United Kingdom .. .. .	0·16	1·91
1885-88	France .. .. .	0·15	0·69
1885-89	Germany .. .. .	0·09	3·62
1884-88	Austro-Hungary .. .. .	0·11	0·86
1885-89	Belgium .. .. .	0·11	1·21
1890	Canada .. .. .	0·86	.....
1887-91	New South Wales .. .. .	0·32	3·70
1887-91	Victoria .. .. .	0·07	2·44
1888-91	South Australia .. .. .	0·20	0·59
1890-91	New Zealand .. .. .	0·87	2·04