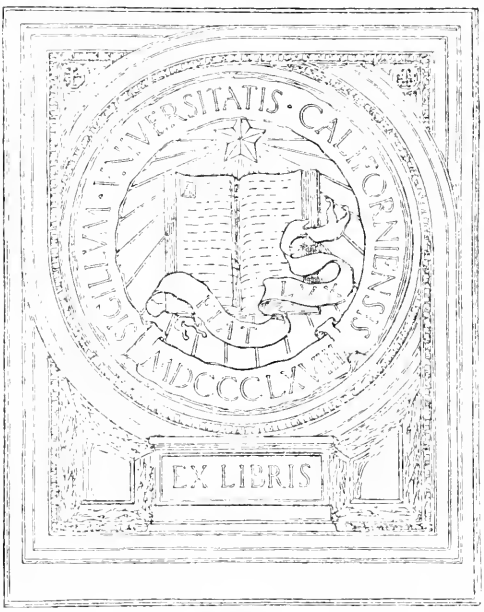

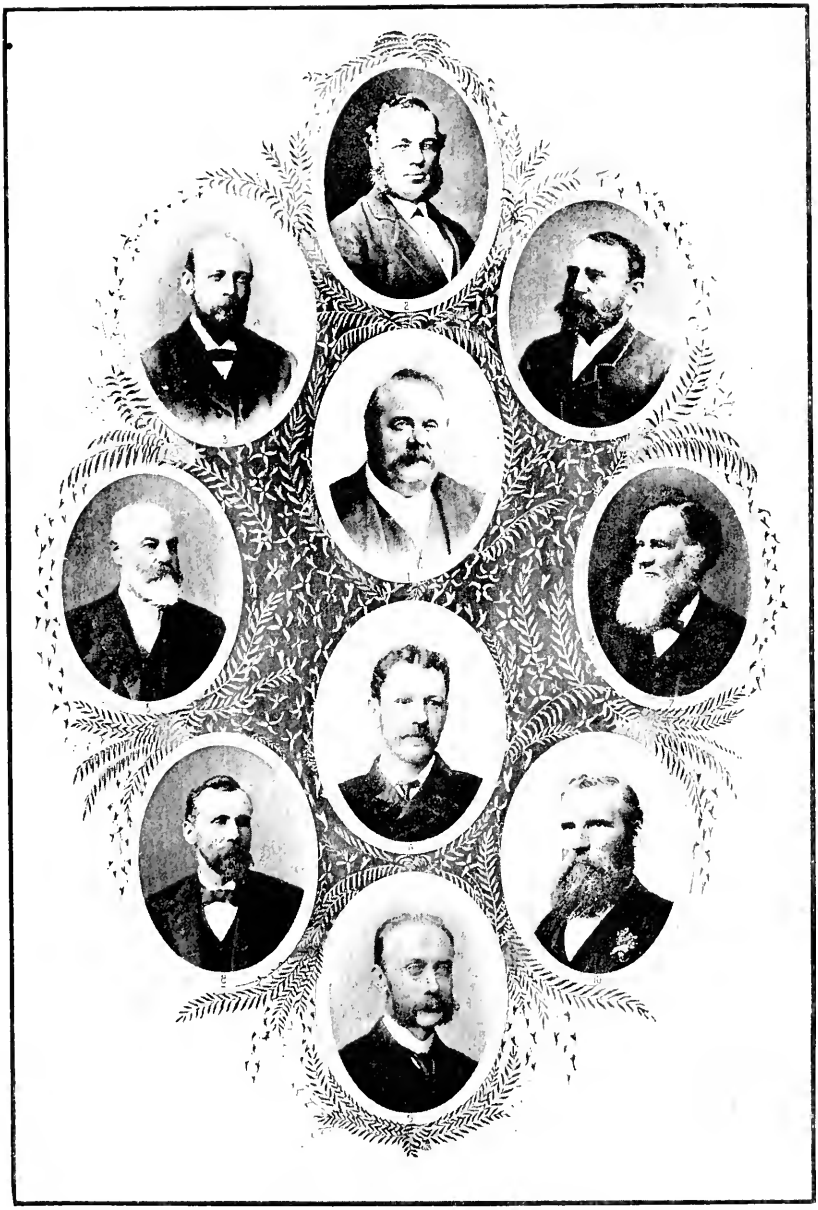

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NEW SOUTH WALES:

"THE MOTHER COLONY

OF

THE AUSTRALIAS."

EDITED BY FRANK HUTCHINSON.

1896.

By Authority:

SYDNEY: CHARLES POTTER, GOVERNMENT PRINTER, PHILLIP STREET.

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[5s]

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ERRATA.

Page 11. Paragraph "Electoral Districts." Eighth line, for 2,513 *read* 2,110. Thirteenth line, for "thirty-nine" *read* "twenty-six" Fourteenth line, for "eighty-five" *read* "eighty-eight."

Illustration facing page 168. For "Harvest Home" *read* "Harvest Queen."

Page 357. For 25 May, 1833 (Mitchell's expedition to the Darling), *read* 25 May, 1835.

Page 359. Eleventh line from bottom For "Assembly" *read* "Council."

CONTENTS.

LIST OF ILLUSTRATIONS.

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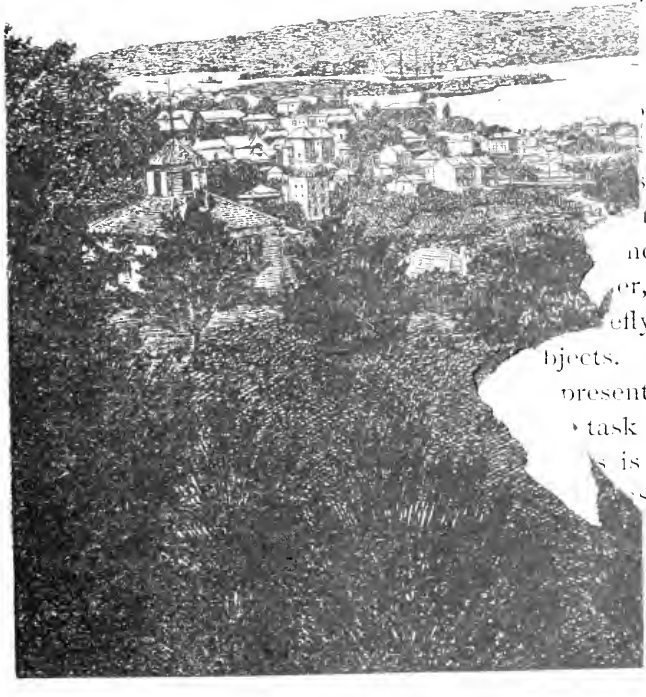

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INTRODUCTION.

THE purpose of this book may be very briefly told: As there are stages in the life of the individual when he naturally pauses, or is made to pause, and takes stock, so to say, of his actual position, his profit or loss account to date, his probable or possible prospects for the future, so there may be in the case of a community. Such a time in the affairs of this community to the projectors of this volume appeared to be the present. We are on the eve, rather, at the starting point of a totally new departure in our political and commercial, and therefore, it may be hoped, in our industrial and social, career; and in order that due note may be possible hereafter of our progress or otherwise, it behoves us to know exactly to-day, in all these respects, where we start from. Hence the engagement of experts in all these departments, and in every branch of them, to set down, in no great detail indeed, which would swell the volume to a library, but with absolute accuracy, precisely where and how we stand at the present moment in regard to each; and hence, we think may be added, within the covers of this book one of the most marvellous records ever written of any country in the world.

It is perhaps needless to say that the credit of the inception of this work rests with the same bold, busy brain to which also is due mainly the new departure it is meant to mark. It was the present Premier, the Hon. G. H. Reid, who first suggested the idea of some such publication, which, with his long experience in such matters, was speedily put into form by the publisher, the Government Printer, Mr. Potter, to whom also is due chiefly the excellent choice of writers to deal with the several subjects. Any editor might well be proud of such an array, and the present one may fairly take this opportunity of saying that an easier task than his, so far as any revision or correction of his contributors is concerned, probably never fell to editor's lot Doubtless this was due mainly to his contributors' own perfect competence, and something perhaps may be put down to the inspiration, so to say, of the marvellous tale which many or most of them had to tell. As he must be a dullard indeed who can read some of the papers in this book

describing the wondrous achievements within little more than a human lifetime, and the yet more wondrous possibilities of this young land without feeling a glow of patriotic pride that he belongs to such a country, so he must be doubly a dullard who could write them without himself being moved with something of the spirit of the brave deeds or bright visions he was recounting. This in truth has been the editor's chief difficulty—rather to restrain the zeal of some of his contributors, if not exactly in painting the lily or gilding the gold, at any rate in making what was meant to be simply a plain matter-of-fact record of Australian progress read like nothing so much as an Arabian Nights tale. Not indeed that even that would be in every case such an extravagance. There have been marvels, not to say miracles, in Australia's short story, outrivalling Sindbad's; magical transformations—witness Ballarat or Broken Hill—to which Aladdin's palace was the merest mushroom. But the object of this book being to set forth, not the romance, nor even the wonder of the country's progress, but the plain facts of its position to-day, and chiefly the practical side of that, there has necessarily been some pruning in this direction, and hence if any of these papers seem wanting in the warmth or colour proper to the subject, let it be put down to the strictly business scruples of the Editor, and not to any lack of enthusiasm on the part of the writers.

Of course there are subjects dealt with here which needed no such precautions. It would have been difficult for instance for Professor Pitt Cobbett to "enthuse" much on his subject, the Law and Constitution of New South Wales, admirable as on the whole both are, or for Mr. Harris Curry on his, the Laws relating to Crown Lands, though he does properly describe them as "characterised by comprehensiveness and liberality." Both these papers will be found excellent digests of their respective subjects, and for all interested in either subject—and who are not?—very useful for reference. Commerce and speculation naturally go together, and doubtless in some quarters, in a sense, the most purely speculative papers in the book may be said to be the commercial. To some extent this was inevitable, since, as one of them admits, the change in the fiscal policy is still too recent to allow of any full or fair judgment, much less positive prediction, as to its results. At the same time it can hardly be called mere speculation to say that "with the loosing of her fiscal bonds the commercial supremacy of New South Wales is assured," seeing that that appears to have

been very fairly maintained, even without the loosing, and considering—which perhaps, after all, has had more to do with the matter—this colony's immense natural advantages. In any case no one can question the ability and perfect knowledge of the subject with which these papers—by Messrs. Nash and Rendall respectively—are written, while he must be a very rabid opponent of the new policy who will not join in the hope that their most sanguine anticipations of its results may be fulfilled. Another paper of marked ability is that by the first-named of these two writers, on our railways—in their splendid success, under the management of Mr. Eddy and his fellow commissioners, not the least remarkable of the many instances in these pages of the country's progress. According to this writer, not only are they "the most efficiently maintained, the best managed, and the most profitable of all the state railway systems of Australasia," but in many important respects, "will stand comparison with the admirably maintained railways of the old country," and he adds, "cannot by men like myself, who have studied the working of the railways of the United Kingdom and elsewhere, fail to be viewed with admiration." It would be difficult to overrate the value of such a paper as this, in the proper appraisement to the world of one of the country's principal assets, and the confounding of those who are in the habit of criticising the working of our railways without studying anything, except, perhaps, the display of their own ignorance or spleen.

To the general public, however, the papers of most interest and value will probably be those treating of the country's several great industries *in esse* or *in posse*, her productions, and grand natural resources. It is not too much to say that here may be found, set forth by the most competent authorities, a complete course of information and instruction on every phase and feature of the country's practical development; and it may be noted that while the older industries are dealt with as fully as the exigencies of space would permit, not less attention is given to the very newest, or to those later developments, in each and all, on the intelligent study and prosecution of which depends so largely the future progress of the colony. Thus, while the great pastoral industry in its more familiar aspects is ably dealt with in the papers by Messrs. Bruce and Wright on Live Stock and Wool respectively, it assumes quite a new or at least even larger importance in the admirable paper on the Meat Export Trade by that undoubted enthusiast on the subject, Mr. Cuthbert Fetherstonhaugh, whose vision of Australia, and specially

New South Wales, becoming the chief or one of the chief food providers to the hungry millions of the old world, if realized, must certainly, in his own words, "soon restore the great pastoral industry to its pristine preeminence." As much may be said of the papers by Messrs. McKinney and Boultbee respectively, on Water Conservation and Artesian Boring, setting forth the incalculable benefits to be derived not only by the pastoral industry but by the country generally from a thorough system of irrigation, as the one writer has it, "giving encouragement to dreams of progress and development, even in the most arid districts, far beyond the conception of the present nomadic, purely pastoral population," or as the other, "equivalent to the addition of a new province."

Then there are the group of papers relating to the several branches of agriculture, following the excellent one by Principal Thompson, of the Agricultural College, on the main subject. These include every conceivable phase of this great industry, from grain-growing to tobacco culture, wine-growing to butter-making, and may be said to form a veritable farmer's *vade mecum*, wherever in this wide country of infinitely varied soil and climate, and therefore of production, his lot may be cast. Principal Thompson's paper may be specially noted both for its eminently practical character and the excellent account it gives of the work being done in the way of agricultural education under the auspices of the Department of Agriculture, established in 1890 by the present Minister for Mines, etc., the Hon. Sydney Smith. Certainly it would seem to be all needed, for though the Principal of the Agricultural College is naturally sanguine as to the future of agriculture in this country, his conditions are absolute. There must be, he declares, much improved methods of culture, more intense cultivation, a better system of rotation of crops and more careful husbanding of resources, all directed to the raising of only the best class of products. In a word agriculture must be made a science. And when we are told that the course of education at the Agricultural College includes, besides all practical farm work, such subjects as the principles of agriculture, agricultural chemistry, botany, geology, physics, mechanics, &c., that the Department of Agriculture is for ever gathering and distributing fresh information for the farmers, and that at the several experimental farms throughout the country tests are being made as to the best crops and methods of culture for the special district, there is evidently good hope that the requisite scientific knowledge will be supplied.

The much neglected Fish and Timber industries find sympathetic treatment at the capable hands of Messrs. Ogilby and Maiden, which, it is hoped, may tend somewhat to their improvement. Much useful information as to the Mining Industry is furnished by the Chief Inspector of Mines, Mr. Slee ; and a series of thoughtful papers by Mr. Frank Donohue and others deal fairly, if not very fully, with the several features of our social and educational progress. But why run further through the long list? The book is here to speak for itself, and may be described generally as a sort of literary panorama (though necessarily, from the purely practical character of most of the papers, with few literary pretensions) of the present condition and prospects, from almost every point of view, of the Colony. That it will altogether escape criticism, of course, cannot be expected; that it will answer largely its main purpose as an authentic record of the country's progress up to date, and further, as spreading far and wide, both among her own people and those of other countries—the book has been translated into French, and will be well distributed—a fuller knowledge and appreciation of the splendid resources and capabilities of this glorious land, may, the Editor thinks, as certainly be hoped.

FRANK HUTCHINSON.

PUBLISHER'S NOTE.

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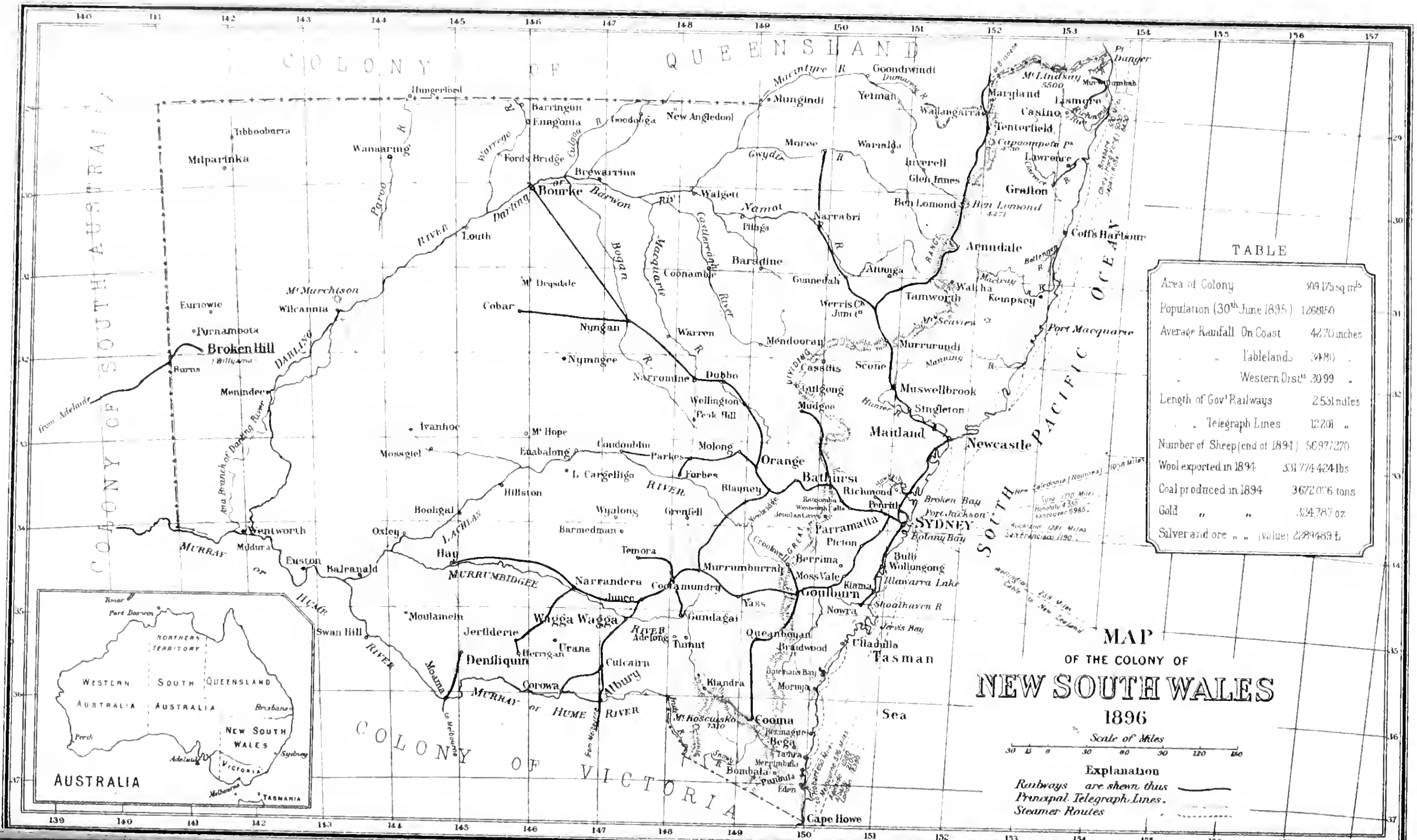


Lithographed & Printed at the Department of Lands Sydney New South Wales, 1896

Physical Geography and Climate.

By H C Russell, B.A., C M.G., F.R.S., Government Astronomer.

Very early history points definitely to the knowledge of a great south land, the "Terra Australis incognita," and the stories which were told of its gold and other treasures for ages inflamed the minds of the adventurous navigators of those early days. Later the actual Australia seemed to contradict these stories, but colonisation and exploration show that there was a solid basis of fact as to the enormous natural treasures of gold and precious stones, and many invaluable stores of other minerals, which fully justify the dreams of early navigators. Whether the natives ever did barter gold for European or Asiatic products cannot be decided now, but the fact remains that the old myths about Australian natural wealth are fully borne out by actual experience. These earlier references to Australia treated the country as a whole. Our present purpose is to deal only with New South Wales where the first colonists landed. It is only a fraction (one-seventh) of the whole continent. Its eastern boundary is the coastline between latitudes 28° 15′ and 37° 30′ south, the northern boundary is the 29° parallel south latitude, except a small distance near the coast where the river Macintyre and the Mountains come in and are used. The western boundary is the 141st meridian, and the southern boundary is the river Murray. Its climate is without doubt that of the best part of Australia, and very similar to that of Southern Europe, with extremes that place the hottest point of New South Wales on Sicily, and its coldest town, Kiandra, with an elevation of 4,600 feet, upon Edinburgh.

General Features.

New South Wales is divided by its natural features into three distinct areas in which there are essential differences of climate.

First we have a strip of country 800 miles long bounded on the one side by the ocean, and on the other by the mountain chain, known as the coast districts. This area varies from 30 to 150 miles in width, and in it there are no less than fifteen considerable rivers—a good index of the general abundance of rain on the coast, which ranges from 36 to 76 inches. About these rivers there is found an abundance of first-class agricultural soil, a genial climate, with rain and sunshine alternating, and hence a natural forest of luxuriant growth, only a part of which has been brought under the plough. The details of the climate on the coast as to the distribution of temperature and rainfall will be found in the accompanying charts, and it is only necessary to add that in the summer the prevailing winds which are from east to south are cool and pleasant.

The numerous rivers, of which we will say more presently, make this coastal area a well-watered country, and greatly facilitate the transport of agricultural products to the Sydney and other markets.

The second division likewise extends the whole length of the Colony and comprises the whole of the high lands ranging in altitude from 1,000 to 7,000 feet; the greater part, however, is from 2,000 to 3,000 feet. Here, also, the rainfall is abundant, from 26 to 50 inches per annum, and, as a consequence of this rainfall rivers and smaller streams are very numerous, making this section of the Colony a well-watered area. (*See* maps.) There are vast areas here of first-class soil for the growth of cereals and fruit, and all of this section is good for pastoral purposes.

The third division includes the great plains of the west intersected by the Darling, Lachlan, Murrumbidgee, and Murray, with many smaller rivers. The rainfall varies from 10 inches in the extreme west to 25 inches in the eastern part. (*See* maps.) The soil is chiefly good for pastoral purposes, the rainfall being too small for agriculture, except in the south-eastern part, where the comparatively abundant rains of winter, spring, and summer, coupled with most suitable soil, make wheat-growing a profitable investment, and the finest wheat of Australia is grown here. In the early days of the Colony much of this flat country was without surface water in dry years; but a large capital has been devoted to making tanks that are invaluable and the wells of artesian water afford an abundant and perennial supply. Of these an enormous number have been made, which yield, literally, rivers of water, and the number is being added to every year. Practically these wells and bores have solved the difficulty as to surface water in dry seasons. The distribution of rain is best seen in the small map of rainfall; and the temperature map gives the seasonal temperatures, the mean, and the highest and lowest temperatures.

Inland Rivers.

The inland rivers of New South Wales are the longest and most important in Australia. The Murray, which is the most permanent, has never been known to be dry. Fed, as it is, by the snows of the Snowy Range, capped by Koscinsko, the highest point in Australia, it is always in flood in summer, for the summer melts the snow. It is navigable for 1,703 miles, 1,216 in New South Wales, and 487 in South Australia. The Murrumbidgee, its chief tributary, is 1,350 miles long, and the Lachlan, its other tributary, is 700 miles long.

The Darling is really a tributary of the Murray, and discharges into it at Wentworth; but it is by far the longer river of the two, and is navigable from Wentworth to Walgett, 1,758 miles. It must, however, be understood that its existence depends upon rain. Its tributaries are important streams measured from the Darling to their sources:—

Tributary.	Miles long.
Culgoa	1,524
Warrego...	1,210
Macquarie	750
Namoi	600
Bogan	450
Gwydir	445
Macintyre	350

From the head of the Culgoa to the sea, *viâ* the Darling and Murray, is 3,869 miles.

Coast Rivers.

It has already been shown that the coast district has abundant rain, the annual fall ranging from 36 to 76 inches. Most of this rain is brought in by easterly winds, laden with moisture, which, when they reach the mountains, rise up over them; and in doing so they drop abundance of rain in accordance with a well-known law of nature that, if a cloud rises it drops some of its moisture, and this abundant downfall feeds the numerous rivers. We find, then, no less than fifteen rivers of various sizes, but all helping for navigation and the general water supply necessary for husbandry. Beginning, we pass these rivers in review:

1. The Tweed River flows into the sea at the northern boundary of the Colony, its abundant stream is fed by the rain on the highest of the coast mountains; it flows to the north-east 30 miles, but its navigation is by its bar harbour made only possible to small craft.

2. The Richmond River, immediately south, rises in part in the same high range as the Tweed, and flows through some rugged pastoral country and large areas of very rich soil, parts of which are covered with valuable timbers, and it reaches the sea in 120 miles, and drains an area of 2,400 square miles. It is navigable in one branch to Casino 40 miles, and the other branch to Lismore 65 miles. Products, sugar and tropical fruits.

3. The Clarence River. Rising in the mountains it reaches the sea after a course of 240 miles, in latitude 29° 26′. It is one of the finest rivers of the east coast, and drains an area of 8,000 square miles, which is rich in minerals and tropical vegetation. Climate perfect in winter, but warm as Southern Europe in summer; it is, however, tempered by the trade wind, and abundant rains. The river is navigable for 136 miles, and is in places half a mile wide.

4. The Macleay River rises in the northern tablelands, flows through magnificent gorges, with many waterfalls, one of which is 240 feet; in places the mountains rise almost perpendicularly from the river to 3,000 feet. The river is 200 miles long, passing through a country very rich in timber, it drains 4,800 square miles, and is navigable for 30 miles.

5. The Hastings is a fine stream flowing into the sea at Port Macquarie. It drains 1,400 square miles of country, with abundance of fine timber and rich alluvial soil.

6. The Manning River rises in the mountains near Nundle, flows easterly through a fine timber country and rich soil, draining an area of 3,000 square miles; navigable 20 miles.

7. Karuah River rises in the Mount Royal Range, flows for 45 miles through rich agricultural soil to the sea at Port Stephens. It drains an area of 600 square miles.

8. The Hunter River rises in the Liverpool Ranges, and makes a south and east course for 200 miles to the sea at Newcastle; it drains 7,900 square miles, and is navigable for large steamers 35 miles. The Williams, one of its tributaries, is navigable for 20 miles to Clarence Town; and the Paterson, another tributary, is navigable 18 miles. The whole of the Hunter River district is very rich in pastoral and agricultural products; it is famous for its vineyards, its corn, and its tobacco; and minerals are not wanting, the finest deposit of coal in the Colony is found here.

9. The Hawkesbury is another very fine river, which rises in the Cullarin Range and flows northerly for 190 miles; then its course turns to the east, and near this point it is joined by large tributaries, the Colo and the Macdonald. Sections of the river are, unfortunately, known by different names, the upper portion being the Warragamba, the central portion the Nepean, and the rest the Hawkesbury. The river is navigable 140 miles, to Windsor, and in its lower reaches the scenery is magnificent, far exceeding Sydney Harbour in grandeur and extent, but of the same general character. The alluvial lands of this river were the first wheat fields of the young colony, but wheat has long since given place to lucerne, a far more profitable crop. The whole length of the river is 330 miles, and it drains an area of 8,600 square miles, and has eighteen tributary streams.

10. The Shoalhaven River is the largest of those south of Sydney. It takes its origin in a swamp called Carombars, at an elevation of 2,800 feet. This river is 260 miles in length, and drains an area of 3,300 square miles. In its upper reaches it passes through very rough country, in which minerals abound, especially gold. In its lower reaches it flows through rich agricultural land. Owing to obstacles in the river, it is only navigable for 12 miles.

11. The Clyde River is an important stream, taking its rise in the Pigeonhouse Mountain, and flowing 70 miles in a southerly course to Bateman's Bay; it drains 450 square miles of country, which is rich in dairy and agricultural land.

12. The Moruya River rises near Araluen, and flows 80 miles to S.E., into a wide estuary. This river drains 350 square miles, and is the only outlet by water of the rich auriferous districts of Araluen and Braidwood. In its lower reaches are found magnificent alluvial flats. In its upper course it passes through rugged country containing abundance of gold-bearing quartz and very rich silver ore. The river abounds in fish and oysters.

13. The Turas River rises in a lofty mountain known as Barren-Jumbo, and takes a N.E. course through rich pastoral and mineral lands. It drains 600 square miles of country.

14. The Bega River is a fine stream, rising in the coast ranges and flowing east 60 miles to the sea through a rich pastoral and agricultural land. Great quantities of butter, cheese, &c., are produced in the district, while amongst its mineral stores are abundance of coal and kerosene shale.

15. Towamba River rises in the eastern slopes of the coast range; thence it flows 40 miles through a rich pastoral and agricultural district into Twofold Bay, 280 miles south of Sydney. This is the port from which cattle for the Tasmanian market are shipped.

Neglecting the smaller streams and the portions of these rivers which could easily be made navigable by the removal of a few trees, we have in actual use 545 miles of navigable water in our coastal rivers.

Harbours.

New South Wales has a coast-line of 800 miles on which, comparatively, very little stormy weather is experienced.

Before the coast was well lighted easterly gales were dangerous, but now the lighthouses guide the mariner into the places of shelter

which are numerous. Beginning on the south we have Twofold Bay, a fine harbour in latitude 37° S. Another at Jervis Bay, 35° 6′ S.; Botany Bay, 12 miles south of Sydney. Then Port Jackson (Sydney Harbour), latitude 33° 50′ S.; Broken Bay, 11 miles north of Sydney; Newcastle, the mouth of the river Hunter, 60 miles north of Sydney; Port Stephens in latitude 32° 45′; Shoal Bay, the estuary of the Clarence River, latitude 29° 30′ with a number of smaller harbours.

Temperature and Rainfall.

TABLE showing the Temperature and Rainfall of various places in EUROPE and AMERICA (*in italics*), and NEW SOUTH WALES (in Roman).

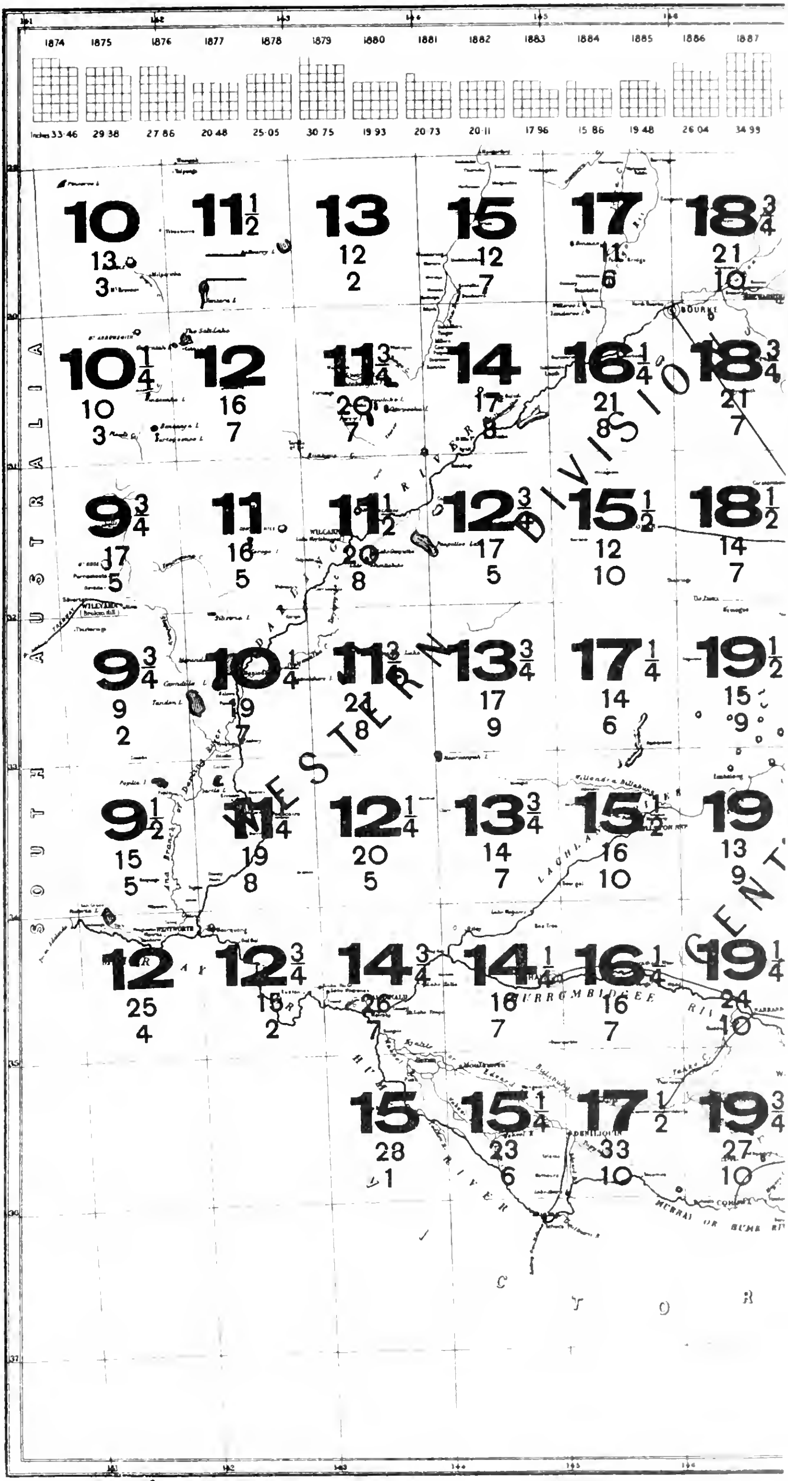
Places.	Latitude.	Mean temperature.	Mean summer temperature.	Mean winter temperature.	Highest reading of thermometer.	Lowest reading of thermometer.	Mean rainfall.
	° ′		°	°	°	°	inches.
Kiandra	35 52 S.	45·8	57·3	34·1	102·3	*20·0	64·3
Dumferline	*56 5 N.*	*45·3*	*55·3*	*28·4*	.....	.....	*25·0*
Boston, U.S.A.	*42 20 N.*	*47·5*	*70·2*	*27·3*	*95·5*	*11·0	*47·7*
Edinburgh	*55 57 N.*	*47·5*	*58·0*	*38·0*	.....	.....	*24·9*
Nottingham	*52 57 N.*	*48·1*	*59·9*	*37·2*	*92·5*	*6·1*	*28·7*
Oxford	*51 45 N.*	*48·6*	*60·4*	*37·0*	.. ...	... ..	*26·5*
Manchester	*53 29 N.*	*48·8*	*59·8*	*38·3*	*91·2*	*3·0*	*33·0*
Liverpool	*53 24 N.*	*49·4*	*60·2*	*39·9*	*85·9*	*16·2*	*37·0*
Dublin	*53 21 N.*	*50·0*	*61·1*	*40·7*	.....	*25·0*	*30·0*
Haarlem	*52 23 N.*	*50·0*	*62·6*	*37·0*	.....	.....	*23·0*
Bombala	36 52 S.	55·3	66·1	43·6	104·1	17·1	25·7
London	*51 32 N.*	*50·8*	*62·9*	*39·5*	*95·0*	*5·0*	*24·0*
Paris	*48 50 N.*	*51·3*	*64·7*	*37·8*	*104·0*	*10·3	*22·9*
Ventnor	*50 35 N.*	*51·6*	*62·0*	*41·7*	*82·0*	*21·0*	*25·5*
Plymouth	*50 22 N.*	*52·0*	*60·8*	*42·4*	.....	.....	*39·0*
Cooma	36 12 S.	54·0	65·5	41·7	107·1	12·2	20·2
Helston	*50 7 N.*	*52·4*	*61·6*	*43·9*	*90·0*	*18·0*	*35·3*
Monaro Plains	36 S.	53·0	.....	.....	.....	.....	20·0
New York	*41 6 N.*	*53·2*	*70·9*	*30·1*	*95·0*	*2·0*	*46·5*
Queanbeyan	35 20 S.	57·1	70·0	43·6	109·4	20·1	24·7
Swansea	*51 38 N.*	*55·7*	*63·7*	*45·5*	.....	.. ...	*43·0*
Mount Victoria	33 36 S.	54·5	65·7	42·6	106·0	11·9	38·7
Boulogne	*50 44 N.*	*54·4*	*67·2*	*40·2*	.....	.....	*30·5*
Pavia	*45 11 N.*	*54·8*	*73·0*	*36·0*	.....	.....	*35·3*
Milan	*45 27 N.*	*55·0*	*73·0*	*36·0*	.....	.....	*38·0*
All Lombardy	*45 30 N.*	*55·0*	.....	.....	.....	.....	*30·0*
Orange, N.S.W.	33 18 S.	55·0	67·3	42·4	100·2	16·0	39·9
Toulouse	*43 36 N.*	*55·2*	*69·1*	*41·2*	*104·0*	*12·7*	*24·9*
Goulburn	34 45 S.	56·6	67·9	44·3	109·0	13·0	27·1
Moss Vale	34 32 S.	55·9	66·4	44·5	103·7	22·9	41·1
Bathurst Plains	33 30 S.	55·5	.....	.. ...	.....	.....	25·0
Armidale	30 32 S.	56·5	67·7	44·4	105·2	13·9	33·1
Washington	*38 52 N.*	*56·9*	*76·7*	*37·8*	*102·0*	*3·0*	*44·4*
Bordeaux	*44 50 N.*	*57·0*	*71·1*	*43·0*	.....	.....	*33·8*
Bathurst	33 24 S.	56·9	69·7	44·0	112·5	13·0	24·7
Tenterfield	29 5 S.	59·1	69·6	47·2	107·1	12·0	34·9
Faulconbridge	33 44 S.	57·6	66·1	47·8	92·3	34·4	53·6
Madrid	*40 25 N.*	*57·6*	*74·1*	*42·1*	.....	. ...	*14·9*
Marseilles	*43 18 N.*	*58·3*	*72·9*	*45·2*	.....	.....	*19·0*
Young	34 18 S.	61·4	73·7	49·1	113·4	20·9	28·6

*Degrees below zero.

TABLE showing Temperature and Rainfall—*continued.*

Places.	Latitude.	Mean temperature.	Mean summer temperature.	Mean winter temperature.	Highest reading of thermometer.	Lowest reading of thermometer.	Mean rainfall.
	° ′	°	°	°	°	°	inches.
Inverell	29 48 S.	60·4	73·5	46·3	108·6	13·4	32·8
Montpellier	*43 36 N.*	*59·5*	*76·0*	*44·4*	*101·5*	** 0·4*	*20·0*
Mudgee	32 35 S.	62·3	74·3	49·5	114·4	17·6	27·8
Albury	36 6 S.	60·5	73·9	47·1	117·3	20·2	29·3
Liverpool, N.S.W.	33 56 S.	59·8	70·8	48·2	106·0	22·0	40·3
Deniliquin	35 32 S.	61·5	74·1	48·5	121·1	18·0	17·4
Nice	*43 44 N.*	*60·1*	*73·5*	*48·8*	.....	.....	*35·5*
Murrurundi	31 46 S.	60·4	72·3	47·9	107·3	19·0	33·6
Wagga Wagga	35 7 S.	60·7	74·5	46·9	113·4	18·4	23·7
Eden...	37 0 S.	60·3	67·9	52·0	106·0	29·3	36·9
Rome	*41 54 N.*	*60·5*	*74·2*	*46·6*	*100·4*	*19·6*	*30·9*
Dubbo	32 18 S.	63·1	76·4	49·2	112·9	17·0	23·6
Forbes	33 27 S.	62·9	76·8	48·9	118·4	24·0	22·2
Cassilis	32 0 S.	61·1	74·7	47·1	111·7	21·5	25·3
Lisbon	*38 43 N.*	*61·5*	*70·9*	*52·5*	*101·8*	*24·7*	*29·3*
Cape St. George	35 12 S.	61·8	69·2	53·9	105·2	25·5	55·0
Naples	*40 50 N.*	*62·0*	*74·4*	*47·6*	*104·0*	*23·0*	*39·3*
Wollongong	34 25 S.	62·7	69·9	54·8	106·9	31·9	44·0
Scone	32 4 S.	62·2	74·4	49·3	114·2	22·2	25·1
Barcelona	*41 22 N.*	*62·4*	*76·1*	*50·0*	.....	.....	*22·4*
Toulon	*43 7 N.*	*62·3*	*75·2*	*48·5*	.....	.....	*19·7*
Sydney	33 51 S.	62·9	70·7	54·0	108·5	35·9	50·6
West Maitland	32 47 S.	64·1	74·7	52·8	109·9	24·0	36·1
Port Macquarie	31 25 S.	64·2	72·1	55·4	97·6	30·4	64·1
Windsor	33 36 S.	64·5	74·6	52·9	118·8	21·5	33·6
Newcastle	32 55 S.	64·6	72·4	55·6	107·5	31·3	49·2
Wentworth...	34 8 S.	64·4	77·1	51·6	119·0	25·0	12·6
Muswellbrook	32 17 S.	64·5	76·7	51·6	117·6	20·0	24·0
Orange, France	*44 7 N.*	*65·0*	*83·7*	*46·8*	*106·5*	** 0·4*	*30·3*
Bourke	30 3 S.	69·7	83·6	54·7	127·0	28·0	17·0
Messina	*38 11 N.*	*65·8*	*77·2*	*55·0*	... ..	.....	*34·0*
Narrabri	30 20 S.	67·0	81·1	52·3	118·9	18·4	27·7
Grafton	29 43 S.	68·5	77·1	58·1	118·0	20·9	40·1
New Orleans	*30 0 N.*	*69·8*	*82·0*	*55·8*	*94·0*	*31·0*	*52·0*
Cairo	*30, 3 N.*	*72·3*	*85·1*	*58·2*	.....	.....	.....

* Degrees below zero.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SOUTH AUSTRALIA
WESTERN DIVISION
CENT
BOURKE
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WILLYAMA Broken Hill
WENTWORTH
DENILIQUIN
DARLING RIVER
LACHLAN
MURRUMBIDGEE RIVER
MURRAY OR HUME RIVER
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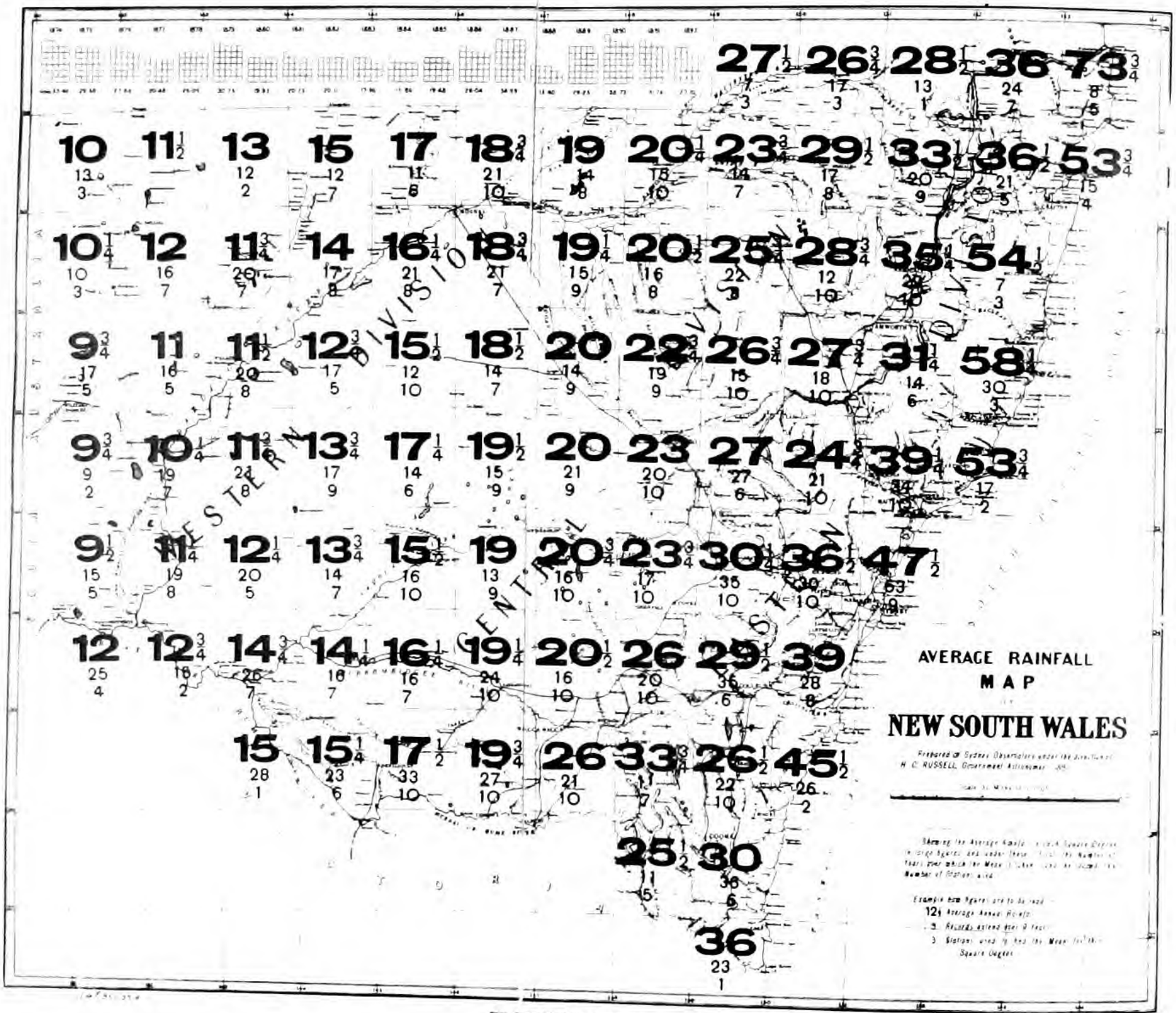
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NEW SOUTH WALES
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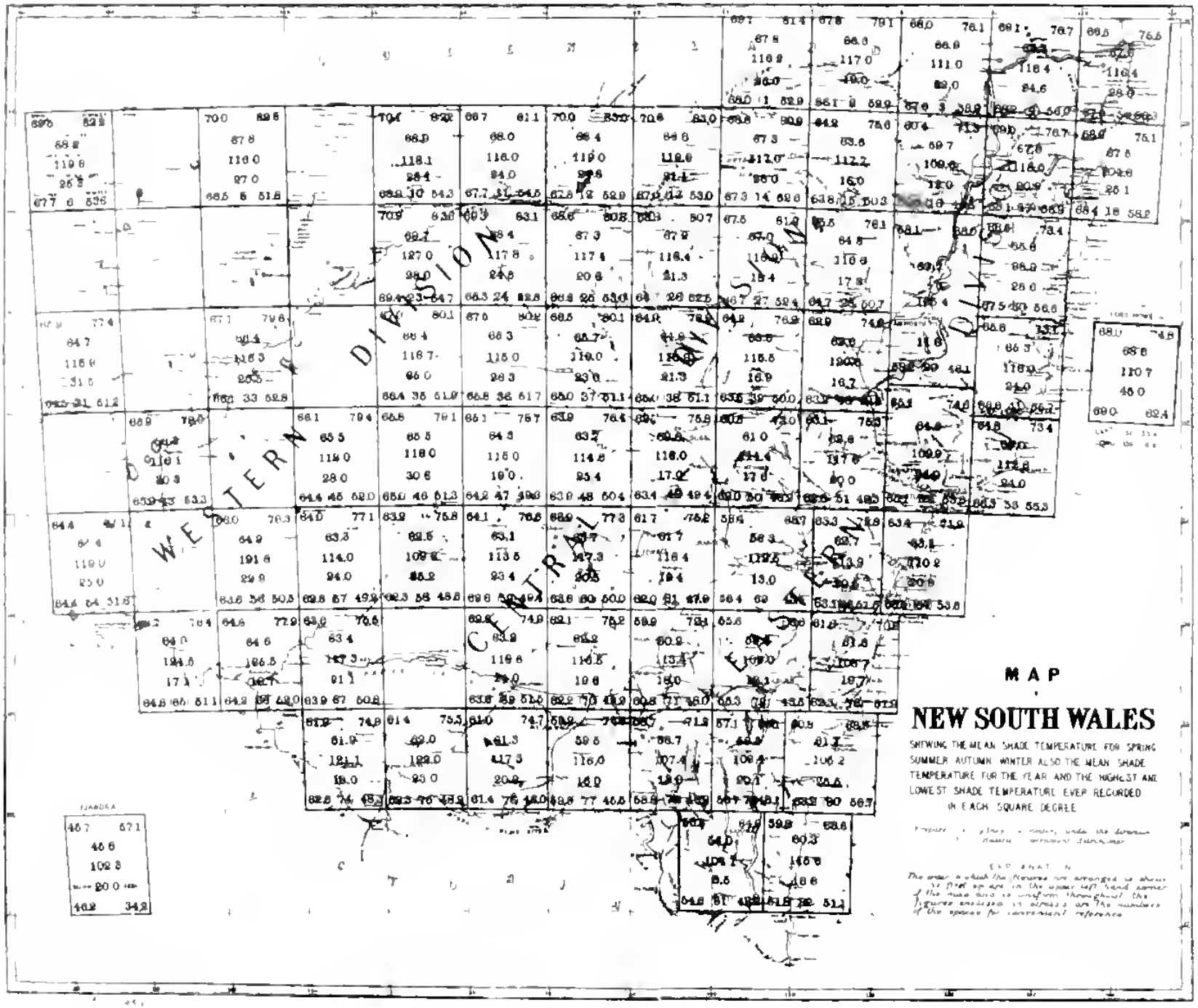
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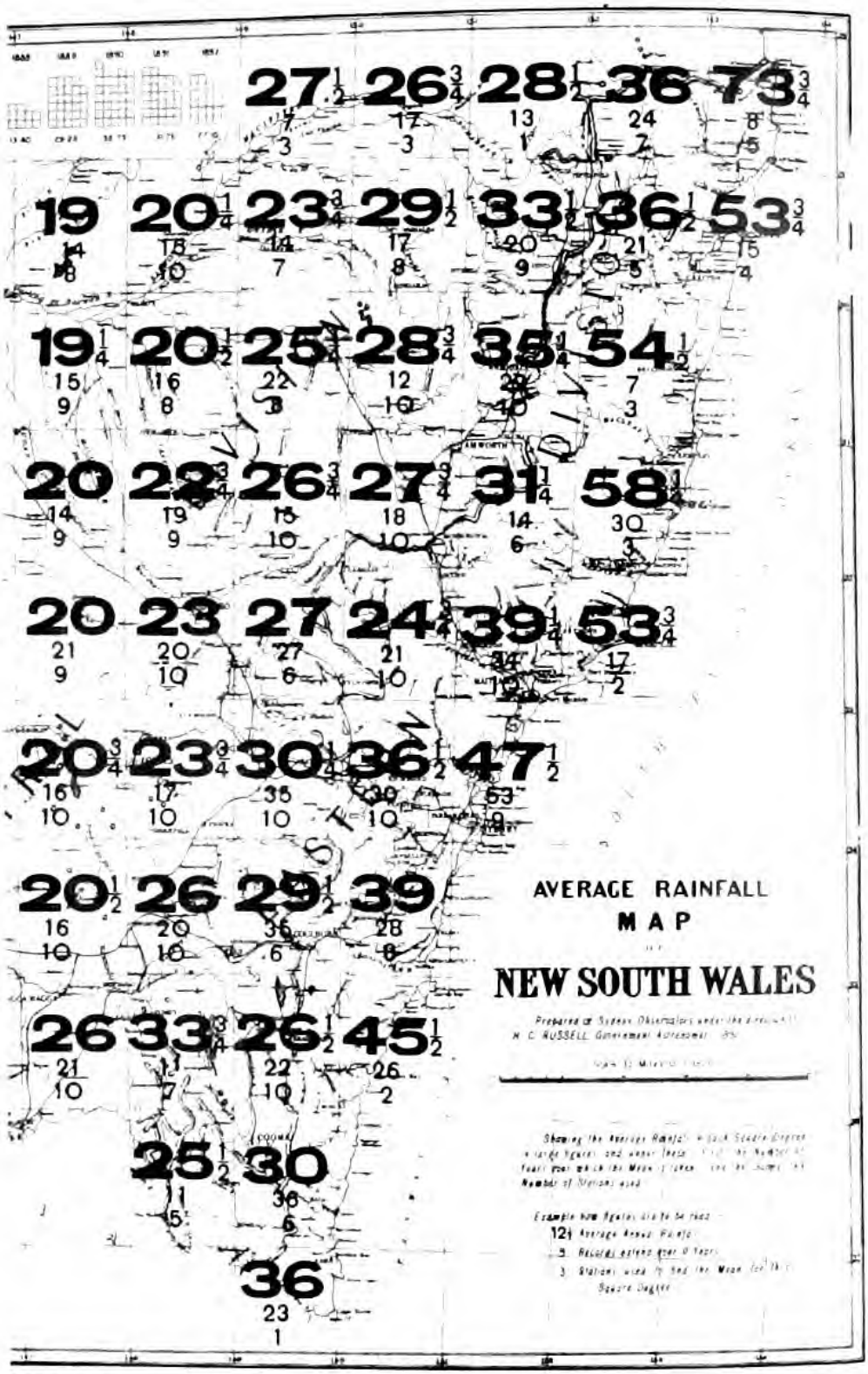
NEW SOUTH WALES
SHEWING THE MEAN SHADE TEMPERATURE FOR SPRING SUMMER AUTUMN WINTER ALSO THE MEAN SHADE TEMPERATURE FOR THE YEAR AND THE HIGHEST AND LOWEST SHADE TEMPERATURE EVER RECORDED IN EACH SQUARE DEGREE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MAP
NEW SOUTH WALES

The Constitution and Laws.*

By Pitt Cobbett, Challis Professor of Law in the University of Sydney

Earlier Forms of Government

The first settlement of New South Wales dates back to the year 1788. The history of the government of the Colony since that time may be roughly distributed under four periods:—(1) A period of military and despotic government, extending from 1788 to 1823,† adapted only to the circumstances of a penal settlement. (2) A period of civil but non-representative institutions extending from 1823 to 1842, during which the Colony was ruled by a Governor and a Legislative Council appointed by the Crown. (3) A period of partially representative institutions extending from 1842 to 1856, during which the Legislative Council consisted in part of elective members, although the executive government was still conducted by officials who were appointed by and responsible to the Home Government, and (4) A period of responsible government, extending from 1856 to the present time, during which the Legislature has consisted of two Houses, one nominated and the other elective, whilst the executive government has been virtually conducted by Ministers responsible to the elective chamber.† Each of these periods has left its mark on existing institutions.

The Present Constitution—(1) *The Imperial Element.*

The Colony, although it possesses a domestic constitution of its own, is strictly a dependency of the British Empire. This involves the existence of two sets of legislative, executive, and judicial authorities—the one imperial and the other local—the line between whose jurisdictions is not always clear and is often drawn in one way by law and in another by convention. Of the Imperial element it will be sufficient to say that it is represented by two fundamental principles or factors—

* Within the limits of space allotted to this subject it was found impossible to do more than give the briefest possible survey of the more important institutions of government. The writer has, however, where possible, appended references, from which more complete information may be gathered.

† The dates given are those at which the Acts inaugurating the changes referred to were passed. The changes themselves did not actually take effect in the Colony till somewhat later.

See 4 Geo. IV., c. 96, 9 Geo. IV. c. 83, Charter of Justice, 1823.
See 5 and 6 Vict. c. 76, 13 and 14 Vict. c. 59.
See 18 and 19 Vict., c. 54, and the Constitution Act.
For an account of the earlier methods of government see Jenks History of the Australasian Colonies, ch. VII. and ch. XI.

the supremacy of the Imperial Parliament, and the Royal prerogative. The former, although still an active principle, is greatly limited in practice by considerations of policy, under which imperial legislation is virtually confined to matters of general or imperial concern and to cases where such intervention is requested by the Colony itself.[a] The prerogative powers of the Crown in relation to the Colony have not only been considerably modified by statute,[b] but are still more largely qualified by the convention which precludes the Crown, under ordinary circumstances, from interfering in matters of local or domestic concern. These powers, moreover, are no longer wielded by the Crown itself, but by a minister responsible to the Imperial Parliament—the Secretary of State for the Colonies.[c] From *without*, the Royal prerogative manifests itself mainly in two ways—(1) the control which is still exercised by the Secretary of State over colonial legislation and over the colonial Governor; and (2) the maintenance of the appellate jurisdiction of the Crown as exercised through the Judicial Committee of the Privy Council. *Within* the Colony, the prerogative powers of the Crown, so far as they are delegated to the Governor, still constitute the basis and measure of local executive authority, except indeed in so far as they have been modified by local or imperial statute.[d]

(II) *The Local Element.*

So far as relates to local affairs, therefore, the Colony enjoys the fullest measure of self-government. Its domestic constitution rests partly on statute,[e] partly on the common law,[f] and partly on convention.[g] Its groundwork is furnished by the Imperial statute 18 and 19 Vic., c. 54, to which the local Constitution Act is appended by way of schedule.[h] The latter has, however, been considerably modified by later acts, such as the Constitution Act Amendment Acts of 1857, 1884, and 1890, the Triennial Parliaments Act of 1874, the Parliamentary Representatives Allowance Act of 1889, and the Electoral Act of 1893.[i] The chief factors that require to be noticed in connection with the local constitution are the Governor, the Legislature, the system of Administration, and the Judicial system.

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[a] As illustrations of the former class of cases we may take Foreign Enlistment and Extradition Acts; as illustrations of the latter, the passing of the Federal Council of Australasia Act, 1885, and the proposed reference of the Federal Constitution to the Imperial Parliament.

[b] 18 and 19 Vic., c. 54, sec. 2; Constitution Act, secs. 47 and 48.

[c] Anson, Law and Custom of the Constitution, ii. 249.

[d] For a judicial recognition of this principle see *ex parte Leong Kum* (7 N.S.W. R. at p. 262), which on this point is not affected by the later decision in *Chun Teeong Toy* v. *Musgrove* (1891, App. Ca. 272).

[e] The statutes affecting the Constitution are partly imperial, such as 9 Geo. IV, c. 82, 18 and 19 Vic., c. 54, and the Colonial Laws Act, 1865; and partly local, such as the various Constitution Act Amendment Acts 1857, 1884, 1890. With them we may class orders and regulations made under this authority.

[f] The Letters Patent and Instructions take effect under the Royal prerogative as it exists at common law.

[g] The Ministerial system rests on convention, the only reference to it in the Constitution Act being found in sec. 37.

[h] The Constitution Act is not strictly a local statute, having been altered by the Colonial Office before being assented to by the Crown.

[i] Strictly the Parliamentary Electorates and Elections Act, 1893.

The Office of Governor.

The office of Governor is constituted by Letters Patent from the Crown under the Great Seal. The present Letters Patent bear date the 29th April, 1879. The powers and duties annexed to the office are conferred partly by this instrument,[a] and partly by Imperial or local statute.[b] The permanent Instructions, also, provide a standing body of rules for the guidance of the Governor in the exercise of the duties conferred on him. The present Instructions bear date the 9th July, 1892. They may, however, at any time be supplemented by particular or further instructions issued by the Secretary of State. The duties of the office, as thus constituted, may be discharged either either by the Governor himself, by the Lieutenant-Governor, or by an Administrator of the Government; a separate commission being provided for each of these officers. The Governor himself is appointed by the Crown, on the recommendation of the Secretary of State, and holds office at the pleasure of the Crown, although the usual term of office is six years.[c] His salary is at present fixed at £7,000 a year, this sum being charged on the Consolidated Fund. The commission of the Lieutenant-Governor is usually issued to the Chief Justice of the Colony, but is only operative[d] in the event of the Governor dying or becoming incapable or departing from the Colony. It is also usual to issue a third commission to the President of the Legislative Council or some other high official, authorising him to administer the government in the event of both Governor and Lieutenant-Governor being unable to act. But both these commissions may at any time be superseded by a special commission issued to any other person. The Governor is the connecting link between the Imperial and local authorities. His functions may be roughly grouped under three heads:—(1) Those attaching to him as the local representative of the Imperial Government. Here he acts not as a local constitutional ruler but as an Imperial officer subject to the Secretary of State for the Colonies.[e] In this capacity he is the medium of communication between the Imperial and local authorities; and exercises also certain powers of reservation in regard to colonial Bills. (2) Those attaching to him as the titular head of the Colonial Government. In this capacity he is charged with a multitude of functions relating alike to legislation, administration, and judicature. These functions he is required to exercise, for the most part, on the advice of his Ministers, who are in their turn responsible to the Legislature. Even here, however, he is invested with some discretionary power, the nature of which will be referred to hereafter. (3) Those attaching to him as the representative of the Crown, in its august capacity. These functions are for the most part of a formal or ceremonial kind, and their exercise depends on his own judgment and discretion. It is at this point that the Imperial and local aspects of his office blend, and it is hard to say which predominates.

[a] *See* Letters Patent, cl. 2, 5, 8 to 11.

[b] Constitution Act, secs. 2, 7, 9, 37, 54, 55. There are also a vast number of local statutes which confer administrative powers on the Governor, to be exercised on the advice of the Executive Council.

[c] Colonial Office Regulations, 1894, No. 7.

[d] Except for the purposes of precedence.

[e] On this subject generally, see Todd, Government of the British Colonies, ch. xviii.

The Legislature.

The Legislature of the Colony is made up of the Sovereign, who is for this purpose locally represented by the Governor, and two Houses of Parliament—a nominee Council and an elective Assembly.[a] This body is invested by statute with a general legislative capacity, including the power of making changes in its own constitution and judicial system,[b] subject only in certain cases to the necessity of reservation.[c] Its powers are, however, limited—by the principle of the supremacy of the Imperial Parliament, in virtue of which any colonial enactment that conflicts with the provisions of an Imperial statute extending to the Colony is deemed to be inoperative and void;[d] by the principle of territoriality, in virtue of which a colonial enactment is precluded from having any extra-territorial effect, except where authorised by imperial statute;[e] and also by certain provisions restricting the imposition of certain kinds of fiscal duties.[f]

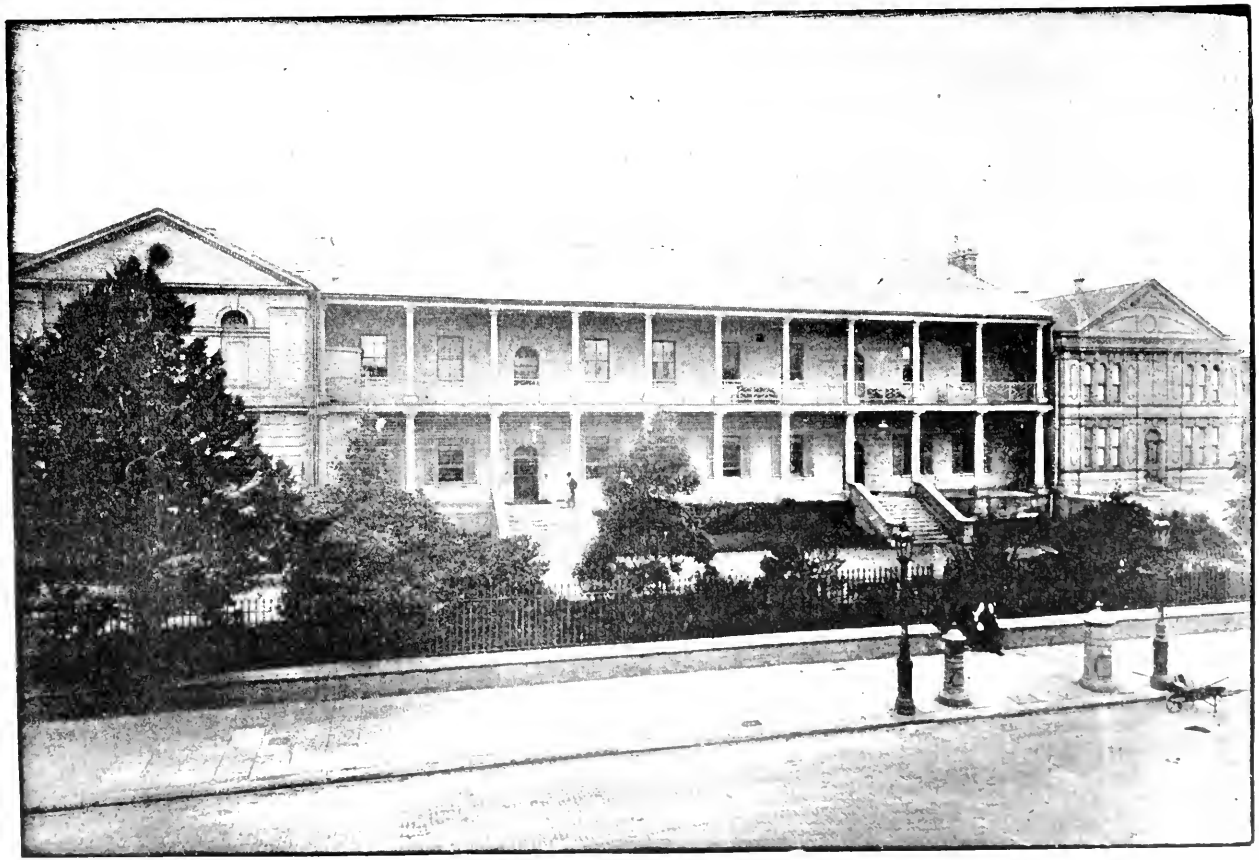
The Legislative Council.

The Legislative Council consists of not less than twenty-one members, who are appointed by the Governor on the advice of the Executive Council.[g] The present number is sixty-eight,[h] of whom one-fourth constitute a quorum.[i] There are certain personal qualifications, but no property qualification. Four-fifths of the members at least must consist of persons not holding any office of profit under the Crown.[j] Subject to certain provisions as to the vacating of seats and resignation, members hold office for life.[k] The chief officer of the House is the President, who is appointed by the Governor and Executive Council from amongst the members. Although appointments to the Upper Chamber can only be made by the Governor on the advice of the Executive Council, yet it would seem that the Governor possesses a discretionary power of refusing to act on such recommendation in certain events; as in the case where there was good ground for believing that such recommendation would not be endorsed by the Legislature or the constituencies.[l]

The Legislative Assembly.

The Legislative Assembly consists of 125 elective members, of whom twenty, exclusive of the Speaker, constitute a quorum.[m] Members are subject to certain qualifications imposed by the Electoral Act 1893,[n] and the Constitution Act.[o] Of these perhaps the most important is that which excludes any person holding an office of profit under the Crown, with the exception of the chiefs of the nine great administrative

[a] Constitution Act, sec. 1. [b] 18 and 19 Vic., c. 54, sec. 4; 28 and 29 Vic. c. 36, sec. 5.
[c] Reservation appears to be still required by statute in the case of certain bills, such as bills altering the electoral system. *See* 13 and 14 Vic., c 59, sec. 32; and 18 and 19 Vic., c. 54, sec. 3. The non-observance of this requirement led to the passing of the Colonial Acts Confirmation Act, 1894.
[d] 28 and 29 Vic., c. 63, sec. 2. [e] *Reg. v. M'Leod* (L.R., 1891, App. ca., 455.)
[f] Constitution Act, sec. 45; 36 and 37, Vic., c. 22, sec. 3.
[g] Constitution Act, sec. 2; and Letters Patent, cl. 11.
[h] November, 1895. [i] Constitution Act Amendment Act, 1890.
[j] Constitution Act, sec. 2. [k] Constitution Act, secs. 3, 4, 5.
[l] Todd, 657 *et seq.*, 821 *et seq.* [m] Constitution Act, sec. 23. [n] 56 Vic. No. 38, sec. 65.
[o] Constitution Act, secs. 17, 28; strictly, also, the Constitution Act Amendment Act, 1884.



TEMPORARY HOUSES OF PARLIAMENT, SYDNEY

departments, whose presence in the Legislature is, of course, essential to the system of Ministerial government.[a] The acceptance even of one of the latter offices has the effect of vacating the seat of the member accepting it, although he is eligible for re-election.[b] Members receive an allowance at the rate of £300 a year.[c] The chief officer of the House is the Speaker, who is elected by the House itself, on the occasion of the assembling of a new Parliament after a general election, or on an intermediate vacancy occurring.

The Electoral System.

The system of Parliamentary representation is now governed by the Electoral Act of 1893.[d] This Act establishes in the Colony a uniform system of manhood suffrage, single-member constituencies, equal electoral districts, and self-registration of voters. It also attempts to provide additional safeguards against illegal voting and corrupt practices.

Electoral Districts.

Under this Act three Commissioners were appointed, whose duty it was to distribute the Colony into 125 electorates, each returning one member, and each containing, so far as was consistent with practical convenience, the same number of electors. For this purpose the Commissioners were directed to ascertain from the rolls then in force the total number of existing electors qualified by residence, and to divide this total by 125.[e] The result was to give the quota, or proportionate number of electors for each district. This was found, in fact, to amount to 2,513 electors. The Commissioners were, however, allowed a margin of 600 above or below this quota,[f] to enable them to give some consideration to existing boundaries, natural features, lines of communication, and community or divergence of interest.[e] On these principles the Colony was ultimately distributed into eleven city districts, thirty-nine suburban districts, and eighty-five country districts. The new system came into operation on the 29th of December, 1893. To guard against future inequality arising from changes in population, the Act requires this distribution to be readjusted on the same principles, and by means of the same machinery, after each decennial census; whilst it also authorizes a readjustment in the fourth or fifth year after any census, in regard to any part of the Colony where the electoral roll of any district shows an increase or decrease in the prescribed quota of not less than 25 per cent.[g]

The Parliamentary Franchise.

The Parliamentary franchise is also regulated by the Electoral Act of 1893. Under this Act every person claiming to vote for any district must be the holder of an elector's right for the district; must

[a] Constitution Act Amendment Act, 1884. These officials, together with the Vice-President of the Executive Council, constitute the Ministry.

[b] *Ib*, sec. 3. [c] Parliamentary Representatives Allowance Act, 1889, sec. 2.

[d] 56 Vic., No. 38; to which must be added the amending Acts, 57 Vic., No. 3, 57 Vic., No. 24, 58 Vic., No. 1.

[e] Electoral Act, 1893, sec. 17.

[f] Although special reasons had to be given where advantage of this was taken to the extent of 200 or more.

[g] Electoral Act, 1893, secs. 13, 17.

be entered on the electoral roll for the district; and must also, at the time of tendering his vote, retain the qualifications in virtue of which his right was issued to him.[a] An elector's right is a certificate issued in the form prescribed by the Act by the registrar of an electoral district to a duly qualified person, entitling him to vote for that district.[b] These rights are required to be renewed at intervals of three years, from the 31st December, 1896.[c] In the first instance they were distributed by the police; but for the future they can only be obtained by personal application, although a right once obtained may be renewed by written application, accompanied by a statutory declaration in the prescribed form.[d] A substituted certificate may also be issued on change of residence from one district to another, or on the loss or defacement of the original right.[e] The electoral roll is the official register of persons *primâ facie* entitled to vote at parliamentary elections for the district. For registration purposes each district is, where necessary, subdivided into divisions.[f] The Act also provides for the periodical publication and revision of a general and a supplementary list of voters for each division; these divisional rolls when printed together constitute the electoral roll for the district.[g] The more important qualifications necessary to entitle a person to receive an elector's right and to be entered on the electoral roll are as follows:—The applicant must be a British subject, of the male sex, of the age of twenty-one years, and absolutely free; he must have had his principal place of abode in New South Wales for a continuous period of one year,[h] and in the electoral district for a continuous period of three months prior to the date of his application.[i] There are also certain disqualifications set up by the Act, such as service in the regular naval or military forces or constabulary, unsoundness of mind, and conviction for certain offences.[j]

The Method of Holding Elections.

On the occasion of a general election the polling throughout the Colony takes place on the same day.[k] Every candidate must be nominated by at least six registered electors for the district, the nomination paper being in the form prescribed by the Act.[l] No money deposit is now required from candidates. The method of voting is by ballot. For this purpose every elector after exhibiting his right, and having had his name checked on the roll, receives a voting-paper containing the names of the candidates, and punctured and initialed by the presiding officer. The elector then retires to a compartment, and strikes out the names of all candidates, except that candidate for whom he wishes to vote. The ballot-paper is then folded up and delivered to the presiding officer, and deposited by him in the ballot-

[a] Electoral Act, 1893, sec. 24.
[b] *Ib.*, Schedule. He may, however, lose the right to vote by subsequent disqualification.
[c] *Ib.*, sec. 40. [d] *Ib.*, sec. 40. [e] *Ib.*, secs. 38, 39. [f] *Ib.*, sec. 33.
[g] *Ib.*, secs. 41 to 52. The general roll must be issued on or before the 20th December; the supplementary roll on or before the 20th May.
[h] Or, if naturalized, then one year from the date of naturalization.
[i] Electoral Act, 1893, sec. 23.
[j] *Ib.*, sec. 23. The accrual of any disqualification subsequent to the issue of the elector's right will render the latter nugatory; sec. 24.
[k] *Ib.*, sec. 58. [l] *Ib.*, sec. 65.

box.[a] It is claimed for this system that it ensures the utmost possible secrecy in voting. In the case of an equality of votes, the returning officer has a casting vote.[b]

Contested Elections.

The Legislative Assembly still retains the right of determining questions arising out of disputed elections. Under the Electoral Act of 1893, however, this function is required to be exercised by a committee of the House, called the Committee of Elections and Qualifications.[c] This consists of nine members appointed by warrant under the hand of the Speaker, with the approval of the House, at the commencement of each session.[d] The Committee is empowered to decide, finally, all questions respecting the validity of elections, or the qualification of any person returned; and to investigate and report to the Assembly upon any other matter referred to it.[e]

The Duration of Parliament.

The power of convening the Legislature is vested in the Governor subject to the condition that one session at least must be held in each year.[f] This power is really exercised on the advice of the Ministry, who, both for the purposes of legislation and supply, find it necessary not only to convene Parliament frequently, but also to maintain it in session for a considerable part of each year. Once in being, Parliament may be prorogued, or dissolved, or may expire by lapse of time. Prorogation has the effect of putting an end to the session; it applies equally to both Houses; and is effected by proclamation of the Governor.[g] The effect of prorogation was formerly to put an end to all business not then completed; but both Houses have now made provision for enabling bills commenced in the previous session to be resumed in a subsequent session at the point at which they were dropped.[i] Dissolution has the effect of terminating the existence of the Assembly and of suspending the functions of the Council;[j] it also is effected by proclamation of the Governor. The duration of Parliament is limited to three years by the Triennial Parliaments Act, 1874. If not previously dissolved, the Assembly will, *ipso jure*, cease to exist after the lapse of three years from the date of the return of the writs on the occasion of the last general election.[k] Whether it ceases by dissolution or by lapse of time, a new Parliament must be convened within forty-six days.[l] The powers of prorogation and dissolution are commonly exercised by the Governor on the advice of his Ministers; but with respect to dissolution he is invested with a somewhat wider discretion than usual, it being his duty to see that this prerogative power is only resorted to in cases in which a recourse to it is dictated by the public interest.[m]

[a] Electoral Act, 1893, secs. 84, 85. [b] *Ib.*, sec. 102. [c] *Ib.*, secs. 121, 127.
[d] *Ib.*, secs. 121, 122. [e] *Ib.*, sec. 128.
[f] Constitution Act, sec. 30; Letters Patent, cl. 11.
[g] Constitution Act, sec. 3. [h] *Ib.*, sec. 30; Letters Patent, cl. 11.
[i] Standing Orders, Legislative Council, 278 to 280; Legislative Assembly, 409 to 411.
[j] The Council is meanwhile prorogued; but Parliament, of which the Council forms a part, is for the time-being non-existent.
[k] 37 Vic., No. 7, sec. 2.
[l] Electoral Act 1893, secs. 53 to 55, 58; and Further Amendment Act, 1893, sec. 10.
[m] Todd, ch. xvii.

The Conduct of Public Business in Parliament.

The conduct of public business in Parliament is regulated in part by statute,[a] in part by rules and orders framed by both Houses in pursuance of statutory powers,[b] and in part by usage. The English *lex et consuetudo Parliamenti* has no application except in so far as it may have been expressly adopted under statutory authority.[c] The present Standing Orders of the Legislative Assembly were adopted and approved in 1894; and those of the Legislative Council in 1895. The general methods of procedure, both in respect to the conduct of debates, the passing of public and private bills, and the transaction of miscellaneous business, are for the most part modelled on those of the Imperial Parliament.[d] In recent times special provision has been made for the purpose of protecting Parliament against obstruction; this includes (*inter alia*) certain limitations which have been placed on formal motions for adjournment; and the adoption, subject to certain restrictions, of the principle of the closure.[e] The conduct of financial business is subject to the following rules:—(1) All money bills must originate in the Legislative Assembly;[f] (2) The Assembly will not pass any vote or bill for the appropriation of revenue or taxation, except on the recommendation of the Governor;[g] whilst, (3) All financial measures brought before the Assembly must be founded on previous resolutions come to in Committee of the whole House.[h] No public work, the estimated cost of which exceeds £20,000, can be commenced, unless previously reported on by the Parliamentary Standing Committee on Public Works, and approved by resolution of the Assembly.[i]

The Relation of the two Houses.

Technically, each House possesses co-ordinate powers; the concurrence of each is necessary to legislation; whilst, in general, any measure may originate in either House. To the latter rule, however, there are two exceptions, viz., that all money bills must originate in the Legislative Assembly; and that bills affecting the constitution of either House, ought to originate in that House.[j] With respect to money bills, there is a general recognition of the principle that, under a representative system of government, the control over revenue and expenditure ought primarily to rest with the elective chamber. Nevertheless, the Legislative Council both claims, and has occasionally exercised, the right of rejecting measures of taxation.[k] It also claims the right of amending money bills, except, perhaps, where the amendment

[a] Constitution Act, secs. 1, 7, 8, 22, 24, 31, 33, 35, 53, 54. [b] *Ib.* sec. 35.
[c] *Kielley v. Carson* (4 Moo. P. C., 63); *Taylor v. Barton* (7 N.S.W. R. 30).
[d] See also Standing Order Legislative Council, 2; and Legislative Assembly, 2
[e] Standing Orders, Legislative Council, 13, 102; Legislative Assembly, 49, 175.
[f] Constitution Act, sec. 1.
[g] *Ib.*, sec. 54; Standing Order, Legislative Assembly, 247. The object is to concentrate all responsibility for expenditure in the hands of the Executive.
[h] Standing Order, Legislative Assembly, 247.
[i] Public Works Act, 1888, secs. 3, 10, 13.
[j] This principle has been constantly insisted on by the Legislative Council; see resolution 2nd April, 1873, Official History, 510.
[k] The Stamp Duties Bill (No. 2), 1880; The Income Tax Bill, 1893; The Land and Income Tax Assessment Bill, 1895. In a subsequent session this last bill was amended by the Council, it having been ruled that it was not technically a taxing bill.

would have the effect of imposing any additional charge on the people;[a] but this claim has commonly been resisted by the Assembly.[b] With respect to general legislation, although the powers of the two Houses are formally equal, yet the Assembly exercises in the long run a predominating influence, owing, no doubt, to its representative character, its control of the public purse, and, perhaps, in the last resort, to the possibility of "swamping." Although this extreme step has never, so far at least as relates to the Colony, been authoritatively sanctioned,[c] and although it may, perhaps, be unconstitutional, yet the fact that there is no maximum limit to the number of the Council, and that the right of making additions to it is vested in the Executive, undoubtedly tends to diminish the chances of any permanent deadlock.[d]

The Royal Assent.

The assent of the Crown is essential to the validity of colonial legislation. This assent, however, is usually given as a matter of course, through the Governor.[e] Strictly, a colonial Act, even after it has been assented to by the Governor, may be disallowed by the Crown, through the Secretary of State for the Colonies, within two years;[f] but in practice this right is not taken advantage of. There are, however, certain bills which the Governor is required either by statute[g] or by his Instructions to reserve. By his Instructions the Governor must reserve all bills relating to divorce, or involving any grant of land or money to himself, or affecting the currency of the colony, or imposing differential duties,[h] or inconsistent with imperial treaties, or interfering with the discipline of the Royal forces in the colony, or to the prejudice of the prerogative or the rights and property of British subjects outside the Colony or the trade and shipping of the United Kingdom, or containing provisions to which the Royal assent has already been refused.[i] But even these bills the Governor is empowered to assent to, in case of emergency, except where the bill is repugnant to the law of England or inconsistent with Imperial treaty. This obligation of reservation is perhaps a necessary measure of precaution; but in practice the colony enjoys the fullest freedom of legislation in regard to its own domestic affairs. Between 1855 and 1890, only 15 bills were reserved, and none of these were finally disallowed.[j]

The Executive Council and Ministry.

The Governor is the titular head of the executive department of government, but like the sovereign in England he is required to exercise these powers, at the instance and on the responsibility of certain constitutional advisers. Many of his powers he is expressly

[a] *See* ruling of Sir T. Murray, 26th April, 1871; *see* also Official History, pp. 269, 355, 371, 401, 457, 472, 522, 606.

[b] See Official History, pp. 401, 472, 522, 605.

[c] An abortive effort at swamping appears to have been made in 1861; *see* Official History, 334 *et seq.*

[d] As to the functions of a nominee chamber generally, *see* Todd, 695 *et seq.* As to nominations to Upper House, *see* p. 10 *supra* and references there cited.

[e] 5 and 6 Vic., c. 76, sec. 31. [f] *Ib.*, sec. 32. [g] 13 and 14 Vic., c. 59, sec. 32.

[h] Except so far as is allowed by the Australian Colonies Duties Act, 1873.

[i] Instructions 1892, cl. 8.

[j] Todd, 158. Even the Divorce Amendment Act of 1892 was ultimately sanctioned.

required to exercise with the formal assent and advice of the Executive Council, this obligation being imposed partly by statute[a] and partly by the Instructions;[b] other powers he exercises on the advice and responsibility of a single Minister.[c] The constitution of the Executive Council, and the duties of its members, are regulated by the Letters Patent,[d] by the Instructions,[e] and by statute.[f] It is usually presided over by the Governor, and consists of the Vice-President, and nine other members, who are at the same time the heads of the great executive departments. Saving the presence of the Governor, the Executive Council is in fact identical with the Ministry or Cabinet. It was no doubt originally intended that the Executive Council should constitute the real executive organ, but the presence of the Governor appears to have led to the adoption by its members of the practice of deliberating in private, and this, in its turn, gave rise to the Ministry or Cabinet as a distinct though informal institution. Hence the Council has come to assume the character of a formal body, through the medium of which the more important acts of State are sanctioned or allowed; but whose action is prompted or set in motion by a responsible Minister, after consultation with the whole Ministry in matters of moment, or on his own responsibility in minor or departmental matters. Members of the Executive Council resign their offices on ceasing to be Ministers. The Ministry or Cabinet is virtually a committee of the leading members of both Houses, who possess the confidence of the majority in the Legislative Assembly, and generally represent the dominant party in that House. It is made up of the chiefs of the executive departments, who are at liberty to sit in the Legislative Assembly,[g] and whose tenure of office depends on political considerations;[h] together with the Vice-President of the Council. The Ministry or Cabinet is thus an informal deliberative body; it has no corporate existence or official recognition; and no formal record is kept of its proceedings. In the Colony there is no distinction, such as exists in England, between Cabinet and Ministry.[i] For the rest, however, the relations between the Ministry and the Legislature, are much the same as those which exist in the United Kingdom.[j] Although the Governor is as a rule bound to act on his Ministers' advice, yet he is expressly authorised by his Instructions to refuse such advice in case of need.[k] In practice, however, such cases are not very frequent. It is difficult to reduce them to any satisfactory principle, but roughly they may be said to include :—(1) Cases where the Governor acts as

[a] Constitution Act, secs. 3, 37; besides which there are an immense number of local statutes, which confer new administrative powers, but expressly require these to be exercised on the advice of the Executive Council.

[b] Instructions 1892, cl. 6. This clause, however, expressly authorises the Governor to act in opposition of such advice, if he deems it necessary, subject to certain conditions.

[c] Such as the prerogative of mercy in non-capital cases : *see* Instructions, cl. 9.

[d] Letters Patent, cl. 6. [e] Instructions 1892, cl. 3, 4, and 5.

[f] Executive Councillors Act, 1881, secs. 2, 4; Promissory Oaths Act, 1870, sec. 5.

[g] For a list of these officers *see* Constitution Act Amendment Act, 1884, sec. 2 and schedule.

[h] Constitution Act, sec. 37.

The Cabinet, under the English system, is strictly a committee of the larger body or Ministry. The tendency in the Colony is to use the term to indicate a sitting of the Ministry.

[i] Anson II. chap. iii. sec. 3. [k] Instructions, cl. 6.

guardian of the law or of the Constitution;[a] (2) Cases where he acts as supreme guardian of the public interest;[b] and (3) Cases where he acts as the representative of the interests of the Imperial Government. In the event of his refusing to act on the advice of his Ministers in matters of domestic concern, it will be incumbent on him, if his Ministers should resign, to procure other Ministers who will accept the political responsibility for his action.[d]

The Administrative Departments and the Public Service.

For the purposes of administration, the public business of the Colony is distributed between nine different departments, each of which is presided over by a responsible Minister, as head, and worked by a staff of permanent officials. These Ministers are:—(1) The Colonial Secretary;[e] (2) The Colonial Treasurer; (3) The Attorney-General; (4) The Secretary for Lands; (5) The Secretary for Public Works; (6) The Minister of Justice; (7) The Minister of Public Instruction; (8) The Secretary for Mines and Agriculture; and (9) The Postmaster-General. The functions of the departments respectively presided over by these Ministers are fixed partly by statute and partly by Executive minute. The Ministers or political heads of these departments are technically appointed by the Governor alone,[f] but are really selected on the recommendation of the political leader who may be invited by the Governor to form an administration, and who appears to possess the confidence of the Assembly; they also retire or are dismissible from office on political grounds. The appointment and tenure of other public officers are now regulated, in the main, by the Public Service Act, 1895.[g] This Act was passed for the purpose of effecting a complete reorganization of the Public Service, and of withdrawing both appointments and promotions, as far as possible, from the sphere of political influence. To this end the Act constitutes a Public Service Board, consisting of three Commissioners, who are appointed for a period of seven years, and are irremovable during that period except by resolution of both Houses, although they are liable to vacate their offices in certain events specified by the Act.[h] This Board is charged with the duty of investigating both the organization and working of each department of the Public Service, and of determining (subject to the restrictions imposed by the Act) the number, grade, and salaries of the officers employed.[i] The Board is endowed with the power of making administrative regulations; and is also required to furnish an annual report on the state of the Public Service for presentation to Parliament.[j] The officers of the Public Service are distributed into five divisions—the special, professional, clerical, educational, and

[a] *E.g.*, refusal to sanction the issue of public moneys in violation of statutory requirements: *see* Constitution Act, sec. 55; Todd, 628 *et seq.*, 726.

[b] *E.g.*, refusal to sanction any abuse of position, or wanton sacrifice of public to party interests, by the Ministry in office; Todd, 662, 736 *et seq.*

[c] *E.g.*, refusal to sanction an administrative act in violation of treaty obligations, Todd, 819.

[d] Todd, 817 *et seq.* [e] This officer is now usually termed the Chief Secretary.

[f] Constitution Act sec. 37.

[g] 59 Vic., No. 25; as to officers excepted from the operation of the Act, *see* sec. 3.

[h] *Ib.*, secs. 5, 6.

[i] *Ib.*, secs. 7 to 15; the grading and classification of officers must be renewed at intervals of not more than 5 years. [j] *Ib.*, secs. 18 to 20.

general.[a] As a rule all future appointments to the permanent service are to be made by the Governor and Executive Council either at the instance of the Board itself, or at the request of the political or permanent head of a department addressed to the Board, but in any case only on the certificate of the Board;[b] the appointees being under ordinary circumstances selected by competitive examination, and being further subject to a probation of six months. The control of future promotion is also vested in the Board, subject, however, to certain conditions prescribed by the Act, which include (*inter alia*) the passing of a qualifying examination on transfer from the lower to the higher grades recognised in the certain divisions.[d] Public officers still continue to hold office at the pleasure of the Crown,[e] although they enjoy the protection of certain provisions of the Act designed to guard against arbitrary or unfair dismissal.[f] Officers appointed after the passing of the Act are not entitled to any pension or allowance;[g] but are subject to an obligation of compulsory insurance, or to an equivalent deduction of salary.[h] Public officers are prohibited, except by express permission of the Governor, from engaging in commercial or professional business outside the duties of their office.[i] The control and working of the Government railways and tramways are vested in the Railway Commissioners, under the provisions of the Railways Act of 1888.[j] The Agent-General is the representative of the Colony in the United Kingdom; it is his duty to look after its general and commercial interests in the United Kingdom and Continent of Europe, and to carry out such instructions as may be given to him from time to time by the Executive.

The Fiscal System—Revenue—Appropriation.

The fundamental principles which underlie the fiscal system of the Colony are :—(1) That no tax or impost shall be levied on the inhabitants except with the consent of the Colonial Legislature;[k] (2) That all public revenue raised within the Colony, whether by taxation or otherwise, belongs to the Colonial Legislature;[l] and (3) That no public money shall be expended except under the authority of an Act of the Legislature.[m] The main sources of the Colonial revenue are :—(1) The proceeds of taxation, including customs duties, excise duties, stamp duties, and licenses, to which must now be added a tax on the unimproved value of land, and an income tax;[n] (2) Revenue derived from Crown lands, including the proceeds of sales, interest on unpaid balances, and rents; (3) Moneys received for services rendered, including the revenue derived from the Government railways, tramways, and postal and telegraph systems; and (4) Miscellaneous receipts, such as the proceeds of fines and forfeitures. The proceeds

[a] Public Service Act, 1895, sec. 21. [b] *Ib.*, secs. 28, 29.
[c] *Ib.*, secs. 22 to 27; *see* also secs. 33 and 34; and as to special and temporary appointments, secs. 37 and 38.
[d] *Ib.*, secs. 40 to 48. [e] *Ib.*, sec. 58. [f] *Ib.*, sec. 49 *et seq.* [g] *Ib.*, sec. 59.
[h] *Ib.*, sec. 63. [i] *Ib.*, sec. 64. [j] 51 Vic., No. 35.
[k] 18 Geo. III, c. 12, as extended by policy and convention to all British Colonies; *see* also Constitution Act, secs. 44 and 45.
[l] 18, 19 Vic., c. 54, s. 2; Constitution Act, sec. 50. [m] Constitution Act, sec. 53.
[n] Under the Land and Income Tax Act, and the Assessment Act, 1895, this amounts to 1d. in the pound on the unimproved value of land, subject to an exemption of £240; whilst the tax on incomes amounts to 6d. in the pound, subject to an exemption of £200.

of these revenues go to form the Consolidated Revenue Fund of the Colony.[a] The collection and payment of these revenues into the Treasury is regulated by the Audit Act, 1870, and is subject to the control and supervision of the Auditor-General.[b] No moneys can be paid out of the Consolidated Fund, with the exception of the civil list and other charges specified in the Constitution Act, except under the authority of either a permanent Act,[d] or the annual Appropriation Act. Temporary supply bills are, however, passed in anticipation of the Appropriation Act, with a view of putting the Government in funds to meet current expenditure. A fund is also provided, called the Treasurer's Advance Account, for the purpose of enabling the Government to meet expenses of an unforeseen nature; the amount of this fund is fixed by the Appropriation Act for one year, whilst payments made out of it are allowed in the supplementary estimates of the following year. Subject to this exception, all payments out of the Consolidated Fund must be sanctioned by legislative enactment. Payments out are also required to be made in pursuance of warrants under the hand of the Governor,[e] and in the manner provided by the Audit Act.[f] All public accounts are subject to audit by the Auditor-General who reports to Parliament thereon.[g] The financial year commences on the 1st July and ends on the following 30th June. A periodical statement of receipts and expenditure is required to be published in the *Gazette*.[h]

Military and Naval Forces of the Colony.

The military forces of the Colony comprise:—(1) The Permanent Forces, (2) the Partially-paid Forces, and (3) the Reserve Forces; together with a Head Quarters and General Staff.[i] The Governor is titular Commander-in-Chief, but the actual military command is vested in the General Officer commanding the Forces;[j] whilst the civil control over both military and naval establishments is vested in the Colonial Secretary, as Minister of Defence.[k] The engagement, discipline, and discharge of members of the Permanent Forces are regulated by the Military and Naval Forces Regulation Act of 1871;[l] whilst the Partially-paid Forces are subject to the Volunteer Force Regulation Act of 1867 and the regulations made thereunder.[m] A local defence committee has been recently instituted for the purpose of assisting the General Officer commanding the Forces with advice in relation to

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[a] Constitution Act, sec. 47. [b] 33 Vic., No. 18, secs. 1 to 10.

[c] Constitution Act, secs. 48 to 53.

[d] The payment of the interest on the public debt, and the salaries and pensions of the judges are provided for by permanent Act; *see* 36 Vic., No. 21, sec. 4; 46 Vic., No. 15, sec. 3.

[e] Constitution Act, sec. 55. [f] 33 Vic., No. 18, secs. 11 to 16. [g] *Ib.*, Part II.

[h] *Ib.*, Part II., sec. 21.

[i] These forces give a total peace establishment of 5,867 men, and a total war establishment of 9,241 men. There is also one volunteer corps which has not been enrolled in the partially-paid forces.

[j] Who is appointed under 34 Vic. No. 19, sec. 6.

[k] With the exception of the Public School Cadet Corps, which is subject to the Minister of Public Instruction.

[l] 34 Vic., No. 19. Under sec. 5, members of this Force are subject to the Imperial Army Act 1882, and articles or regulations made thereunder, so far as these are not inconsistent with the local Act and regulations made thereunder.

[m] 31 Vic., No. 5; *see* especially Part II.

the defences of the Colony. The Naval Forces of the Colony comprise the Naval Brigade and a corps of Naval Artillery Volunteers, both of which are partially paid.[a] By an agreement concluded in 1887 between the Imperial Government and the Australasian Colonies, an additional naval force of five armed cruisers and two torpedo boats, is to be maintained by the Imperial Government on the Australasian station, the Colonies undertaking to pay interest not exceeding £35,000 a year on the cost of construction and equipment, and a further sum not exceeding £91,000 a year towards the cost of maintenance. The agreement is to continue for not less than ten years, but may be terminated at or after that time by two years' previous notice. This agreement was ratified so far as related to the United Kingdom by the Imperial Defence Act, 1888,[b] and so far as related to the Colony by the Australasian Naval Forces Act, 1887.[c]

Public Education.

The educational system of the Colony now rests on the Public Instruction Act, 1880.[d] This Act provided for the establishment throughout the Colony of a system of compulsory and non-sectarian education; the Council of Education, established under the previous Act of 1866, was dissolved; and the control and working of the new system, together with the administration of all moneys voted by Parliament for educational purposes,[e] were transferred to the Minister of Public Instruction; at the same time it was provided that all aid previously given to denominational schools should cease after 1882.[f] The different classes of schools at present existing comprise (1) elementary public schools, in which only primary instruction is given; (2) superior public schools, for the purposes of higher instruction; and (3) a limited number of high schools, both for boys and girls, in which a still more advanced course is followed, and which are intended to constitute a link between the public schools and the University.[g] The Act also provides for the establishment of evening public schools; for the appointment of provisional schools and itinerant teachers in sparsely inhabited districts; and for the establishment of a training school for teachers.[h] Attendance is compulsory between the ages of 6 and 14 for not less than 70 days in each half year, unless the child has been or is being otherwise efficiently instructed, or is prevented from attending by infirmity or distance.[i] The instruction given is non-sectarian, but embraces general religious and moral teaching; in addition to which provision is made for the giving of separate unofficial religious instruction by voluntary teachers, at the option of the parents.[j] Parents are required to pay certain small fees which are fixed by the Act, but may be remitted in case of poverty or inability;[k] a higher rate of fees, however, is payable in the high schools.[l] Provision is also made for the establishment of Public School Districts and School Boards for the inspection of schools and the supervising of

[a] Comprising in 1894 about 591 men. [b] 51 and 52 Vic., c. 32. [c] 51 Vic., No. 22.
[d] Except in so far as this has been varied in certain particulars by the Public Service Act, 1895, secs. 46 to 48.
[e] Except where specifically appropriated. [f] 43 Vic., No. 23, secs. 1, 2, 7, 28.
[g] *Ib.*, sec. 6. [h] *Ib.*, secs. 10, 22, 23, 24. [i] *Ib.*, sec. 20. [j] *Ib.*, sec. 17. [k] *Ib.*, sec. 11.
[l] *Ib.*, sec. 27; these being fixed by regulation of the Governor and Executive Council.

teachers within the district.[a] A system of State bursaries and scholarships exists for the encouragement of poor but proficient students. A technical college has also been established in Sydney, and various technical schools and technical classes in other parts of the Colony.

Local and Municipal Government.

No complete system of Local Government has as yet been adopted; but under the Municipalities Act of 1867[b] and the Amending Act of 1874,[c] provision is made for the incorporation of Municipal Districts and Boroughs.[d] Incorporation is in no case compulsory, and requires the consent of a majority of the prospective ratepayers.[e] The affairs of the municipality are conducted by a Municipal Council varying in number according to population, and elected by the ratepayers.[f] The Council is empowered to frame by-laws, to borrow money, to levy rates, to construct and maintain roads and other local works, such as those relating to sewerage, lighting, water supply, public health, and recreation.[g] The Municipality of Sydney is governed by special Acts.[h] Altogether there are now some 170 municipalities, comprising less than one-hundredth part of the area of the Colony, but somewhat more than one-half of its total population.

The Judicial System.

The central feature of the judicial system of the Colony is the Supreme Court. This was first established by the Charter of Justice of 1823,[i] but its jurisdiction has since been regulated and modified by subsequent legislation.[j] The Court now consists of a Chief Justice and six *puisne* Judges, together with a staff of ministerial and other officers. The judges hold office during good behaviour, but are nevertheless removable by the Crown upon an address of the two Houses of Legislature.[k] Their salaries and pensions are charged upon the Consolidated Fund and cannot be reduced during their continuance in office.[l] The Supreme Court exercises both a civil and a criminal jurisdiction, the former being distributed into various branches, including a jurisdiction at Common Law,[m] in Equity,[n] in Probate,[o] in Divorce,[p] and Bankruptcy.[q]

The Common Law jurisdiction, both in civil and criminal cases, is exercised in part at Sydney, and in part at Circuit Courts held throughout the country. The Court also exercises an appellate jurisdiction both from the decisions of its own judges sitting in the first instance, and from the inferior courts. It also exercises a supervisory and corrective jurisdiction over inferior courts and magistrates. A final appeal

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[a] 43 Vic., No. 23, sec. 19. [b] 31 Vic., No. 12. [c] 37 Vic., No. 15.

[d] 31 Vic., No. 12, sec. 8. Boroughs include city or suburban or populous country districts, having a population of at least 1,000; municipal districts include incorporated districts, not being boroughs, but comprising a population of not less than 500.

[e] 37 Vic., No. 15, sec. 10. [f] As to the municipal franchise, see sec. 52.

[g] 31 Vic., No. 12, sec. 117. [h] Of these the most important is 43 Vic. No. 3.

[i] That is in its present form. A Supreme Court had been established in 1814; but both its constitution and jurisdiction differed from that of the present Court.

[j] 9 Geo. IV, ch. 83; 2 and 3 Vic., ch. 70; 4 Vic., No. 22; and other statutes subsequently referred to.

[k] Constitution Act, sec. 39; *see* also Memorandum of Privy Council (6 Moo. P.C.C., N.S. App.)

[l] Constitution Act, sec. 40. [m] 17 Vic., No. 21; 20 Vic., No. 31; 24 Vic., No. 6.

[n] 44 Vic., No. 18. [o] 54 Vic., No. 25. [p] 36 Vic., No. 9; 55 Vic., No 37. [q] 51 Vic., No. 19.

lies to the Judicial Committee of the Privy Council—(1) in certain cases specified by the Orders in Council,[a] and (2) in other cases by special leave of the Council. Besides the Supreme Court there is also a system of local Land Boards and a Land Court of Appeal[b] as well as a Vice-Admiralty Court.[c] The inferior Courts include—(1) The District Courts, which exercise an inferior civil jurisdiction;[d] (2) The Courts of General and Quarter Sessions, which exercise a subordinate criminal jurisdiction and are presided over by a District Court Judge as chairman[e]; and (3) the Magistrates' courts, which exercise a petty jurisdiction both in civil and criminal cases.[f] The magistrates of the Colony include—(1). Stipendiary Magistrates, who are appointed to act within the metropolitan district; (2) Police Magistrates, who are appointed to act at different places throughout the Colony; and (3) Honorary Justices of the Peace. The system of jury trial has been adopted in the Colony and applies to the trial of all criminal offences except those punishable by courts of summary jurisdiction; as well as to civil issues of fact or damages triable before the Supreme Court at common law. In other cases the adoption of this mode of trial is made to depend sometimes on the consent of the judge,[g] sometimes on the agreement of the parties,[h] and sometimes on a claim to this effect being made by either party.[h] There is no grand jury in the Colony, the functions of that body being performed by the Attorney General.

The Laws of the Colony.

The laws in force in the Colony may be classed, according to their origin, under three heads:—(1) Rules of English law, which became applicable to the Colony, either at the date of the original settlement, or by virtue of 9 Geo. IV, c. 83. Under the latter statute, all rules which were then (1828) in force in England, and which were reasonably suited to the circumstances of the Colony, were to be applied in the administration of justice.[i] These rules are, however, capable of being altered, and have to a large extent been altered by local legislation.[j] (2) The Imperial law, which includes such Acts of the Imperial Parliament as apply to the Colony either by express enactment or necessary implication, together with orders and conventions made in pursuance of them.[k] Rules derived from this source cannot be altered by the local Legislature, except under express powers conferred by Imperial Act.[l] (3) The Colonial law, which includes rules derived either from colonial legislation or the interpretation of the local courts, together with a slight element of local usage. Even the colonial law, however, embraces many rules of English

[a] 13th Nov., 1850; 13th June, 1853. [b] 48 Vic., No. 18; 50 Vic., No. 21.
[c] 26 and 27 Vic., ch. 24; 31 Vic., ch. 45. [d] 22 Vic., No. 18 and Amending Acts.
[e] 22 Vic. No. 18, sec. 25.
[f] The jurisdiction of the magistrate in criminal cases is regulated by 11 and 12 Vic., ch. 42 and 43; and in civil cases by 10 Vic. No. 10.
[g] 44 Vic., No. 18, sec. 36. [h] 48 Vic., No. 7, sec. 9. [i] 9 Geo. IV, ch. 83, sec. 24.
[j] Thus the devolution of land upon intestacy has now been assimilated to that of personalty; *see* 26 Vic., No. 2; 54 Vic., No. 25, sec. 32.
[k] Some of the Imperial Acts apply to the Colony alone, such as 18 and 19 Vic., c. 54; some to the Australasian Colonies generally, such as the Australian Colonies Duties Act, 1873; and some to all British territory, such as the Foreign Enlistment Act of 1870.
[l] For an illustration of the bestowal of this power *see* the Merchant Shipping Act, 1854, sec. 547.

origin, some of these having been directly adopted, whilst others have been embodied with modifications in Acts of the colonial Legislature. Much colonial legislation, however, is of an original character, having been framed to meet the peculiar conditions and requirements of the Colony. Amongst other things, a system of registration of titles to land has been established,[a] as well as a system of registration of deeds;[b] whilst the old distinction between the devolution of real and personal property in intestacy has been abolished.[c]

Naturalization—Chinese.

The subject of naturalization is governed by the local Naturalization Act of 1875, under which any alien who has resided in the Colony for five years and intends to continue such residence, may on complying with certain conditions and paying a small fee obtain from the Governor through the Chief Secretary a certificate of naturalization.[d] He will then become entitled (although only within the Colony) to all the rights, and will be subject to all the obligations of a natural born English subject.[e] Naturalization in the United Kingdom or in any other Colony does not extend to New South Wales, but special facilities are afforded to persons who have been so naturalized of obtaining naturalization certificates in New South Wales.[f] Aliens, whether domiciled within the Colony or not, are virtually entitled to all civil rights except (1) political or public rights, and (2) the right of being registered as owners of British vessels.[g] The immigration of Chinese, however, is subject to certain restrictions imposed by the Chinese Restriction and Regulation Act of 1888. By this Act a poll-tax of £100 is imposed on every Chinese entering the Colony; vessels arriving in the Colony are prohibited from bringing more than one Chinese for every 300 tons of tonnage; no Chinese even after entering may engage in mining without the consent of the Minister for Mines; whilst the naturalization of the Chinese in the Colony is altogether prohibited.[h]

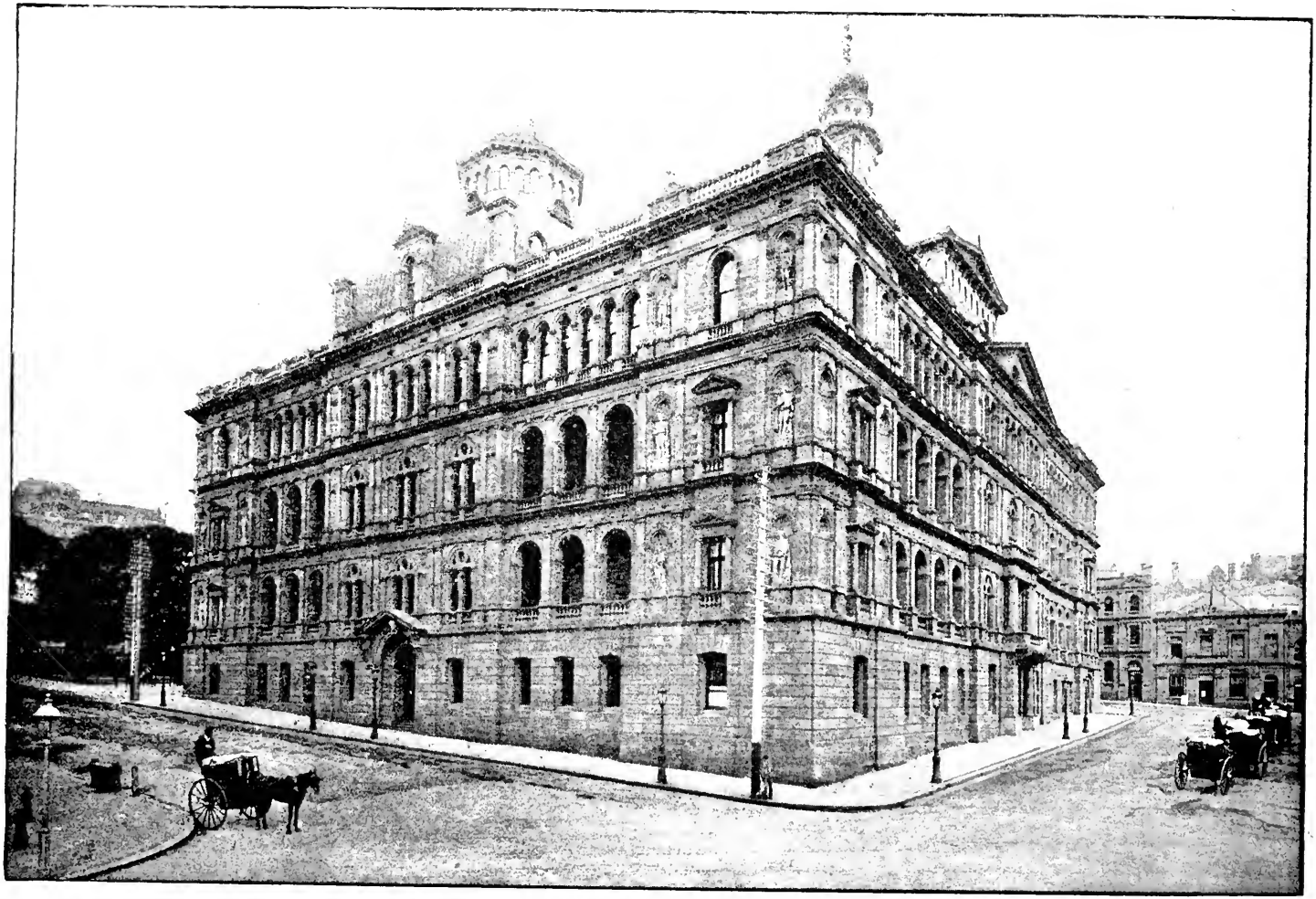
Miscellaneous Points.

The principle of religious equality has long prevailed in the Colony. There is no established church, and all religious denominations remain on the footing of voluntary associations.[i] Notwithstanding the desire of the Imperial Government to maintain, as far as possible, a uniform marriage law, the facilities for divorce have of late been considerably increased by local legislation. Under the present divorce law a wife may obtain a dissolution of marriage by reason of adultery only on the part of the husband,[j] whilst wilful desertion for three years and upwards, habitual drunkenness coupled with cruelty or neglect, or conviction for certain offences will, also, under certain

[a] The Real Property Act, 1862, and Amending Acts.
[b] 7 Vic., No. 16; 20 Vic., No. 27; 24 Vic., No. 7.
[c] Probate Act, 1880, sec. 32. [d] Naturalization Act, 1875, secs. 4 and 5.
[e] *Ib.*, sec. 6. [f] *Ib.*, sec. 8. [g] *Ib.*, sec. 3.
[h] Chinese Restriction Regulation Act of 1888, sub-sec. 3 to 8 and 11; but for exemptions, *see* secs. 12, 13, and 15.
[i] As to the position of the Anglican Church in the Colony, *see* Todd, ch. XIII.
[j] 44 Vic., No. 31, sec. 1; subject to the husband being domiciled in the Colony at the time of the suit.

circumstances, constitute a sufficient ground for divorce.[a] The provisions of the Extradition Act of 1870, and the treaties entered into thereunder, apply in the Colony, subject to certain differences in the mode of procedure.[b] The surrender of criminals as between British possessions in general, and between the Australasian colonies in particular, is governed by the Fugitive Offenders Act, 1881.[c] A system of judicial co-operation has also been established, under which facilities are given, as between adjacent colonies, for the mutual furtherance of judicial proceedings, and the mutual enforcement of judgments.[d]

[a] 55 Vic., No. 37, sec. 1; only the general purport of the section is given above.
[b] 33–34 Vic. ch. 52, secs. 17 and 18. [c] 44–45 Vic., c. 69.
[d] See, as regards N.S.W., 19 Vic., No. 12; 52 Vic., No. 23; 44–45 Vic., c. 69, sec. 15.



THE LANDS OFFICE.

The Laws Relating to Crown Lands.

By H. A. G. Curry, Department of Lands.

It may be at least claimed for the laws relating to Crown lands of New South Wales that they are characterised by liberality and comprehensiveness, and it is a fact deserving of more than passing mention that each succeeding enactment exhibits broader and more generous provisions than any of its predecessors. In Parliament no subject excites keener or more general interest than land legislation, and its importance is so widely recognised as to ensure the fullest possible consideration and criticism. The growth of the present body of laws has been rapid, and is an evidence both of the desire and the determination of successive Governments to keep pace with the ever-varying requirements, which are a necessary consequence of the progressive conditions, of the Colony. In the year 1884 the Acts then in force* were repealed, and the "Crown Lands Act of 1884"† by which they were superseded has since been amended and largely supplemented by the "Crown Lands Act of 1889"‡ and the "Crown Lands Act of 1895,"§ leaving out of account a large number of intermediate Acts of more or less importance. Prior to the commencement of the Act of 1884 the provisions of the law were somewhat indiscriminately operative over the unsold land of the whole Colony. One of the features of that Act was the modification of this condition of things by the separation of the Colony into three divisions, termed respectively the Eastern, the Central, and the Western, in connection with each of which the provisions of the law were made to differ; and by an alteration of the tenure under which pastoral leases had previously been held. Happily the Crown Lands Act of 1895—an Act wide in its scope and partaking more of the character of an original than of an amending measure—has followed with a long-desired provision which admits of the classification and survey of land before selection. Such a provision is well calculated to prevent the complications and delay which experience has shown to be almost inseparable from unsurveyed land being applied for without due regard to conflicting interests or to the question whether

* The principal of these were the Crown Lands Alienation Act of 1861, the Crown Lands Occupation Act of 1861, the Lands Acts Amendment Act, 1875, and the Lands Acts Further Amendment Act, 1880. The Acts of 1861 were known as the late Sir John Robertson's Acts. The Act of 1875 was introduced by the late J. S. Farnell, and the Act of 1880 by Mr., now the Hon. James Hoskins, M.L.C.

† Introduced by the late James Squire Farnell. Took effect from 1st January, 1885.

‡ Introduced by the Hon. James Nixon Brunker (now Colonial Secretary), when Minister for Lands in Sir Henry Parkes' Government.

§ Introduced by the Hon. Joseph Hector Carruthers, Minister for Lands in the present Government. The Hon. G. H. Reid, Premier, 1896.

Note.—It should not pass unmentioned that Mr. Henry Copeland, M.P., and the late Mr. Garrett were both associated with important proposals of land legislation.

the land is legally available, while at the same time it affords protection to the public estate against indiscriminate absorption in detached portions without reference to any general symmetry of design.

Administration.

The head office of the Department of Lands and Survey is in Sydney, and is presided over by the Minister for Lands—the permanent head of the Department being the Under-Secretary for Lands.* Branches of the Department are now situated in various parts of the Colony. Prior to 1885 the whole business of the Department was dealt with at the head office, but during that year it was largely decentralised by the calling into existence of local Land Boards. Each Board is presided over by a Chairman, who is a salaried officer of the Government, his coadjutors, of whom there are two, being local residents, remunerated by fees. At the head office of each Board a District Surveyor and a staff of clerks and draftsmen are employed, besides whom are surveyors and other field officers located elsewhere within the boundaries which mark the Board's jurisdiction. Applications for certain classes of holdings, such as Homestead Selections, Conditional Purchases, Conditional Leases, &c., come before the Board in the first instance for investigation, and applicants are not entitled to finally (though in some cases they may provisionally) take possession of the land applied for until their applications have been what is termed "Confirmed" by the Board. Against a Board's decision an appeal lies to a Land Appeal Court, which consists of a President and two Commissioners.

Each Board District includes several smaller districts, called Land Districts (for each of which, however, there is a separate Board), which have been established for the convenience of the public. In each district a Crown Lands Agent is stationed, whose duty is to supply information to persons seeking land, and to receive applications, deposits, and other payments under the Crown Lands Acts.

At the head office in Sydney an Information Bureau is in existence, where the fullest and latest particulars as to the situation of available land in the Colony, and the prices and conditions under which it may be taken up, are always obtainable.

Reserves, Dedications, &c.

The Governor is invested with large powers of temporarily reserving Crown lands either from sale or lease generally, or from any specific kind of sale or lease. Reservation takes effect immediately upon notification in the *Government Gazette*. Revocation of reservation does not mature until the expiration of sixty days after *Gazette* notification.

The purposes of reserves are various: for instance, for water supply, for preservation of timber, for commonage, for the convenience of stock travelling through the country, &c. Reserves of the last-mentioned description may be up to one mile in width, and are associated with camping reserves usually 640 acres in extent.

* William Houston, Esq.

Within one month after *Gazette* notification, an abstract of the reservation is laid before both Houses of Parliament, if in session, or, if not in session, within one month after the commencement of the ensuing session.

The Governor is also invested with the power of dedicating Crown land in such manner as may seem best for the public interest, and he may, if thought necessary, issue a grant in fee-simple and vest the land in trustees. An abstract of any intended dedication has to be laid before both Houses of Parliament before the dedication can be made.

When a Government township or village is laid out, it is usual to define the boundaries of adjoining suburban lands, and beyond these again to define the boundaries of what is called a "population area."

Methods of Disposal of Crown Lands.

The principal methods by which Crown lands are alienated are by Homestead Selection, Conditional Purchase, Purchase by virtue of Improvements, and Purchase at Auction. The principal methods under which Crown lands are let are by Settlement Lease, Pastoral Lease, Occupation License, Conditional Lease, Homestead Lease, Improvement Lease, Scrub Lease, Lease of Inferior Lands, Annual Lease, Artesian Well Lease, Special Lease, and Residential Lease. It will be convenient to refer to each of these under separate heads.

Limitations as to Selecting.

The intention of the authors of the various Land Acts has been to provide land on easy terms for those who might require it for their own *bonâ fide* use and occupation. Unhappily this intention has been too often disappointed, and the liberal provisions of the law taken advantage of for speculative purposes, and for the aggregation of large estates. To prevent a recurrence of, or to limit, this evil, stringent provisions were necessary. These have been supplied by recent legislation, and may be summed up as follows:—

1. An applicant for a homestead selection, an original conditional purchase, an original homestead lease, or a settlement lease, is debited with the quantity of land already held by him in fee simple or under conditional purchase or conditional lease, and can take up only such an area, as, added to that already held, will keep within the maximum area allowed for the holding applied for. Provision is made against defeat of this restriction by any fraudulent transfer.
2. A person who shall obtain a homestead selection, an original conditional purchase, an original homestead lease, or a settlement lease, will be precluded from obtaining any further holding of any of these four classes unless he has obtained a certificate that adverse circumstances compelled him to abandon or surrender his holding.
3. If his holding consists of a homestead lease or a settlement lease, the disqualification will, however, in any circumstances cease when the term with which the lease started shall have run its full course.

Every application of any of the classes referred to is required to be made in good faith, and an application is not taken to be made in good faith unless the sole object of the applicant is to obtain the land in order that he may hold and use it for his own exclusive benefit according to law.

Qualifications to Select.

A person of, or over, the age of 16 years (of either sex) may make a Conditional Purchase or Homestead Selection, but no person under the age of 21 years can apply for any lease other than a Conditional Lease, or in certain circumstances a Homestead Lease. For the last mentioned lease a minor may apply if not less than 16 years of age and of the male sex. Minors, so far as concerns their transactions in connection with certain holdings under the Crown Lands Acts, enjoy the rights, and are subject to the liabilities, of persons of full age.

A person who is not a naturalised subject of Her Majesty is debarred until he obtains letters of naturalisation, or until he has resided in New South Wales for twelve months, and then at the date of application he must lodge a declaration of his intention to become a naturalised subject within five years from that date.

Married women are disqualified unless they are judicially separated and actually living apart from their husbands.

Homestead Selection.

The Homestead Selection system owes its introduction to the Crown Lands Act of 1895, and offers special advantages to the small capitalist, inasmuch as the land may be held for the first five years at the extremely low rental of 1¼, and thereafter at an annual rental of 2½ per cent. of its capital value. The rental period dates from the date of confirmation of the application by the Local Land Board, and the rent is payable in advance half-yearly. The initial capital value is determined and advertised before the land is thrown open, and is not susceptible of alteration for the first fifteen years. For every subsequent period of ten years the land is revalued by the Local Land Board, a fresh appraisement being necessary for each decade. It is important to note that no minimum value is fixed by law, and it is thus made possible from the beginning, and throughout, to accommodate the rent to actual and changing values, an advantage which, during a period of depreciation, must necessarily be felt by the land owner. Land before being made available for Homestead Selection (and there is no restriction as to the division of the Colony in which it may be situated), is ascertained to be suitable for the purpose, and is measured into blocks, estimated to be each sufficient for the maintenance of a family, not, however, in any case exceeding 1,280 acres in extent; but, for the convenience of town residents, lands within easy distances of their places of business, are sometimes made available in comparatively small areas. After a given date (which is notified in the *Government Gazette*) the land may be obtained on application to the local Crown Land Agent, the earliest applicant having the right to the block which he may have chosen. Where

two or more applications happen to be tendered simultaneously for the same block, the Land Agent determines their priority by ballot.* At the time of application one half year's rent and one third of a fee charged for survey (see appended scale) have to be deposited. Payment of the balance of the survey fee is spread over the first two years, one half of such balance being payable within the first, and the other half within the second twelve months after confirmation. To illustrate the foregoing:—If a block of 640 acres (1 square mile) should be advertised at £1 per acre, or £640 in all—but it should be mentioned here that land is frequently thrown open at prices considerably below this—the first annual rent would be £8, and the survey fee £8 1s. 3d. Of the former £4, and of the latter £2 13s. 9d. (*i.e.* £6 13s. 9d. in all) would be required at the time of application. This initial expense will be recognised as small, and it will be seen that the selector is not called upon afterwards to expend any but a nominal sum in improvements. All that the law requires in this connection is that he shall within the first eighteen months after confirmation of his application erect a dwelling house worth at least £20. A condition of perpetual residence, commencing within three months after date of confirmation of the application, however, attaches to the holding, the object of which is to secure that the land shall be used for its intended purpose, and as a salutary check against, what has hitherto been, a prevailing tendency to take advantage of the law for merely speculative purposes. To such purposes a short definite term of residence has, unfortunately, hitherto been found to lend itself, land freed from all but monetary obligations being readily taken over.

Should the land selected contain improvements at the date of application, the Selector is required to pay for them in four equal yearly instalments, with interest at 4 per cent. per annum.

The title of a homestead selection is a freehold one, but the issue of a grant in fee simple is deferred for five years, and during this term the land cannot be transferred. The issue of the grant is contingent upon the Land Board granting a certificate that the conditions attaching to the selection have, up to the time of inquiry, been properly fulfilled. The grant contains provisions for "the annual payment by the grantee, his heirs, and assigns for ever of a perpetual rent; the performance by the grantee, his heirs, and assigns for ever of an obligation to live upon the homestead selection, having his or their home and place of abode there†; and forfeiture to the Crown of the lands granted in case the obligation to live thereon or to pay any sums due as rent be not duly performed."

The condition of residence may perhaps appear stringent, but it is not inflexible, as before issue of the grant the Local Land Board may grant leave to the selector for a necessary cause, and for such period as may be determined, and, after issue of the grant, the

* This provision as to ballot applies to conflicting applications of all kinds, including applications for Conditional Purchases, Homestead Leases, &c.

† After issue of the grant the minimum period of living on the land may be defined by the Governor by regulations. The period, however, cannot be less than seven months in every year.

Governor, although expressly debarred from abrogating the condition altogether, is invested with the power of granting exemptions from, or relaxation of, its performance in such cases of inability or hardship (such as sickness, &c.) as are likely to arise. No one exemption can operate for a longer period than one year; but as no limitation is placed upon the number of exemptions which may be granted, it follows that an original period of exemption may, if necessity should dictate, be extended by a series of exemptions following one upon the other.

To meet the circumstances of persons who, though anxious to secure a Homestead Selection, may be prevented by their occupations from immediately entering into residence, the law provides that, until issue of the grant, that is during the first five years, the condition may be performed by an approved deputy, on the understanding, however, that when the grant does issue, the selector himself will take over the obligation. In such cases the general conditions differ from those attaching to an ordinary Homestead Selection. The survey fee is payable in full at the date of application, the rent up to the issue of the grant is $3\frac{1}{2}$ instead of $1\frac{1}{4}$ per cent. of the capital value, the dwelling-house has to be worth at least £40 in value, and, in addition, one-tenth of the land has to be in full tillage within three years after the date of confirmation, and one-fifth during the fourth and fifth years after that date.

When a number of selectors comprising not fewer than twenty families desire, for the sake of social conveniences and advantages, to settle together, the Governor may allow their respective conditions of residence to be performed within the boundaries of a village or hamlet adjacent to their selections, subject to such conditions as he may see fit to prescribe.

There is one special advantage conferred upon a homestead selector, which has, so far, not been extended to other purchasers from the Crown. This is protection for his holding. He is at liberty, by a simple process of registration at the office of the local Crown Land Agent, if not in insolvent circumstances at the time, to secure himself against deprivation. His land cannot then be sold under a writ of execution, will not be affected by his bankruptcy, or in any way taken from him for the satisfaction of any debt or liability under process or constraint of law. He himself is precluded from transferring the land while the registration remains unwithdrawn, and the registration becomes inoperative when he ceases to live on the land, or obtains protection for another holding.

A Homestead Selection may be surrendered, in which case the surrenderor is entitled to tenant-right in improvements. Tenant-right may also be conceded in the case of a forfeited Homestead Selection.

Conditional Purchases.

The Conditional Purchase (or, as it is sometimes called, the Free Selection) System, dates back to the year 1861. As the words imply, a conditional purchase is a purchase in fee simple subject to the fulfilment of certain conditions. These conditions include residence for a term

of ten years, the fencing or other improvement of the land, and the payment by annual instalments of the purchase money with interest at 4 per cent. per annum. A conditional purchase may be of land in the Eastern or Central Divisions, and may comprise unreserved country land not held under pastoral or other lease. The fact of land being held under annual lease or occupation license and containing improvements is not a bar to purchase, nor is survey or classification of the land a necessary preliminary. If an applicant selects land containing improvements, he accepts an obligation to pay for them, but payment is usually spread over a period and arranged for in instalments. In either of the divisions mentioned the minimum area is 40 acres, the maximum area being in the Eastern Division 640 and in the Central Division 2,560 acres. The maximum areas referred to may be acquired by degrees at intervals, that is to say, the selector may take up a comparatively small area at first, and gradually supplement it by what are called additional purchases.

Land applied for under conditional purchase is ordinarily taken at a statutory price of £1 per acre, but the law contains a provision for the setting apart of what are termed Special Areas (which may be in the Western as well as in either of the two divisions already mentioned), and the price of land within these may be fixed at 30s. per acre and upwards. A conditional purchase within a special area cannot exceed 320 acres in the Eastern or 640 acres in the other divisions, and in the Eastern Division carries no right to a conditional lease. One feature with respect to special areas is that they may include land within suburban or population boundaries, but it is to be understood that the minimum and maximum areas of all special area conditional purchases, whether within suburban or population area boundaries, or not, are governed by the terms of the proclamation setting them apart.

With an application (which has to be made to the local Crown Lands Agent) for a conditional purchase of ordinary land, a deposit of 2s. per acre and a survey fee according to the appended scale are required. No other payment to the Crown is necessary for three years. At the end of the third year from the date of application an instalment of 1s. an acre is due, and thereafter a like instalment is payable annually. Three months' grace is allowed for the payment of each instalment. The deposit and the first instalment are wholly devoted to reduce the debt, interest not being charged for the first three years. The balance, after payment of the first instalment, is therefore 17s. per acre. Out of each succeeding instalment interest is taken and the residue credited in reduction of the debt. The interest is computed on the balance as reduced from year to year, and is, consequently, a diminishing quantity. Under this system it takes thirty instalments of 1s. per acre, together with the original deposit, to clear off the debt; but the holder of the land may, after he has obtained a certificate from the Local Land Board that he has fulfilled his conditions, pay off two or more instalments, or the whole of his balance according as it suits his convenience.

On a conditional purchase within a special area a deposit of 10 per cent., and annual instalments, each 5 per cent. of the price of the land, are required. A survey fee is payable at the date of application.

The following is a complete illustration of the method of payment referred to. The figures refer to a conditional purchase of 40 acres applied for on the 3rd September, 1891, at £1 per acre :—

Payments.	Date when Instalment due (three months' grace allowed for payment).	Interest taken out of Instalment.	Portion of Payment taken to reduce the Balance.	Balance.	Amount upon which the Interest is computed.	Period of Interest.
£ s. d.		£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Deposit.						
4 0 0	on application.	.....	4 0 0	36 0 0	.....	
Instalments.						
2 0 0	3 Sept., 1894	Nil.	2 0 0	34 0 0	.....	
2 0 0	3 ,, 1895	1 7 2	0 12 10	33 7 2	34 0 0	3 Sept., 1894, to 3 Sept., 1895
2 0 0	3 ,, 1896	1 6 9	0 13 3	32 13 11	33 7 2	3 ,, 1895, to 3 ,, 1896
2 0 0	3 ,, 1897	1 6 2	0 13 10	32 0 1	32 13 11	3 ,, 1896, to 3 ,, 1897
2 0 0	3 ,, 1898	1 5 7	0 14 5	31 5 8	32 0 1	3 ,, 1897, to 3 ,, 1898
2 0 0	3 ,, 1899	1 5 0	0 15 0	30 10 8	31 5 8	3 ,, 1898, to 3 ,, 1899
2 0 0	3 ,, 1900	1 4 5	0 15 7	29 15 1	30 10 8	3 ,, 1899, to 3 ,, 1900
2 0 0	3 ,, 1901	1 3 10	0 16 2	28 18 11	29 15 1	3 ,, 1900, to 3 ,, 1901
2 0 0	3 ,, 1902	1 3 2	0 16 10	28 2 1	28 18 11	3 ,, 1901, to 3 ,, 1902
2 0 0	3 ,, 1903	1 2 5	0 17 7	27 4 6	28 2 1	3 ,, 1902, to 3 ,, 1903
2 0 0	3 ,, 1904	1 1 10	0 18 2	26 6 4	27 4 6	3 ,, 1903, to 3 ,, 1904
2 0 0	3 ,, 1905	1 1 1	0 18 11	25 7 5	26 6 4	3 ,, 1904, to 3 ,, 1905
2 0 0	3 ,, 1906	1 0 3	0 19 9	24 7 8	25 7 5	3 ,, 1905, to 3 ,, 1906
2 0 0	3 ,, 1907	0 19 6	1 0 6	23 7 2	24 7 8	3 ,, 1906, to 3 ,, 1907
2 0 0	3 ,, 1908	0 18 8	1 1 4	22 5 10	23 7 2	3 ,, 1907, to 3 ,, 1908
2 0 0	3 ,, 1909	0 17 10	1 2 2	21 3 8	22 5 10	3 ,, 1908, to 3 ,, 1909
2 0 0	3 ,, 1910	0 17 0	1 3 0	20 0 8	21 3 8	3 ,, 1909, to 3 ,, 1910
2 0 0	3 ,, 1911	0 16 0	1 4 0	18 16 8	20 0 8	3 ,, 1910, to 3 ,, 1911
2 0 0	3 ,, 1912	0 15 1	1 4 11	17 11 9	18 16 8	3 ,, 1911, to 3 ,, 1912
2 0 0	3 ,, 1913	0 14 1	1 5 11	16 5 10	17 11 9	3 ,, 1912, to 3 ,, 1913
2 0 0	3 ,, 1914	0 13 0	1 7 0	14 18 10	16 5 10	3 ,, 1913, to 3 ,, 1914
2 0 0	3 ,, 1915	0 12 0	1 8 0	13 10 10	14 18 10	3 ,, 1914, to 3 ,, 1915
2 0 0	3 ,, 1916	0 10 10	1 9 2	12 1 8	13 10 10	3 ,, 1915, to 3 ,, 1916
2 0 0	3 ,, 1917	0 9 7	1 10 5	10 11 3	12 1 8	3 ,, 1916, to 3 ,, 1917
2 0 0	3 ,, 1918	0 8 6	1 11 6	8 19 9	10 11 3	3 ,, 1917, to 3 ,, 1918
2 0 0	3 ,, 1919	0 7 2	1 12 10	7 6 11	8 19 9	3 ,, 1918, to 3 ,, 1919
2 0 0	3 ,, 1920	0 5 11	1 14 1	5 12 10	7 6 11	3 ,, 1919, to 3 ,, 1920
2 0 0	3 ,, 1921	0 4 6	1 15 6	3 17 4	5 12 10	3 ,, 1920, to 3 ,, 1921
2 0 0	3 ,, 1922	0 3 1	1 15 11	2 0 5	3 17 4	3 ,, 1921, to 3 ,, 1922
2 0 0	3 ,, 1923	0 1 7	1 18 5	0 2 0	2 0 5	3 ,, 1922, to 3 ,, 1923

A conditional purchase holder who may, for any year, be unable to pay his instalment may obtain the Minister's permission to suspend payment, in which case the interest alone is payable, or may itself remain unpaid, and become part of the original debt. During the period of suspension the holder must reside on the land.

If of, or over, an area of 100 acres a conditional purchase may be subdivided, and the balance paid up on one or more of the blocks into which the land has been subdivided.

In certain circumstances a conditional purchase may be converted into a homestead selection.

An original conditional purchase cannot be transferred until the conditions of the first five years are certified to have been fulfilled.

Conditional Lease.

Any applicant for, or holder of, a conditional purchase applied for since the 1st January, 1885, is entitled to hold adjoining land under conditional lease. With an application for a conditional lease a deposit of 2d. per acre and a survey fee as for an additional conditional purchase are payable. A conditional lease may comprise up to three times the area of the purchase by virtue of which it is applied for, and the total area of conditionally purchased and conditionally leased land may reach 1,280 acres in the Eastern, and cannot exceed 2,560 acres in the

Central Division. The lease has a term of twenty-eight years, subject to payment of an annual rent as appraised by the Land Board, and to the fulfilment of such conditions as apply to an additional conditional purchase. Pending appraisement of rent, a provisional rent of 2d. per acre is payable. The rent, which is calculated from the date of application having regard to the fact that the lessee may enter into immediate occupation, is payable annually in advance, and is subject (on the application of the lessee or at the instance of the Minister) to reappraisement at the expiration of fifteen years, the new rent applying to the balance of the term. The lessee is entitled to convert his lease wholly or partly into an additional conditional purchase at any time during its currency, and to continue to hold the balance under lease. Although, therefore, in the Eastern Division a conditional purchase cannot be applied for in excess of 640 acres, double this area may be secured by the agency of a conditional lease.

Tenant-right in improvements is given to the last holder of an expired lease, and the Governor may concede it where the lease has been forfeited or surrendered.

Condition of Residence attached to Conditional Purchases and Conditional Leases.

The term of residence is computed so as to expire ten years from the date of application, and although the applicant may enter into residence immediately, he is not required to do so until his application has been confirmed by the Land Board. He then has three months' grace to do so. Residence is defined as "continuous and *bonâ fide* living on the land as the holder's usual home without any other habitual residence."

A separate condition of residence attaches to every additional conditional purchase or conditional lease, but in this connection certain qualifications have to be pointed out.

An original conditional purchase and any additional conditional purchases and conditional leases of the same series are treated as one holding, so that no alteration of the original *place* of residence is necessary.

The new condition of residence is abrogated altogether so long as the additional conditional purchase or lease is held by the same person who applied for the original conditional purchase; but this exemption will not apply if the holder has previously taken up or is the owner under conditional purchase or conditional lease of 1,280 acres in the Eastern Division, 2,560 acres in the Central Division, or 1,920 acres partly in two or more divisions.

Even although the holder of the additional conditional purchase or lease may not be identical with the original selector, if he has, prior to taking up the additional area, been continuously resident on the earlier selections, his previous term of residence will be calculated in reduction of the new term, but in no case will he receive credit for more than five years.

These provisions are calculated to relieve the *bonâ fide* resident from unnecessary conditions, while at the same time they provide a check

against non-residential holders of large areas of conditionally purchased land extending their holdings, to the exclusion of selectors willing to take up land to make their homes thereon.

Where a parent and child hold land under conditional purchase or conditional lease adjoining each other, the child may continue to reside with the parent until the age of 21 is reached in the case of a boy, or 24 in the case of a girl.

In the case of an unmarried man and an unmarried woman holding incomplete conditional purchases, and then marrying before the completion of the term of residence, they are permitted to reside for the balance of the term on either one of the holdings.

The condition of residence on any conditional purchase may be suspended by the Local Land Board for a definite period in case of illness, drought, or for other sufficient cause.

Condition of Fencing or Improvement.

Land held under conditional purchase or conditional lease has to be fenced in within three years from the date of confirmation of application; but the selector may dispense with fencing, provided that he effects substantial improvements to the value of 6s. per acre within the first three years after the date of confirmation, and brings their value up to 10s. per acre within the next two succeeding years. In no case, however, need the expenditure exceed £384 within the first, or £640 within the second term. In other words, no greater expenditure is required on 2,560 acres in the Central Division than on 1,280 acres in the Eastern Division.

Conditional purchases and conditional leases held by a parent and child may without the imposition of any extra conditions be enclosed together with a ring fence.

Local Land Boards are empowered to extend the period for fencing in any case, and in case of illness, &c., &c., to suspend the condition of fencing or improvements.

Non-residential Conditional Purchases.

Provision is made for conditional purchases exempt from any condition of residence. The minimum area is 40, the maximum area 320 acres.* The price, deposit, and annual instalments are double those which would be payable for the same land if taken up under residential conditions. This does not apply to the survey fee. Within twelve months after the date of confirmation of the application the land must be fenced, and within five years from that date improvements (excluding the fencing) have to be made to the value of £1 per acre. With the permission of the Land Board the fencing may be dispensed with, in which case the improvements within the five years referred to are required to be of the value of £1 10s. per acre. Anyone who has made any conditional purchase is disqualified from making or holding a non-residential conditional purchase; and the making of a non-residential conditional purchase disqualifies the conditional purchaser from at any

* If the land is within a special area the maximum area is limited by the terms of the proclamation.

time thereafter making either a residential or another non-residential conditional purchase, unless the latter is necessary to enable him to reach his maximum area. A non-residential conditional purchase does not carry a right to a conditional lease.

Auction Sales.

Crown lands may be sold by auction without conditions; but from considerations of policy the law provides that during any one year not more than 200,000 acres shall be disposed of by this method. Town and suburban lands are for the most part disposed of in this manner. Lands are put up in blocks, each not exceeding ½ acre in the case of town lands, 20 acres in the case of suburban lands, and 640 acres in the case of country lands. The blocks are offered at upset prices, which necessarily vary according to their situation and advantages; but such upset prices cannot be lower than for town lands £8 per acre, suburban lands £2 10s. per acre, and country lands £1 5s. per acre.

In all cases a deposit of 25 per cent. is payable by the purchaser at the time of sale. The balance, in ordinary circumstances, is payable within three months; but in the case of town or suburban lands, or portions not exceeding 20 acres, the Minister may submit the land to sale on deferred payments, in which case the balance is spread over a fixed period (not exceeding five years), and is payable in annual instalments with 5 per cent. interest.

Town or suburban land, or land within a population area, which has passed at auction may be applied for at the upset price. A deposit of 25 per cent. of such upset price is payable at the time of application, the balance being payable on the terms fixed for the auction sale.

Purchases by Virtue of Improvements on Gold-fields.

The discovery of gold naturally attracts a large population to the locality, and is frequently followed by the setting out of a town with suburban and population limits. Under the provisions of the Mining Act, persons are authorised to occupy small areas for residential or business purposes; and these areas they are permitted—under the Crown Lands Act—to purchase in fee-simple by virtue of the improvements.

Application is made to the Local Crown Lands Agent with a deposit of £1, and a survey fee of £1.

The holders must be in residence on the land; but the place of residence, though it must be of substantial materials, need not exceed a few pounds in value. Indeed, so far as the actual requirements of the Land Act are concerned, it will be sufficient if the improvements should be of the value of £8 per acre on town, and £2 10s. on other lands. The purchasable areas cannot exceed ¼ acre of town lands, or 1 acre of other lands. The value of the land is subject to appraisement by the Local Land Board, but cannot go below £8 per acre for town land, and £2 10s. per acre for other lands, or for any block containing less than 1 acre. The purchase money is payable within three months after notification in the *Government Gazette* that the purchase has been approved.

Settlement Leases for Agricultural or Grazing Purposes.

The settlement lease system, like that of homestead selection, is of recent origin, and is a further attempt to place land within easy reach of the small capitalist. The land does not become available until after classification and survey, but there is no restriction as to the division of the Colony in which it may be situated. The quantity of land which may be taken up is regulated by the size of the farms into which the land may be subdivided. Where the land is suitable for agriculture a farm cannot exceed 1,280 acres; but where it is suitable for grazing a farm may contain up to 10,240 acres. Before being thrown open, the capital value of the land is determined and the lease is subject to an annual rent (not susceptible of alteration) of 1¼ per cent., or 3d. in the £, of this capital value. Application has to be made to the Local Crown Lands Agent, and with the application a deposit of one half-year's rent and a survey fee according to the appended scale are required. The application has to be considered by the Land Board, and after it has been confirmed the granting of the lease is a matter for the Governor. The lease has a term of twenty-eight years.

In addition to payment of rent, the conditions of the lease are: That the lessee shall pay the value of improvements which may be on the land at date of application, either in one sum or in three equal yearly instalments, with interest at 4 per cent. per annum; that he shall reside on the farm and make it his *bonâ fide* residence during the whole term; that he shall fence it within five years; that he shall not assign or sublet without the Minister's consent; and that he shall conform to any regulations made by the Minister with respect to keeping the farm clear of rabbits or other noxious animals, and also to clearing the farm of scrub and noxious weeds.

Upon the expiration of the full term of the lease the last holder is given tenant-right in improvements, and during the last year of the lease the holder may convert 1,280 acres into a homestead selection.

Pastoral Leases and Occupation Licenses.

Up to the year 1885 the whole of the unsold lands outside town and suburban limits were, broadly speaking, held under pastoral lease.* Lessees, however, although they nominally held for a term of years, had no security of tenure, inasmuch as the land could be disposed of by the Crown in various ways, and was open to the selector on any Thursday. Lessees possessed the privilege of buying portions of the land by virtue of such permanent improvements as they had effected, but this was found to invite artificial expenditure on their part, and the privilege, in fact, came to be limited, and at last abolished, by law. In the meantime they had yielded to the temptation of securing parts of their runs by purchase at auction, and indirectly by conditional purchase—a course which, no doubt, was in some measure induced by the fact that speculative selection directed against their interest had come to be somewhat freely indulged in. It has thus happened that most pastoral properties at the present day consist of a proportion of

* It has not been thought necessary here to make any special reference to what were called the first-class settled districts in which the land was held under annual lease.

freehold, conditionally purchased, and leasehold land, and indeed, at the present time, many extensive runs practically consist wholly of lands which have passed out of the possession of the Crown.

After the Act of 1884 came into operation every pastoral holding in the Colony was subdivided.* The lessee was left in occupation of the whole area under new rentals, but his tenure of one-half differed entirely in character from his tenure of the other. Of one (called the Leasehold Area) he was granted a lease for a definite term and without risk of disturbance. Of the other (called the Resumed Area) he was granted an occupation license, renewable annually, but as the land has remained open to the public under the various provisions of the Crown Lands Acts the area over which the license operated has been liable to constant diminution. This is characteristic of all occupation licenses, including those that may come into existence in future, as well as those in existence now.

Leases in the Eastern Division were granted for five years, those in the Central Division for ten years, and those in the Western Division for fifteen years.

The Eastern leases expired in the year 1890, and the land is for the most part held under occupation license, a preferential right to which was granted to the outgoing lessees, together with ownership in improvements

The Central leases expired in 1895, but by virtue of a provision of the Act of 1889 some of the lessees by improving their holdings earned, and are now in the enjoyment of, an additional term which varied in different cases from less than one up to five years. Such outgoing lessees as did not apply for, or did not obtain, or withdrew their applications for, an extension of lease were entitled to remain in occupation of the land on the same terms as outgoing lessees in the Eastern Division.

In connection with these extended leases the Crown, on the expiration of the lease, will claim all improvements made before the 1st June, 1895, taking them as the price paid by the lessee for his extended term; but such as may be made subsequently will, if the Crown's permission to their being effected be first sought and obtained, be treated as the property of the lessee upon his continuing in occupation of the land under occupation license, a preferential right to which is given him to exercise.

With respect to the Western leases the term of fifteen years was by the Act of 1889 converted, on application by the holders, into a new term of twenty-one years, and by the Act of 1895 an additional term of seven years has been added. This term of twenty-eight years dates from the year 1890, and is divisible into seven-year periods, the rent applicable to each period being subject to reappraisement.† On the expiration of the term of a western lease, the last holder is given tenant right in improvements. During the last year of the lease 640

* A few holdings were not subdivided on account of their limited area, the whole of which then became a Leasehold Area.

† Under the Act of 1895 holders of Pastoral leases in the Western Division have been allowed to apply for an immediate reappraisement, which includes the balance of the current seven-year period and the succeeding seven-year period.

acres may be applied for under Homestead Selection. There is now a provision in the Act of 1895 under which a resumed area in the Western Division may be re-attached to the leasehold area.

It will be understood from the foregoing that the term of the new pastoral leases brought into existence under the Act of 1884 varied with the situation of the land, being shortest in the Eastern, longest in the Western, and of intermediate duration in the Central Division. In this way a progressive supply of land was kept up extending from the coast to the interior, and a further provision has been made in the Act of 1895 for withdrawing land from pastoral lease in either the Central or Western Division, the lessee obtaining by way of compensation an extension of lease of the residue of the leasehold, proportioned to the area withdrawn, and a right to a preferential occupation license of the land withdrawn. In the case of a Central Division lease up to one-half, and in the case of a Western Division lease up to one-eighth of the area may be resumed.

No conditions attach to a pastoral lease or occupation license other than the payment of rent annually in advance.

The Minister may direct a re-appraisement of the rent of an occupation license at any time.

Homestead Leases.

A Homestead Lease is confined to land in the Western Division, and may be applied for over vacant land, or land held under occupation license, but must in either case be outside the limits of a town, or its suburban or population area. The lease is for grazing purposes, and offers an invitation to the small pastoralist. The minimum area is 2,560 acres, the maximum area 10,240 acres. Application has to be made to the local Crown Lands Agent, and at the time of application a deposit of 1d. per acre is payable, together with £10 towards cost of survey. The application is subject to consideration and recommendation by the Land Board, by whom also the rent is appraised. The granting of the lease devolves upon the Governor. The approval of the lease is notified in the *Gazette*, and within sixty days thereafter the balance of cost of survey and any rent due are payable. The rent is calculated from the date of application (which gives the applicant a right to enter into occupation), and pending the *Gazette* notice a provisional rent of 1d. per acre is payable. The lease has a term of twenty-eight years, the rent being payable annually in advance, and subject to reappraisement every seven years.*

The holder of a homestead lease is required to enter into occupation within ninety days after the *Gazette* notification of approval of the lease, and during each year of the first five years (computed from the date of application) to reside continually on the land for the space of six months.

Within the first two years of the lease he is required to fence the boundaries of the land, but the Land Board may for sufficient cause extend this term.

* Under the Act of 1895 holders of Homestead leases in existence when that act became law have been allowed to apply for an immediate re-appraisement, which includes the balance of the current seven-year period and the succeeding seven-year period.

A lease of this character cannot be transferred (except by way of *bona-fide* mortgage) until the residential term has expired.

On expiration of the lease the last holder is given tenant right in improvements, and during the last year the holder may apply for 640 acres as a Homestead Selection.

Leases of Scrub and Inferior Lands and Improvement Leases.

These leases are classed together, having regard to the fact that, although there are separate provisions in the Crown Lands Acts applying to each, they all have features in common; and in fact the question whether land shall be offered under one provision or another is largely a matter of choice. Some of the scrub-infested lands in the Colony are of a high-class character, and the aim of the law is to offer such land on terms and conditions calculated to render their occupation profitable both to the lessee and to the Crown.

Before land can be offered under Scrub Lease it is necessary that the Local Land Board should recommend it to be declared scrub land; and in connection with inferior lands a report from the Board has also to be first obtained. This procedure is not technically necessary with regard to lands proposed to be offered under Improvement Lease.

There is no limitation as to the area of a Scrub Lease or of a lease of inferior lands, but an Improvement Lease cannot exceed an area of 20,480 acres.

A Pastoral or Homestead Lease may be converted wholly or in part into a Scrub Lease.

Scrub Leases may be granted on application or disposed of by auction or tender. Leases of the other two classes may be disposed of by auction or tender only. The rent of a lease obtained by application is determined by the Local Land Board. A lease offered by auction or tender of course ordinarily falls to the highest bidder or tenderer. In all cases the rent is payable annually in advance.

The initial rent of an Improvement Lease or a lease of inferior lands applies throughout the whole term of the lease, and this may be the case with respect to a Scrub Lease; but it is in the power of the Minister when offering a Scrub Lease to arrange that the term of the lease shall be divided into periods, and that the rent for each period shall be determined by appraisement.

The term of the lease is fixed by the Minister and cannot exceed twenty-eight years. Indeed Scrub Leases or leases of inferior land are limited in the first instance to twenty-one and twenty years respectively, but under the Act of 1895 the Governor now has the power of extending the term to twenty-eight years after once a lease has been granted.

A condition of residence does not attach to any of these leases. The conditions imposed are directed principally to the destruction of scrub or the improvement of the land. The provisions of the law in this respect are:—

Scrub Leases.—Every holder of a Scrub Lease shall as a condition of his lease be required to take all such steps as the Local Land Board shall from time to time, subject to appeal, direct, for the purpose of destroying such scrub as may be specified in his lease or promise of lease, in and upon the land under Scrub Lease, or in and upon any

land within the boundaries of the lease, or in and upon any reserves or roads within such boundaries; and when so destroyed to keep such land free from the same; and shall commence to destroy the same within three months after the commencement of the lease. And if the rent thereon shall not be paid within the time allowed, or if in the opinion of the Minister, after report by the Local Land Board, subject to appeal, the holder shall have failed to comply with any condition of his lease, the Minister may, by notification in the *Gazette*, declare such lease to be forfeited; and all improvements on such lands shall be the property of the Crown.

Leases of Inferior Lands.—Such leases shall be subject to such conditions as may be specified in the *Gazette*.

Improvement Leases.—The lease may contain such covenants and provisions as to the Governor may seem expedient, according to the circumstances of each case, and all such covenants and provisions shall be notified in the *Gazette*, and in a local newspaper before the lease is offered for sale or tenders called for. The lease shall contain covenants and provisions for the improvement of the land leased, and for the expenditure of money thereon, for the payment of rent, and for the determination of the lease upon any breach by the lessee of the covenants and provisions thereof.

The last holder of an Improvement Lease is granted tenant-right in improvements, and the Governor may grant tenant-right to the holder of a Scrub Lease or a lease of inferior lands. With respect to any of these leases (where the land is not within a Pastoral or Homestead Lease) 640 acres may be converted into a Homestead Selection.

Annual Leases.

Annual Leases of unoccupied land may be obtained for grazing purposes on application to the local Crown Land Agent and payment of a deposit of £3 for each 640 acres or less area, or may be offered by auction or tender. They carry no security of tenure, but are somewhat largely availed of for temporary purposes; and if the land should not be absorbed by conditional purchase, &c., they are renewable from year to year by payment of rent in advance on or before the 31st December. No one lease can comprise more than 1,920 acres; but there is no limit to the number of leases any one person may hold. No conditions of residence or improvements are attached to them, the only condition being, as already explained, payment of rent annually in advance.

With respect to a lease applied for, the land is allotted, and the rent appraised, by the Local Land Board. The Minister may refuse any application, and, after three months' notice, cancel any Annual Lease.

Leases Surrounding Artesian Wells.

The discovery of artesian water in large quantities promises to be a fact of the largest importance to lands in the Western Division of the Colony, and, as an encouragement to the holders of land in that division under the insecure tenures of annual lease or occupation license, the law contains the following provision:—Any such holder desirous of boring and searching for water may, on making application to the Minister and depositing £10, obtain the reservation of an area

up to 10,240 acres surrounding the proposed position of the bore. The effect of the reservation is to protect the land for the applicant's own use, and, should boring operations be, in the Minister's opinion, sufficiently successful and promising, a lease may be granted of the land at the same rent as already paid for it, but for a term which may be as long as the unexpired term of the associated pastoral lease.

Special Leases.

The law provides for a class of leases termed Special Leases. Such leases (which do not involve a condition of residence) are to meet cases where land, in any Division, is required for some industrial or business purpose—such, for example, as for a brick kiln, tannery, wool-washing establishment, &c., &c. Land under the sea or under the waters of any harbour, lake, river, &c., is deemed to be Crown lands, and may be leased for the erection of wharves, bathing places, &c. A Special Lease may be obtained on application at an appraised rent, or disposed of at auction or otherwise. The area leased cannot exceed 320 acres, nor can the term exceed twenty-eight years. The conditions are accommodated to the circumstances of each case. The rent is payable annually in advance.

Application for a Special Lease is made to the Chairman of the Local Land Board with a deposit of £3 and a survey fee according to the appended scale.

Residential Leases.

A "Residential Lease" of land within a Gold or Mineral Field may be granted to the holder of what is termed a "Miner's Right" or "Mineral License." Such right or license is obtainable under the provisions of the Mining Act. Application for the lease is made to the local Crown Lands Agent with a deposit of £1, a provisional rent of 1s. per acre and a survey fee according to the appended scale. The maximum area which may be leased is 20 acres, and the maximum term of the lease is fifteen years. The rent is determined by the Land Board, and is payable annually in advance. The Minister may at any time direct a re-appraisement of rent. The principal conditions of the lease are residence during the currency of the lease, and the erection within twelve months from the commencement of the lease of such buildings and fences as are necessary for the performance of this condition. The lessee is given tenant-right in improvements.

Exchange of Land between the Crown and Private Holders.

In the chapter dealing with Pastoral Leases reference has been made to the fact that Pastoral Lessees before the granting to them of security of tenure had made it a practice to secure portions of their runs by conditional purchase or purchase in fee-simple. The practice was in many instances disadvantageous to the public estate, inasmuch as the Crown lands were left in detached blocks, severed by the lessees' freehold properties, and, moreover, the lessees themselves have come to find that it would be convenient to them to gather their free-holds together into one or more consolidated blocks, especially within their leasehold areas. This result can be secured by the Crown accepting a surrender of private lands, and granting lands in exchange

elsewhere. An exchange may apply to land actually granted, or land (such as that held under conditional purchase) of which a grant could, by the payment of purchase money, be demanded, and it is possible to exchange lands on which a balance is owing for lands to which the debt is transferred. Any proposal for exchange before finally maturing has to be made the subject of an investigation by the Land Board, and while the private owner's interests are fully respected, the Crown's interests are not less jealously guarded. The carrying of an exchange into effect ultimately depends upon the mutual agreement of the private owner on the one hand, and the Crown on the other.

The provisions with regard to exchange extend to cases where the Crown is desirous of securing lands for public purposes, and in such cases the question of consolidation of lands does not necessarily enter.

Scale of Survey Fees.

Area.	For an original Conditional Purchase, Special Lease Residential Lease, &c.	For an additional Conditional Purchase or Conditional Lease.	For a Homestead Selection.	For a Settlement Lease.*
	£ s. d.	£ s. d.	* £ s. d.	£ s. d.
For any area not exceeding 4 acres ...	1 0 0	0 15 0	0 15 0	1 0 0
For every additional acre, or fraction of an acre, up to 10 acres	0 3 4	0 2 6	0 2 6	0 3 4
For 10 acres	2 0 0	1 10 0	1 10 0	2 0 0
For every additional acre, or fraction of an acre, up to 20 acres	0 2 0	0 1 6	0 1 6	0 2 0
For 20 acres	3 0 0	2 5 0	2 5 0	3 0 0
For every additional acre, or fraction of an acre, up to 40 acres	0 1 0	0 0 9	0 0 9	0 1 0
For 40 acres	4 0 0	3 0 0	3 0 0	4 0 0
For every additional 5 acres, or fraction of 5 acres, up to 80 acres	0 2 6	0 1 10½	0 1 10½	0 2 6
For 80 acres	5 0 0	3 15 0	3 15 0	5 0 0
For every additional 10 acres, or fraction of 10 acres, up to 320 acres	0 2 6	0 1 10½	0 1 10½	0 2 6
For 320 acres	8 0 0	6 0 0	6 0 0	8 0 0
For every additional 15 acres, or fraction of 15 acres, up to 640 acres	0 2 6	0 1 10½	0 1 10½	0 2 6
For 640 acres	10 15 0	8 1 3	8 1 3	10 15 0
For every additional 20 acres, or fraction of 20 acres, up to 1,280 acres ...	0 2 6	0 1 10½	0 1 10½	0 2 6
For 1,280 acres	14 15 0	11 1 3	11 1 3	14 15 0
For every additional 40 acres, or fraction of 40 acres, up to 2,560 acres ...	0 2 6	0 1 10½	.....	0 2 6
For 2,560 acres	18 15 0	14 1 3	.....	18 15 0
For every additional 40 acres, or fraction of 40 acres, up to 3,840 acres ...	.....	....	.....	0 2 6
For 3,840 acres	.....	.. ..	.....	22 15 0
For every additional 40 acres, or fraction of 40 acres, up to 5,760 acres ...	.....	.....	.....	0 2 0
For 5,760 acres	.....	.....	.....	27 11 0
For every additional 40 acres, or fraction of 40 acres, up to 7,680 acres ...	.....	.....	.....	0 1 6
For 7,680 acres	.....	.....	.. ..	31 3 0
For every additional 40 acres, or fraction of 40 acres, up to 10,240 acres ...	.....	.....	.....	0 1 0
For 10,240 acres	.....	... .	....	34 7 0

For a Homestead Lease, the survey fee is such sum as may be specified in the *Gazette* notification of approval of the application, but not exceeding £1 per linear mile.

* Where the cost of survey of a Settlement Lease is less than the scale rates, the difference may be refunded.

STATISTICS.

	Acres.
Estimated area of Colony	195,882,151
Area alienated up to 31st December, 1895, not including incomplete conditional purchases	24,559,418
Area unalienated on 31st December, 1895	171,322,733
Area in process of alienation by Conditional Purchase on 31st December 1895	20,445,621

Conditional Purchases.

	No.	Acres.
Number and area of Conditional Purchases for which deeds have been issued up to 31st December, 1895	22,610	2,648,330
Number and area in existence on 31st December, 1895	148,862	20,445,621
Area of Conditional Purchases within special areas (included in above)		853,228

Conditional Leases.

Number, area, and rental of leases in existence on 31st December, 1895 :—

	No.		a.	r.	p.		£	s.	d.
Eastern Division	14,494	...	5,119,791	0	29	...	60,905	11	8
Central Division	7,783	...	7,589,603	3	12	...	90,758	2	8
Western Division*... ..	206	...	243,807	2	19	...	2,541	4	10
Total	22,483	...	12,953,202	2	20	...	154,204	19	2

Average rental per acre :—Eastern, 2·85d. ; Central, 2·87d. ; Western, 2·5d.

Pastoral Leases.

Number, area, and rental of leases current during 1895:—

	No.		Acres.		£	s.	d.
Central Division	491	...	14,814,475	...	161,910	3	10
Western Division...	307	...	38,612,218	...	179,268	12	1
Total	798	...	53,426,693	...	341,178	15	11

Average rental per acre :—Central, 2·62d. ; Western, 1·11d.

Occupation Licenses.

Number, area, and rental of licenses in existence on 31st December, 1895 :—

	No.		Acres.		£	s.	d.
Eastern Division	628	...	7,251,792	...	29,240	13	9
Central Division	786	...	10,138,871	...	52,390	2	2
Western Division	212	..	23,426,621	...	42,097	12	9
Total	1,626	...	40,817,284	...	123,728	8	8

Average rental per acre :—Eastern, 0·97d. ; Central, 1·24d. ; Western, 0·43d.

Homestead Leases.

Number, area, and rental of leases in existence on 31st December, 1895 :—

No.	Acres	£	s.	d.
1,227	10,250,437	68,974	18	0

Average rental per acre, 1·61d.

Special Leases.

Number, area, and rental of leases in existence on 31st December, 1895 :—

No.	a.	r.	p.		£	s.	d.
575	14,344	0	38¾		14,628	6	8

Average rental per acre, £1 0s. 4·7d.

* These had been Pre-emptive Leases in existence before the Act of 1884 became law, and were allowed to be converted into Conditional Leases.

Scrub Leases.

Number, area, and rental of leases in existence on 31st December, 1895 :—

No.	Acres.	£ s. d.
21	121,297½	272 19 10

Average rental per acre, 0·54d.

Leases of Inferior Crown Lands.

Number, area, and rental of leases in existence on 31st December, 1895 :—

No.	a. r. p.	£ s. d.
41	488,475 3 0	421 16 10

Average rental per acre, 0·21d.

Residential Leases.

Number, area, and rental of leases in existence on 31st December, 1895 :—

No.	a. r. p.	£ s. d.
169	1,583 1 10½	256 0 5

Average rental per acre, 3s. 2·8d.

Annual Leases.

Number, area, and rental of leases in existence on 31st December, 1895 :—

	No.	a. r. p.	£ s. d.
Eastern Division	7,818	4,676,669 2 31	31,112 15 9
Central Division	1,037	806,786 2 36	7,898 16 7
Western Division	69	80,847 0 0	499 2 2
Total	8,924	5,564,303 1 27	39,510 14 6

Average rental per acre :—Eastern, 1·6d. ; Central, 2·3d. ; Western, 1·4d.

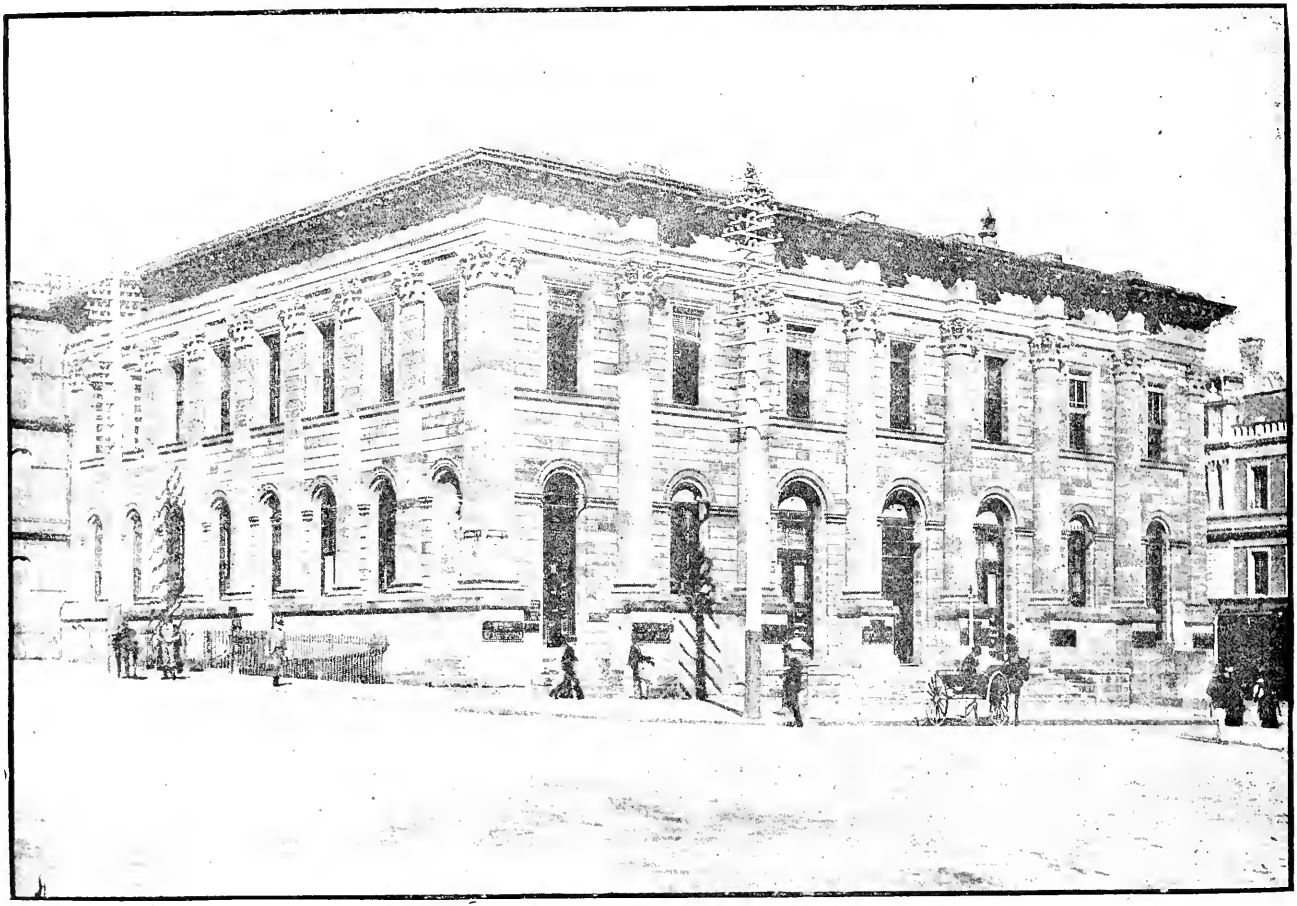
*Homestead Selections.**

	No.	Area. Acres. r. p.	Rent. £ s. d.
Applied for up to 31st December, 1895	206	62,749 0 11	1,333 16 6
Confirmed up to 31st December, 1895	62	23,664 3 5	554 8 3

*Settlement Leases.**

	No.	Area. Acres.	Rent. £ s. d.
Applied for up to 31st December, 1895	75	206,913	2,712 1 6
Confirmed up to 31st December, 1895	19	46,512¾	632 3 7

* It should be explained that the law allowing Homestead Selections and Settlement Leases came into force only on the 1st June, 1895, and little time was given between that date and the 31st December, 1895, to make land available under these new systems. During this short period, however, the popularity of the new systems has been made evident.



SYDNEY EXCHANGE.

Commercial Relations.

By R. L. Nash.

A Preliminary Comparison.

New South Wales has for some years past carried on a more extended commerce with the mother country and with the world in general than any other Australasian Colony. This was the case even while the population of Victoria outnumbered that of New South Wales, and while the people of Melbourne considerably exceeded those of Sydney and Newcastle combined. But now, when this is the most populous Colony, and when Sydney is the most wealthy capital, the supremacy of New South Wales, both as a producer for the outside world and as an importer, is clear and increasing. Her most steadily advancing rival is, probably, at the present time, Queensland, and as a producer of beef, hides, tallow, sugar, and gold Queensland is a very worthy rival. But the clear lead of New South Wales in the total volume of trade is indisputable, and will, I doubt not, be amply maintained until Federation shall wipe away these trading distinctions.

It is not the purpose of these pages to institute detailed comparisons with neighbouring colonies, but the change referred to has been going on gradually for years, and now that New South Wales has definitely determined upon the freest of free-trade in all her ports, it may be expected to develop in a yet more marked degree. The following figures show the expansion of external trade over a period of years of all the seven Colonies in the Australasian group; but, as will soon appear, the returns are open to some very material qualifications.

Imports.

Colony.	1861.	1871.	1881.	1891.	1894.
	£	£	£	£	£
New South Wales	6,391,555	9,609,508	17,587,012	25,383,397	15,801,941
Victoria	13,532,452	12,341,995	16,718,521	21,711,608	12,470,599
Queensland ...	967,951	1,562,665	4,063,625	5,079,004	4,337,400
South Australia..	1,976,018	2,158,022	5,320,549	10,051,123	6,325,635
Western Australia	147,913	226,656	404,831	1,280,093	2,114,414
Tasmania ...	954,517	778,087	1,431,144	2,051,964	979,676
New Zealand ...	2,493,811	4,078,193	7,457,045	6,503,849	6,788,020
Australasia ...	26,464,217	30,755,126	52,982,727	72,061,038	48,817,685

Exports.

Colony.	1861.	1871.	1881.	1891.	1894.
	£	£	£	£	£
New South Wales	5,594,839	11,245,032	16,307,805	25,944,020	20,577,673
Victoria	13,828,606	14,557,820	16,252,103	16,006,743	14,026,546
Queensland ...	709,599	2,760,045	3,540,366	8,305,387	8,795,559
South Australia...	2,032,311	3,582,397	4,508,754	10,642,416	7,528,783
Western Australia	95,789	209,196	502,770	799,466	1,251,406
Tasmania ...	905,463	740,638	1,555,576	1,440,818	1,489,041
New Zealand ...	1,370,247	5,282,084	6,060,866	9,566,397	9,231,047
Australasia ...	24,536,854	38,377,212	48,728,240	72,705,247	62,900,055

It is necessary to go back to the year 1880 and previous years to find the time when Victorian gross exports exceeded those of New South Wales; but the Victorian imports exceeded those of this Colony as late as the year 1889, although in 1894 the New South Wales shipments showed an excess valued at £3,331,342. But this is not a fair statement of the relative importance of the trade of these colonies. For instance, in 1894, New South Wales wool was exported, *viâ* Melbourne, to the value of £2,030,645, and thus to this extent swelled both the imports and exports of Victoria, while a further £488,115 worth went by way of South Australia, to be dealt with in like manner by that colony. The South Australian returns were also swollen by £562,966 of New South Wales imports, and by £2,510,542 of New South Wales exports in and out of Broken Hill; and upon making due allowances for these movements in through trade, a very material difference is disclosed. This may be judged from the following comparison:—

Exports in 1894—Distinguishing Home Produce and Re-Exports.

Colony.	Total Exports.	Less Produce of Other Countries.	Home Produce.
	£	£	£
New South Wales	20,577,673	4,672,712	15,904,961
Victoria	14,026,546	*2,472,929	11,553,617
New Zealand ..	9,231,047	145,899	9,085,148
Queensland ...	8,795,559	215,221	8,580,338
South Australia...	7,528,783	*3,967,892	3,560,891
Tasmania... ...	1,489,041	19,077	1,469,964
Western Australia	1,251,406	32,359	1,219,047
	62,900,055	11,526,089	51,373,966

* Including New South Wales produce, as above.

This, of itself, serves to indicate that the mother country and Europe have already, in a considerable degree, selected Sydney as the *entrepôt* whence their manufactures may be best distributed throughout Australasia; and but for the recent depression in the import trade the marked difference in the "produce of other countries" exported by New South Wales would have been yet more striking.

The Disadvantage of a Comparison based upon 1894 Values.

It must be acknowledged that the year 1894 was one of great depression in the import and re-export trade. The financial crisis of 1893 affected the purchasing powers of all the colonies for the time being very considerably, and imports of European manufactures were much restricted. This may be judged from the general contraction in the imports shown upon contrasting the returns for 1894 with 1891. Again, the depression, which was world-wide, helped to contract our purchasing power by giving us unprecedentedly low prices for almost every article produced here for exportation. Wool, tallow, metals of all kinds, meats and coal—of which the exports of New South Wales mainly consist—were all afflicted in the same way; and low prices told extensively upon the cash value of the shipments in the face of the more extended quantities exported. Mr. Coghlan, when Government Statistician, computed that the average prices of New South Wales exports in 1894, excluding gold, were as much as 48 per cent. lower than in 1873; 41 per cent. lower than in 1884; and 29 per cent. lower than in 1890; and it was impossible, especially in the sudden collapse of prices in 1893–4, to make good these extreme differences by increased quantities. Thus 1894 is an altogether exceptionally adverse year upon which to base a record of the trade of New South Wales, and the money value gives us an altogether foreshortened picture of the real importance of that trade. Let us therefore shift our ground from values which were disheartening, and in a large measure temporary, to quantities which are encouraging, and to more than their full extent permanent.

Exports of New South Wales—Home Produce.

	1870.	1880.	1890.	1894.*
Wool	47,440,610 lb.	154,871,832 lb.	236,322,828 lb.	331,774,424 lb.
Gold (product'n)	240,858 oz.	118,600 oz.	127,760 oz.	324,787 oz.
Silver ...	nil	nil	496,552 ,,	846,822 ,,
Silver-lead ore	nil	nil	89,720 tons	137,813 tons
Coal, raised ...	868,564 tons	1,466,180 tons	3,060,876 ,,	3,332,079 ,,
Do., exported..	578,389 ,,	753,356 ,,	1,821,874 ,,	2,125,125 ,,
Tallow	134,262 cwt.	252,826 cwt.	273,046 cwt.	847,236 cwt.
Meats (frozen)...	nil	nil	72,304 ,,	339,404 ,,
Do. (preserved)	not recorded	not recorded	4,655,523 lb.	16,382,577 lb.
Hides (cattle) ...	45,256	179,887	120,593	77,460
Sheepskins ...	401 pkgs.	2,146 pkgs.	13,820 pkgs.	41,251 pkgs.
Leather ...	3,001 ,,	4,930 ,,	5,300 ,,	11,500 ,,
Copper, ingots...	19,880 cwt.	105,260 cwt.	63,300 cwt.	31,131 cwt.
Tin, ingots ...	nil	109,526 ,,	68,191 ,,	52,225 ,,
Butter(frozen)..	nil	nil	nil	79,164 boxes

* In many instances there must have been considerable increases in 1895, including hides, skins, tallow, leather, copper, and meats (frozen, preserved, and live).

Here there is seen undoubted and sustained progress. In wool, silver, and silver ores, in coal, tallow, frozen and preserved meats, hides, sheepskins, leather, the increase is unmistakable. In gold the pro-

duction diminished by one-half between 1870 and 1880, only to revive rapidly between 1890 and 1894. The reasons for this revival are various. Many of the New South Wales gold ores have proved sufficiently refractory to resist the old-fashioned methods of treatment. But modern science has brought the vast and widely-distributed gold ores within reach of the practical miner, and old abandoned workings, as well as fresh discoveries, point to a considerable extension of the gold-fields of New South Wales in the early future. It is not possible to write so hopefully of the prospects of the copper and tin exports. For a time the remarkable fall in the price of copper resulted in the closing of most of the New South Wales copper mines, which found it difficult to compete against the vastly-increased output of America. But latterly it has been found possible to successfully work some of the mines upon the tribute system; and there can be no question that a fair rise in the price of copper would at once augment the production. The extension of the railway system to Cobar and other localities has also aided in a revival of the industry, which will tell upon the production of the metal within the next few years. Up to the end of 1894 New South Wales has produced tin to the value of £6,040,035. This industry reached its limit of greatest production in 1881; but the shallow deposits have now been largely worked out, and the present operations in stream tin are mainly in the hands of the Chinese. There are, however, lodes worked in the north of the Colony, although the production of tin is not at present increasing.

It is apparent that the present surplus production for exportation—the surplus by which New South Wales is known mainly to markets beyond Australia—lies in her pastoral and mineral industries. Her agricultural, dairying, and manufacturing occupations have hitherto in the main been carried on for internal consumption. The growth of cereals has been extended, and could well be developed to the point when there would be a surplus for shipment; and in 1892 and 1893 there were moderate exports of butter and small exports of cheese. But it is evident that, so far, the Colony has not availed itself of its many and great advantages in its wide extent of lands both for grain-growing and dairying. Considerably more attention has been paid to such industries since the crisis of 1893, and a few years hence the position will be altered materially. But up to the present cattle have been mainly raised for their meat, tallow, and hides, and sheep for their wool, meat, tallow, and skins. Such industries for many years made a high return upon the labour expended. But the late fall in wool and tallow has now directed attention towards making the most of the herds and flocks of which the Colony is possessed, and it will prove to the great permanent advantage of New South Wales that this has been the case.

The External Trade Classified.

The great majority of the staple industries of the Colony are dealt with separately in these pages, and it would, therefore, be a repetition of the other portions of this work if they were enlarged upon here. The following classification, however, of the imports and exports, based mainly upon that made by the Government Statistician, will give an effective general survey of the external trade.

New South Wales Imports and Exports in 1894.

	Total Imports.	Exports, Domestic Produce.	Exports, other Produce.	Total Exports.
	£	£	£	£
Foods, tea, &c.	2,236,012	716,071	323,401	1,039,472
Intoxicants	636,060	29,793	64,831	94,624
Live Stock	632,567	500,264	56,845	557,109
Wool	587,923	9,011,790	616,333	9,628,123
Other animal and vegetable products	1,739,417	1,685,573	629,842	2,315,415
Clothing and textiles	3,286,953	24,260	249,814	274,074
Minerals and metals, (including partly worked up) ..	1,109,974	2,693,893	292,841	2,986,734
Coal and coke	42,613	819,136	Nil	819,136
Specie and gold bullion ...	2,935,614	325,302	1,996,106	2,321,408
Works of art, education, and amusement	599,610	11,026	79,604	90,630
Miscellaneous manufactures ...	1,626,248	59,993	278,861	338,854
Unclassified	368,950	27,860	84,234	112,094
	15,801,941	15,904,961	4,672,712	20,577,673

Note.—The total imports in 1895 were £15,992,415; the exports of domestic produce were £16,456,123; the other produce exported was £5,478,662, and the grand total of the exports £21,934,785.

It may at first appear remarkable that under such heads as foods, live stock, and bullion and specie New South Wales should, in the year 1894, have imported more largely than she exported. But it must be remembered that hitherto the Colony has not produced enough wheat, oats, and sugar for her home consumption, that she imports tea, coffee, and dried fruits, and that her food exports, consisting mainly of frozen and preserved meats, have not yet attained such magnitude as they bid fair to do. Indeed, the following comparison will serve to show that, with due attention to breeding and to slaughtering at the proper ages, there is room for vast increases in the food exports :—

	Number.	Per head of population.
New South Wales sheep	56,977,270	45·58
United Kingdom ,, ...	31,774,824	0·82
New South Wales cattle	2,465,411	1·97
United Kingdom ,, ...	11,207,554	0·29

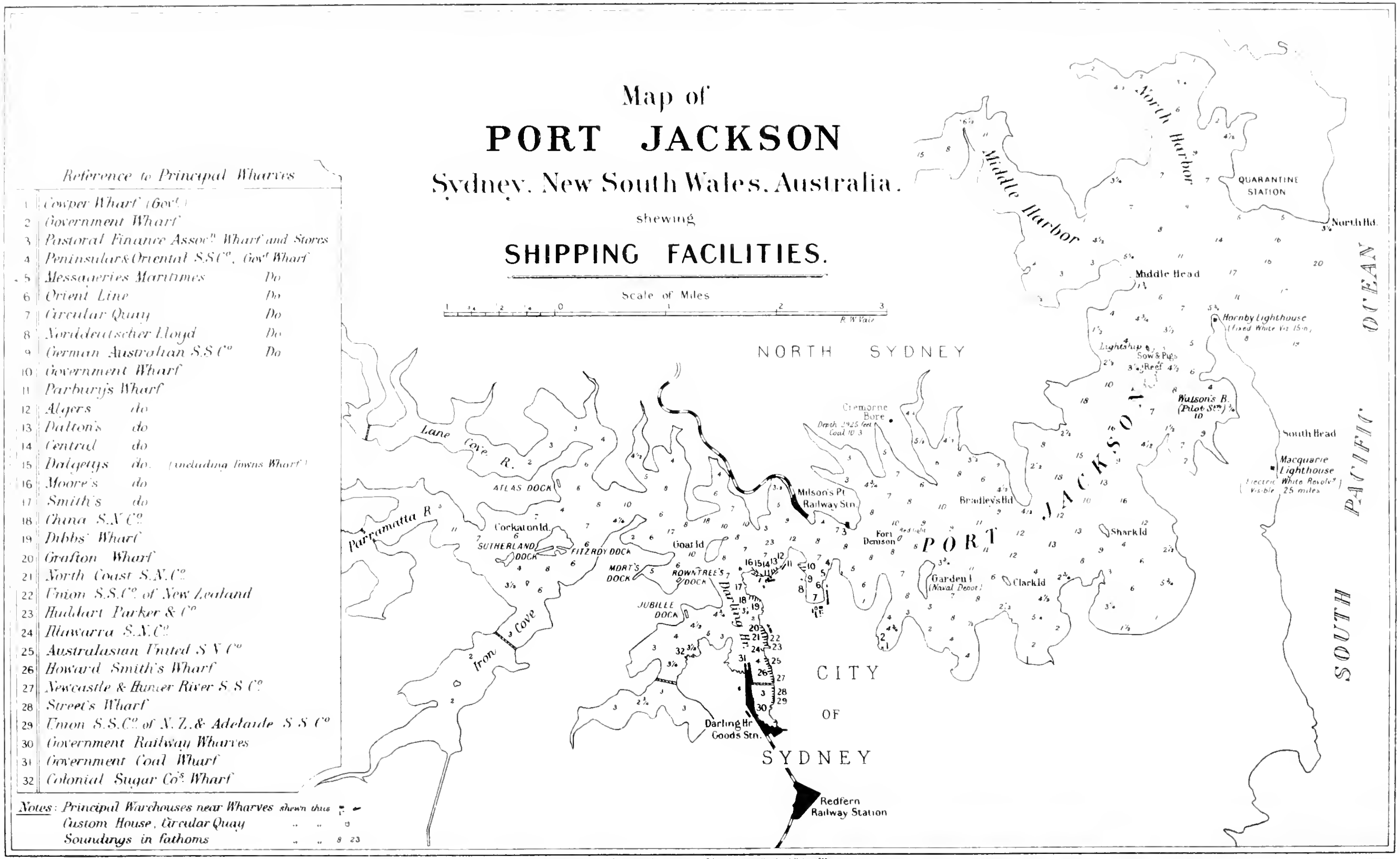
The greatest need in the development of trade in such perishable product is that of adequate and suitable transport, and upon this point the Government and the leading produce merchants are now interesting themselves greatly. A regular supply of shipping possessed of adequate frozen storage, proper warehouse accommodation at the ports of shipment, slaughtering places up the country in touch with the railways, where freezing can at once be effected, and cold carriage over the railways are all requisite to a proper development of the trade where the principal flocks and herds are located hundreds of miles inland, for it is an essential that the meat should be delivered in the United Kingdom in the best condition. Thus, there is much still to be accomplished before this industry can be brought into full bearing.

The Significance of the Present Surplus Exports.

In the years when New South Wales, as well as neighbouring colonies, was importing British capital extensively for investment, the imports, as was to be expected, exceeded in value the exports. But we must never lose sight of the fact that probably something like £100,000,000 of British capital is invested here, or is in the hands of non-residents; and that, taking the average of the five years, 1890–94, payments to the extent of over £5,000,000 a year had thus to be made to other countries—mainly to Great Britain. The Government Statistician places this payment upon British capital, and by way of incomes to non-residents at £5,163,900 per annum in the five years, 1890–94, inclusive; and even after the curtailment of dividends and incomes since the crisis, these payments probably exceed £4,000,000. In view of this important factor in New South Wales finance, the following marked change since 1890 carries considerable significance:—

Year.	Imports.	Exports.	Excess of Imports.	Excess of Exports.
1890	£22,615,004	£22,045,937	£569,067	.....
1891	25,383,397	25,944,020	.....	£560,623
1892	20,776,526	21,972,247	.....	1,195,721
1893	18,107,035	22,921,223	.....	4,814,188
1894	15,801,941	20,577,673	.....	4,775,732
1895	15,992,415	21,934,785	.....	5,942,370

In 1895 the excess of exports is very striking. Thus, upon the face of these returns, it is evident that this Colony is more than paying its way in the shape of an excess of exports. But these valuations are those at New South Wales ports; that is, after all the imports have been swelled by the cost of carriage to our shores, while at the same time the exports are returned minus all shipping charges. Nor do all these shipping charges accrue to the outside shipowner. There are 968 vessels upon the New South Wales Register, with an aggregate of 109,372 tons, upon which 5,806 men find employment; and if these earned a gross average of £100 per head there would be an addition of £580,000 a year to be added to the surplus exports after meeting all payments to British investors and others to the full. There were questions raised in the United Kingdom at the time of the great collapse in prices, and after the financial crisis in Australia, whether these colonies could meet their obligations. Those questions need not have been raised; but figures such as those given above answer them fully. When, too, it is taken into consideration that the production of New South Wales is not only capable of development, but is at the present time actually expanding greatly, the power of her people to deal with that indebtedness and to honour their obligations lies beyond the bounds of dispute. That, for a time, the extravagance of the "boom" period, and its heavy commitments, were followed by loss and hardship, and a curtailment of the spending powers of the people was inevitable. But that period of extravagance, with its actual restriction of production, is at an end, the losses have already, in a great measure, been lived down, and the lesson, bitter as it was at the time, has not been without its advantages. Even old


Map of
PORT JACKSON
Sydney, New South Wales, Australia.
shewing
SHIPPING FACILITIES.
Scale of Miles
Reference to Principal Wharves
1 Cowper Wharf (Govt.)
2 Government Wharf
3 Pastoral Finance Assocn. Wharf and Stores
4 Peninsular & Oriental S.S.Co., Govt. Wharf
5 Messageries Maritimes Do
6 Orient Line Do
7 Circular Quay Do
8 Norddeutscher Lloyd Do
9 German Australian S.S.Co. Do
10 Government Wharf
11 Parbury's Wharf
12 Algers do
13 Dalton's do
14 Central do
15 Dalgetys do. (including Towns Wharf)
16 Moore's do
17 Smith's do
18 China S.N.Co.
19 Dibbs' Wharf
20 Grafton Wharf
21 North Coast S.N.Co.
22 Union S.S.Co. of New Zealand
23 Huddart Parker & Co.
24 Illawarra S.N.Co.
25 Australasian United S.N.Co.
26 Howard Smith's Wharf
27 Newcastle & Hunter River S.S.Co.
28 Street's Wharf
29 Union S.S.Co. of N.Z. & Adelaide S.S.Co.
30 Government Railway Wharves
31 Government Coal Wharf
32 Colonial Sugar Co's. Wharf
Notes: Principal Warehouses near Wharves shewn thus
Custom House, Circular Quay
Soundings in fathoms
NORTH SYDNEY
CITY OF SYDNEY
PORT JACKSON
PACIFIC OCEAN
SOUTH
North Harbor
Middle Harbor
QUARANTINE STATION
North Hd.
Middle Head
Hornby Lighthouse
South Head
Macquarie Lighthouse
Wutson's B.
Lightship
Sow & Pigs Reef
Shark Id
Clark Id
Garden I. (Naval Depot)
Bradley's Hd
Fort Denison
Cremorne Bore
Milson's Pt Railway Stn.
Goat Id
Cockatoo Id.
SUTHERLAND DOCK
FITZROY DOCK
ATLAS DOCK
MORT'S DOCK
ROWNTREE'S DOCK
JUBILEE DOCK
Darling Hr.
Darling Hr Goods Stn.
Redfern Railway Station
Lane Cove R.
Parramatta R.
Iron Cove

countries like the United Kingdom have experienced the effects of such transitions, and have been slower than this Colony to recover. During 1895 there was a material recovery of confidence in New South Wales, and that in spite of a deficient rainfall; and 1896 is opening with yet increased buoyancy.

Sydney and Newcastle as Ports.

Naturally, with the largest share of the trade of these colonies, the shipping returns of New South Wales are likewise the most extensive. The harbour of Sydney, not seldom with nearly a hundred great ocean steamers and sailing ships on its waters, affords the most indisputable evidence of being a busy port, for which its natural advantages entirely fit it. It is, indeed, the busiest port in the Southern Hemisphere. For many miles the depth of water is ample for tonnage of the deepest draught; its tides average but 3 feet 4 inches, and the flow and ebb of water in the centre of the stream is almost imperceptible. Again, the harbour is almost entirely landlocked, even the comparatively narrow opening through the Heads being unseen from any part of Sydney, while the great rollers coming in from the Pacific expend their entire force upon the rocks which face the entrance or upon the nearest shores of Middle Harbour, another extensive waterway at present given over to the Sydney excursionist, but which will some day add to the importance of Sydney as a port. The accompanying plan of Sydney Harbour will serve to show the dimensions of the port better than many pages of description would do; and the multitudinous bays and coves, separated for the most part by high land, afford ample protection in all weathers.

Upon the shores of Sydney Harbour the Government have constructed some 15,500 feet of the wharfage, the major part with a depth alongside from 25 to 30 feet at low tide; and the private wharfs are very numerous, and in the aggregate of fully equal extent, though the depth of water alongside varies considerably. Still, many of the private wharfs will accommodate vessels drawing from 20 to 25 feet, and one has a depth of no less than 35 feet. The bottom, too, being soft, even, and free from currents, vessels may rest thereon at low water without risk. These 7 miles of wharfs are fitted with ample crane power and storage, and additions are constantly in progress.

At Newcastle, there are also about 12,000 feet frontage of Government wharfs, which will accommodate vessels drawing from 20 feet to 23 ft. 6 in., in addition to 1,500 feet of private wharfs.

The dock accommodation in Sydney is extensive. The two Government graving docks on Cockatoo Island stand first in importance. The Sutherland Dock is 600 feet long by 84 in width, and would admit a vessel drawing 32 feet; while the Fitzroy Dock is 470 feet long by 59 in width, and would admit a vessel drawing 21½ feet. Next in importance is Mort's Dock, 410 feet by 66 feet, which will accommodate vessels with a draught of 19 feet; and there are, in addition, a number of floating docks and patent slips at Sydney, and two patent slips at Newcastle.

It would be possible to extend information of this description very greatly. The lighthouse and tug services are excellent; and the

accommodation at such minor ports as Wollongong, the Richmond and Clarence Rivers, Twofold Bay, and elsewhere, are also subjects which might be enlarged upon, as New South Wales possesses many harbours which will in the course of years come into greater prominence. The developments now in progress at Lake Illawarra are also of considerable importance. But to enter into these matters would extend these remarks to an inordinate length.

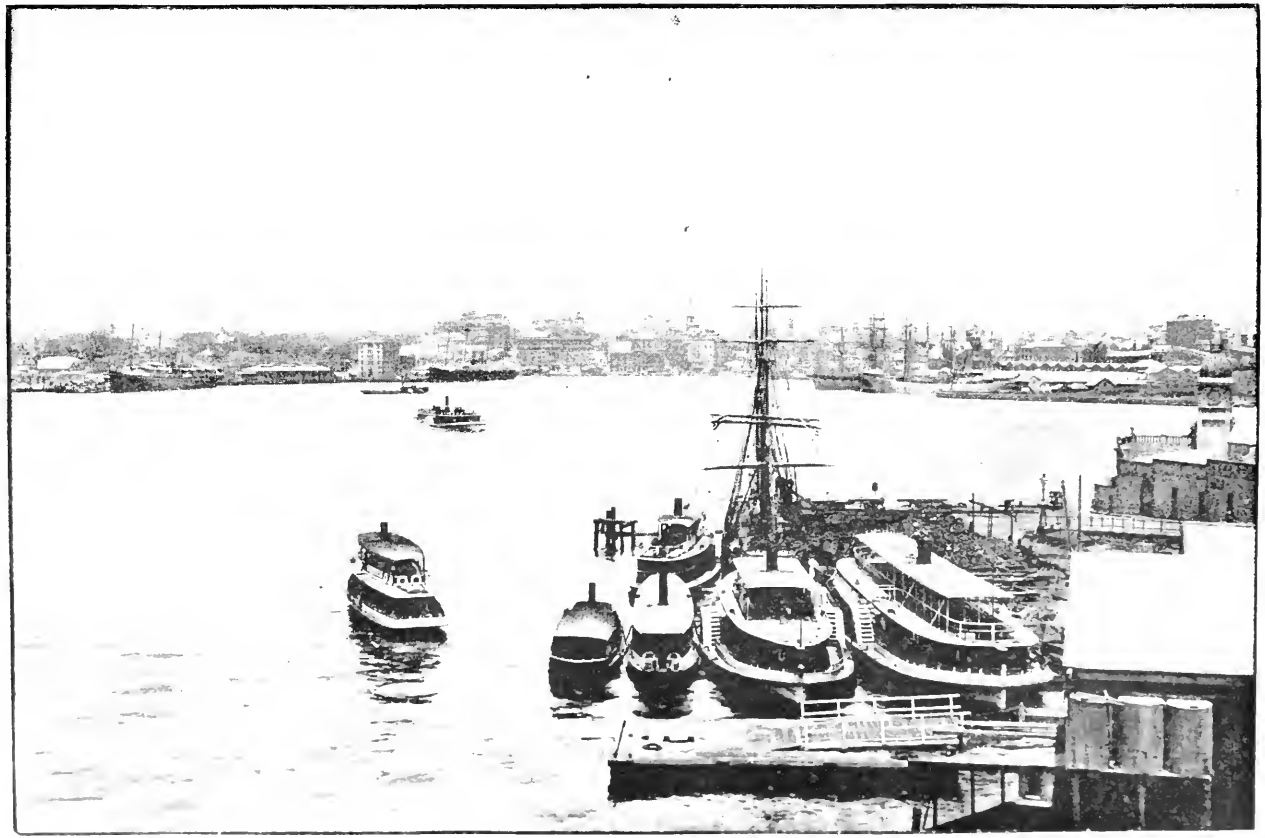
The Shipping Returns.

According to the published returns of the different Australasian colonies, the shipping tonnage entered and cleared during the year 1894 were as under:—

Colony.	Entered.	Cleared.
	Tons.	Tons.
New South Wales	2,859,968	2,878,586
Victoria	2,163,716	2,127,743
Queensland	459,647	468,378
South Australia	1,449,336	1,459,249
Western Australia	675,775	653,303
Tasmania	439,050	459,317
New Zealand	631,100	631,250
Total	8,678,592	8,677,826

But bald figures such as these need a great deal of qualification. For instance, a P. and O. or Orient liner reaching Sydney as its final port is entered and cleared only once, and Sydney is admittedly the most important port which it enters in Australian waters. Yet on its outward voyage it calls at Albany (Western Australia), Adelaide, and Melbourne, and is entered and cleared, and the same process is repeated on its homeward voyage, and upon this weekly mail service alone these duplications add something like 300,000 tons per annum to the apparent tonnage entering and clearing Victorian, South Australian, and Western Australian ports. In New South Wales, too, a vessel proceeding from Sydney to Newcastle for coal is not included as tonnage entering the second port, but only the first port of entry and the port of final departure are returned, and purely coasting services are excluded. Thus the above comparison does not adequately indicate the relative magnitude of the shipping returns of New South Wales. If however, we take the average value of the exports per registered ton cleared in 1894 at £7 3s. in New South Wales, at £6 12s. in Victoria, at £5 3s. in South Australia, and at £1 18s. in Western Australia, we obtain a clearer insight into the relative significance of these shipping services to the different colonies.

A quarter of a century back the shipping returns of Victoria exceeded those of New South Wales materially, and even as late as 1881 the shipping cleared from the ports of this Colony showed, apparently an excess of only 137,000 tons. Last year, however, the excess was as much as 750,000 tons, and as has been shown, the utilisation of that tonnage here was relatively greater.



CIRCULAR QUAY, FROM NORTH SYDNEY.

Nationality of the Shipping.

The question of nationality is important as indicating the extent to which foreign competition has been carried. The following figures show the tonnage cleared in 1894, the tonnage entered being very similar :—

TOTAL Clearances for Outside Ports in 1894.

	Steam.	Sailing.	Total.	Value shipped.
	Tons.	Tons.	Tons.	£
Australasian	1,442,079	74,427	1,516,507	3,021,865
United Kingdom	606,968	457,961	1,064,929	7,956,377
Other British	nil	21,775	21,775	395,871
Total British	2,049,047	554,163	2,603,210	11,374,113
Foreign—				
French	90,312	1,197	91,509	1,067,440
German	60,866	19,374	80,240	917,310
United States	19,587	50,956	70,543	374,541
Norwegian...	nil	14,951	14,951	1,622,180
Other	nil	18,133	18,133	
Total foreign	170,665	104,611	275,376	3,981,471
Total clearances ...	2,219,812	658,774	2,878,586	15,355,584*

* Excluding overland traffic.

It may be a surprise to some readers that the Australian tonnage should so considerably exceed the British tonnage. But the explanation is not far to seek. The Australasian coasting trade deals to a larger extent with passengers to and from intercolonial ports, and in low-priced goods, such as coal, as movements coastwise of goods of higher value are discouraged by the excessive tariffs in the different colonies. There can, indeed, be small doubt that were Australia federated the coasting trade would grow vastly in importance, though it would cease to be classed as imports and exports.

But looking to values, it will be seen that the exports to the United Kingdom in 1894 reached 51·8 per cent. of the total shipments; and in reality it reached a yet larger proportion as the bulk of the overland exports to Melbourne and South Australia were destined for the United Kingdom. It cannot, so far, be said that in spite of heavy subsidies to certain foreign shipping lines, they have appropriated any very large proportion of the merchandise actually conveyed from New South Wales. The direct shipments to France, Germany, and Belgium amount to 20·2 per cent. of the above values, and consisting largely of wool, such exports naturally represent a high cash value. These comparisons, are, however, in a considerable degree vitiated by the tonnage being in part employed in conveying goods to other destinations, and probably an exact comparison, which is not attainable, would considerably vary the foregoing results.

That Germany and America have materially undermined the dealings of the British manufacturer with New South Wales importers in certain trades, such as musical instruments, iron and steel, machinery, toys, clocks, and fancy articles, is strongly in evidence, even though

much of such merchandise is apparently shipped from ports of the United Kingdom; and the imports from Germany especially, shown in our Customs returns at £917,310 in 1894, should probably be nearly doubled.

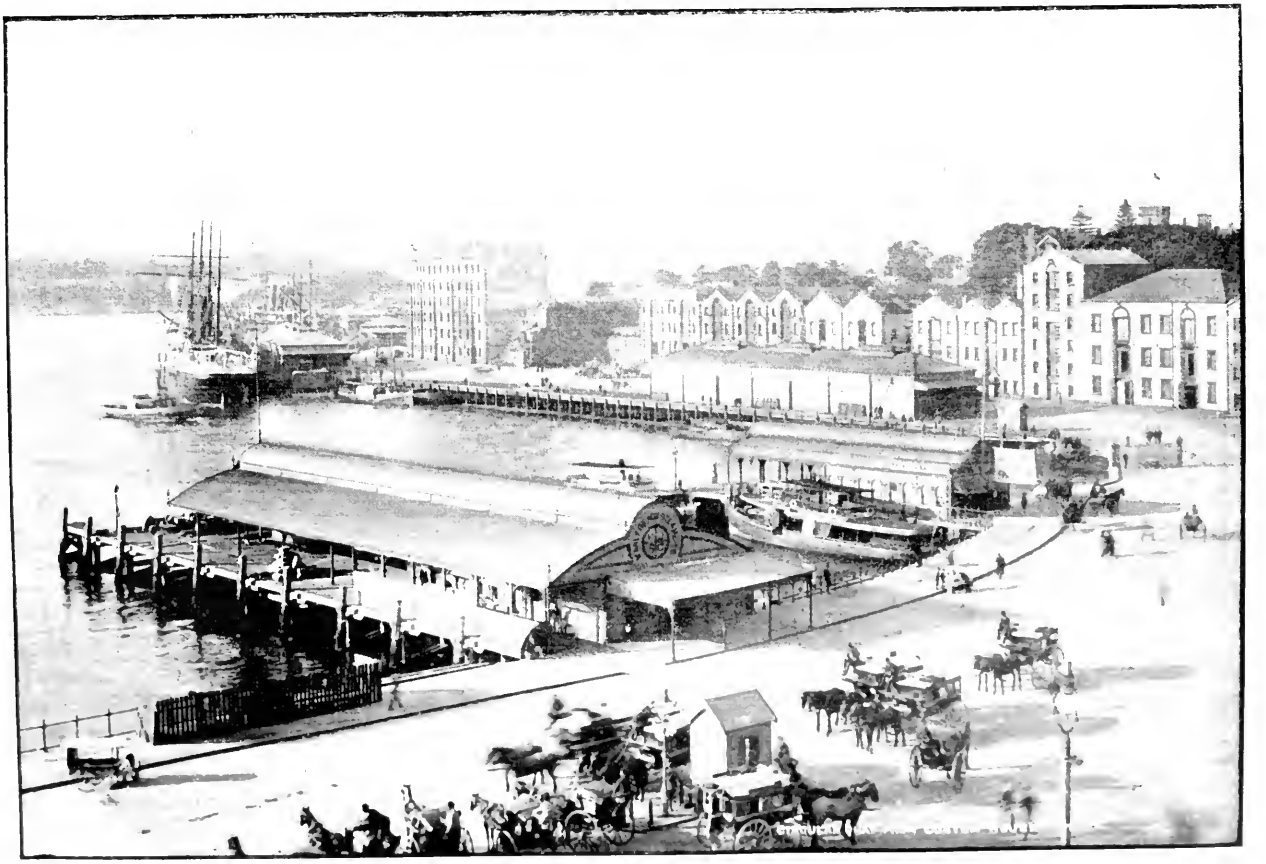
Sydney and Newcastle.

Any comparison of the trade of Sydney and Newcastle is also difficult, owing to the fact that vessels are entered only at their first port in the Colony and cleared from the last port of departure. The following figures are, however, available :—

Ports.	Entered in 1894.		Cleared in 1894.	
	Tonnage.	Value.	Tonnage.	Value.
		£		£
Sydney ...	1,959,435	13,564,181	1,612,179	13,790,770
Newcastle ...	721,931	424,114	1,035,930	1,485,475

The most important export of Newcastle is coal, and there are facilities for the shipment of upwards of 23,000 tons of coal daily from the Newcastle wharfs.

These are big figures. It is strange, even absurd, to peruse the writings of certain organs of public opinion at home in England decrying the progress and stability of Australia when the evidences of that progress are so great, the magnitude of its productions already so enormous, and, to those who study the position, the power of further expansion so evident. There are only three ports in the whole of the United Kingdom which carry on a more important export trade than Sydney, in spite of all the recent unprecedented fall in the market value of New South Wales products. The expansion, too, in the trade of the Colony has been very rapid. In 1871 only 794,500 tons represented the shipping cleared from all ports of the Colony; in 1881 the total was swelled to 1,330,300 tons, while in 1894 it had increased to 2,878,600 tons, and in the years to come the total will be far more considerable. The coast line is free from obstructions and easily navigated; living is exceptionally cheap to the labouring population; and the most material hindrances to progress in times past, which have been found in recurring labour troubles and in the distance from European markets, are certainly less prominent than they were. For labour disputes, measured by the number and importance of strikes, have been fewer during the past two years, and the improvements in modern shipping tend steadily towards the annihilation of distances and to the cheapening of freights. Freights have never been so low from this Colony as they are at the time of writing these remarks. The Australian people are themselves growing steadily in numbers, and in New South Wales they number four-fold what they did a quarter of a century ago. This is a land in which we are accustomed to look forward; and in another quarter of a century how small and pioneer in character all the facts and figures herein quoted will necessarily appear!



CIRCULAR QUAY, FROM CUSTOM-HOUSE.

Import Trade.

By W. G. Rendall.

There is perhaps no department of commerce which has exerted so great an influence on the wealth and progress of New South Wales, or the social condition of the community, as that of the Colony's import trade. With the loosing of her fiscal bonds the port of Sydney gives promise of becoming the *entrepôt* of Australasia and Oceana, and this can hardly be wondered at considering the unrivalled geographical position, combined with the splendid facilities offered alike for import, transhipment, or distribution. Here traders of every clime will find a ready market for their products and manufactures, to return laden with the wealth of our own soil. If the trade of New South Wales has made such substantial progress under the rule of protective duties, the expansion of operations under the flag of freedom can hardly be estimated. Recognising the advantages which must ever accrue to the trade of the port of Sydney, a brief glance at some of its details will be of interest.

Foreign trade with this Colony may be divided into two distinct branches—home consumption and re-export. The latter is by no means a small quantity in the aggregate of the Colony's annual turnover, and it is worthy of note that the volume of our export trade has been largely augmented in proportion to that of the other colonies by reason of our lighter duties and the more liberal scale of port charges. The local import trade of to-day is a totally different business from that of a few years ago. Easy communication and rapid transit have brought about a set of circumstances which the pioneers of Australian trade never dreamed of. With the advent of a liberal cable system between all the principal manufacturing and producing centres of the world, aided by voluminous codes and the choice of numerous steam services, the pulse of the local market has learned to beat in harmony with that of the Antipodes, and spot stocks now feel the effect of fluctuating cost more keenly than was the case when our supplies made long voyages by sailing ships. The result of these new conditions has not been all profit to the average importer however. The strictly "wholesale" trade is a thing of the past, and the occupation of the "middleman" has almost gone. It is now within the means of small retailers to set up as "direct importers" in every part of the Colony, and the business which once transpired within the walls of a few city warehouses has become distributed over the length and breadth of the land. This has been particularly the case with the soft goods trade, and with each succeeding season large warehousemen find it more difficult to place their goods or realise the profits of bygone days. Nor is the importer of soft goods alone in this respect; hardware merchants,

wholesale grocers, and providers have experienced a similar change in the order of things. Not only has the retailer undertaken to represent some particular house in London or on the Continent, or it may be in America or the East, but the pastoralist or agriculturist, prompted by the same example, has taken upon himself the task of importing or indenting his own woolpacks, cornsacks, or fencing wire, though it does not always follow that he makes the best bargain by so doing. Indeed, it not unfrequently happens that the would-be importer, unacquainted with the vagaries of foreign markets, pays higher prices than he would by filling his order on the spot. It is sufficient for him, however, that he has bought first-hand, no matter how much it has cost to do so.

These observations are sufficient to show that the *modus operandi* of import is easy, and that it obtains very largely among traders quite independent of the acknowledged import trade. The result of all this has been distinctly to the advantage of the consumer; moreover, the splitting up of bulk operations has brought general business nearer a cash basis, and at no previous time has general trade been in a more healthy condition than it is at present. Profits have certainly been narrowed down to a very small margin, and importers look to turning their stock over three or four times a year at 3 to 5 per cent. rather than once or twice at larger profits. Keener competition has meant being in closer touch with the world's markets, buying sparingly, and limiting credit, and the sequel has been the purification of trade and the stronger growth of confidence.

The comparatively independent position which importers occupy with relation to each other has given rise to a want of unity as regards current prices, and merchants are more inclined to sell on the basis of individual cost than on actual import values, as compared with prices ruling at export centres. This has no doubt done more to curtail bulk business than any other cause, as in the most buoyant market sellers can always be found willing to quit at below recognised ruling rates. Between the advantages for export and the rapid transit to this market, the opportunities for controlling local stocks do not often present themselves, and it is only by reason of the light stocks carried during the period of fiscal uncertainty that extra profits have been secured by "buying up the market."

The purification which trade has undergone with the experience of a retail class of business has not been without its disadvantages, the most prominent of which may be considered the increased cost of distribution. In past years it was the custom of the country trader to purchase supplies sufficient for three, six, or even twelve months' requirements. Now, however, orders are generally made up of a few cases of each line, to be renewed again from time to time. The cost of handling has necessarily become greatly increased, and buyers' prices have become weighted with extra expense in the way of selling charges, freight, and packing. The return to a short, permanent tariff, however, may be considered likely to remedy this evil in a general way, although it is most unlikely that the distributing trade of the Colony will ever return to what may be called a "bulk basis."

The currency of low prices and over-competition has stimulated a number of efforts among importers to combine for the purpose of

fixing convention rates for leading lines of goods. The life of "associations" formed for the purpose has invariably been of short duration, or they have failed to come to a working head; and, apart from the soft goods and wine and spirit trades, rules and regulations formulated by the various departments of trade have been honoured rather in the breach than the observance. The Wine and Spirit Merchants' Association, however, has proved the most successful venture of its kind, and is doing good work in the suppression of illicit distillation and the adoption of salutary measures for the regulation of the more important branches of the import trade. High duties have been synonymous with the importation of wines and spirits of an undesirable quality, and what has failed to find consumers in the local market has been readily absorbed by the island trade, to the detriment of traffic in a better standard of liquor. As the revenue derived from the import of intoxicants and narcotics amounts to nearly £1,000,000 per annum, the importance of an association having for its special object the regulation of trade in these items cannot be overestimated.

With imports valued at £15,000,000 to £25,000,000 per annum, it is not to be wondered at that competition has grown keen with manufacturing and export countries, especially between the eastern and western worlds. While increasing rivalry for the trade of Port Sydney has reduced prices to their lowest possible level, it has promoted increased communication with foreign ports, and stimulated a reciprocal interchange of natural products. The official division of the import trade of New South Wales between the United Kingdom, the continent of Europe, America, the East, and intercolonial ports, is set forth in the following table; but it is perfectly certain that the trade from and to Germany, the United States, and France, is far more considerable than these figures would indicate, and that in many descriptions of goods it is increasing. Take, as an instance, such an item as fencing wire, the imports of which in 1894 were £97,100. Of this it appeared that under £50,000 worth came from the continent of Europe, whereas in reality the true amount must have been from £80,000 to £90,000 worth, the supply of the vast bulk of the imports having passed into German hands. The imports of such goods from Victoria and other colonies merely represents the sorting up of stocks between the different ports.

Although the figures in the following table are incomplete as representing the whole trade of the Colony, they are fully sufficient to show that the operations of the port of Sydney are spread over a very wide area. It must also be distinctly remembered that the returns furnished do not include business in transhipments from ships' side, for which entry is never passed, which means that the "unknown quantity" in the export transactions must be very considerable, and would show very much larger results in the aggregate. The most superficial analysis of the table is sufficient to reveal the fact that Sydney holds the key of the Queensland and Pacific trade at least, while that of other intercolonial ports shows that the exchange of imported goods is equally important, and it may be fairly assumed that whatever increase may take place in trade with the East is pretty sure to trend towards this port.

Article.	Total.		Victoria.		S. Australia.		Queensland.		New Zealand.		Tasmania.		West Australia.		United Kingdom.		Continent.		America.		Eastern.		Pacific Islands.
	Import.	Export.	Imp. from	Ex. to	Imp. from	Ex. to	Imp. from	Ex. to	Imp. from	Ex. to	Imp. from	Ex. to	Imp fr.	Ex. to	Imp. from	Ex. to	Imp. from	Ex. to	Imp. from	Ex. to	Imp. from	Ex. to	Ex. to
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Tea	367,162	54,179	78,618	6,628	13,766	3,376	1,153	33,059	..	5,447	..	1,604	..	2,256	2,382	..	..	..	..	..	271,011	..	1,679
Sugar, raw	657,445	138,839	86,793	17,700	35,974	1,971	460,378	4,016	100	42,961	..	65,704	..	211	24	233	..	..	..	108	74,025	150	4,770
Flour	214,253	12,894	130,093	..	83,242	..	384	10,214	403	375	..	163	..	..	....	..	..	..	..	..	..	..	2,131
Currants and Raisins	42,150	6,757	7,101	853	3,445	82	..	3,250	..	1,866	..	377	..	48	23,910	..	7,114	..	411	..	..	..	175
Dates	8,155	450	305	21	186	12	..	231	..	70	..	74	..	19	5,334	..	2,270	..	..	..	..	..	..
Fruits, dried & candied	11,701	2,296	784	214	801	192	182	1,213	..	207	..	91	..	95	4,099	..	1,267	..	4,264	..	..	..	175
Candles	44,075	10,620	3,120	2,361	6,180	86	..	6,107	..	..	..	1,457	..	30	9,604	..	25,048	..	..	..	..	..	571
Jams and Jellies	10,474	2,292	1,408	192	2,864	82	..	530	..	70	2,223	48	..	391	3,896	109	..	..	..	172	..	..	599
Condensed Milk	48,294	6,080	889	564	5,940	510	..	967	..	736	..	22	..	842	33,207	291	8,088	..	529	701	..	..	1,300
Pickles and Sauces	41,401	4,433	1,865	95	3,643	299	..	3,013	..	115	..	120	..	165	33,529	..	..	..	..	..	1,810	..	572
Salt in bags	46,009	6,959	4,378	75	10,406	..	231	3,987	..	1,142	..	829	..	..	30,529	283	465	..	..	..	..	.	631
Starch	25,592	1,235	2,275	..	747	..	..	723	..	44	..	341	..	37	14,720	..	7,838	..	..	..	..	..	173
Soap	34,635	6,429	8,290	398	1,917	167	..	942	..	199	..	155	..	..	21,171	..	125	..	2,844	100	20	..	2,817
Fish, dried & preserved	53,303	10,593	3,195	1,742	3,119	752	289	3,875	485	467	..	663	..	..	24,639	..	808	..	19,089	128	..	83	2,452
Tobacco, manufactured	76,441	30,084	11,130	1,296	6,738	1,080	..	7,066	703	1,437	..	219	..	905	40,382	215	..	..	16,209	154	..	..	17,492
„ unmanufactured	16,535	3,127	639	137	83	..	..	2,786	..	143	..	61	..	..	1,309	..	..	..	14,400	..	..	..	..
Linseed Oil	35,255	4,189	873	1,190	464	163	..	1,779	..	71	..	101	..	..	31,703	..	..	..	..	..	2,180	..	826
Kerosene	64,137	12,240	5,254	2,315	3,593	239	423	1,676	..	2,165	..	837	..	177	....	119	..	..	54,867	59	..	62	4,586
Drapery	1,544,144	97,025	86,837	15,508	21,258	7,120	6,941	30,588	7,335	8,743	190	1,170	443	1,102	1,389,865	4,339	14,518	384	3,005	47	2,854	40	27,916
Wearing Apparel	756,370	32,769	49,918	4,892	18,654	2,982	2,816	11,626	3,248	3,483	164	2,094	361	1,296	635,331	2,467	38,236	34	6,791	218	752	..	2,698
Timber, rough	243,370	32,419	5,643	15,200	105,509	701	1,473	1,506	58,063	6,289	137	79	..	573	3,705	1,497	..	122	63,942	434	..	341	5,668
Tools of Trade	85,547	10,332	8,215	541	5,988	1,780	497	4,130	..	219	..	35	..	784	30,897	31	2,889	70	36,942	..	..	..	2,733
Galvanised Sheets & Bars	202,211	26,434	10,482	757	4,593	233	3,725	17,857	..	257	..	393	..	560	180,946	23	2,448	..	..	..	..	..	6,354
Fencing Wire	97,434	14,746	8,127	2,164	7,906	3,286	171	4,837	50	3,205	..	1,007	..	82	31,358	37	49,822	..	..	..	..	..	128
Barbed Wire	6,942	1,283	492	..	..	..	40	1,283	..	..	..	25	..	30	2,213	..	974	..	3,223	..	..	..	428
Nails	25,058	2,072	1,034	245	784	65	75	935	..	104	..	140	..	..	8,834	..	12,500	..	1,787	..	..	..	562
Hardware & Ironmongery	158,334	34,356	24,187	2,084	5,371	1,321	699	15,264	355	1,837	..	320	..	974	94,505	936	7,814	265	24,789	35	..	37	11,528
Leather	74,406	241,848	9,962	4,236	1,810	1,717	432	7,037	381	4,470	..	143	..	752	29,130	220,167	4,278	1,176	27,942	57	..	967	96

With reference to the Pacific Island trade, it is worthy of note that the change in the fiscal policy of the Government is already showing indications of increased trade with Sydney, and this has been made more apparent by the expansion in transactions between the west coast of America and Sydney, which gives promise of enhancing the volume of trade with the Pacific, and nothing can be more conducive to its development than the improved steam service which is now available in that direction. One of the most practical and significant features in connection with the development of this trade has been the recent establishment of an oil-mill in Sydney for the treatment of copra or cocoanut, for the extraction of cocoanut oil and the manufacture of oil-cake. In opening this new venture, which is the first of its kind in Australia, if not south of the Equator, Lever Brothers (Limited) will concentrate in Sydney a large proportion of raw material for manufacture which previously was only transhipped for London. Not only will the island trade be directed to our port by this new project, but with the manufacture of oil-cake the dairy-farming industry will receive a stimulus which will place butter manufacturers and exporters beyond the dangers of droughts and their disastrous effects. Sydney being in a position to shortly absorb the bulk of the copra production at her doors, will hold an impregnable position with respect to a reciprocal trade with the islands, and a glance at the table given above shows that this is no small quantity. The expenditure of some tens of thousands of pounds of English capital in such a venture is at once significant, and illustrates in a practical way that English manufacturers have some confidence in the future of trade in Sydney. This undertaking is one which must necessarily succeed, inasmuch as all the oil which can be produced here will be at once absorbed for manufacturing purposes by the Company mentioned at their English works, so that a market is secured which will stand to the producer without fear or favour. Under such advantageous conditions the future of our trade in the direction of the Pacific seems assured.

A cursory glance at the details of the import trade in some of the items enumerated may not be out of place, as the trade of Sydney carries with it distinctive features of interest to the foreign manufacturer, producer, and the local importer alike, and which may be summarised thus :—

Tea.

Until quite recently the direct import of tea to New South Wales was a small proportion of the trade done with Australia. Now, however, this commodity has taken a strong list Sydneyward, and competition has grown strong between China and the more enterprising growers of India and Ceylon for a first place in our markets. Recent Eastern hostilities certainly gave a great fillip to business with Colombo, and Calcutta has left no stone unturned to be well within the running. The result has been heavy consignments and large offerings at auction, upon which the blender and retailer have thrived at the expense of growers and importers. India has proved a powerful rival both in quality and price, which has tended to flood the market with common descriptions, and not always of a very desirable quality, against which Ceylon has held her own fairly well, notwithstanding the loss of

demand for higher grades. China teas, however, especially the finer descriptions, have suffered materially in the conflict, and costly Foochows have long since been banished to the realms of neglect.

Sugar.

The periodical apparition of "beet sugar," either of continental or threatened colonial production, has levelled the market for Queensland sugars fully 50 per cent. during the past few years, while China, Java, and Mauritius have been active in reducing prices to their present level of £15 10s. in bond. The introduction of beet sugar has not proved a success, inasmuch as recent shipments have invariably resulted in "sweated" cargoes, involving importers in heavy loss. Although the partial failure of the 1895 Queensland crop has strengthened market values, prices have been so completely held in equilibrium by Mauritius and other imports, chiefly to the southern colonies, that the realisation of higher prices has been out of the question.

Breadstuffs.

The return to freetrade has heralded what may be regarded as a phenomenal departure in wheat and flour transactions. At the moment of writing over 20,000 tons of wheat, and several thousand tons of flour, are on the way from San Francisco to Sydney as the first bulk instalment of American breadstuffs to aid in making good the shortage in the 1895-6 wheat crop, which is estimated at between 4,500,000 and 5,000,000 bushels less than the Colony's requirements. This wheat is being brought alongside our wharves at 3s. 4½d. to 3s. 5d. per bushel (c.i.f. and e.), as compared with 4s. to 4s. 3d. for new season's local wheat, although 4s. 6d. was paid by Sydney millers for the first parcels of new wheat. Considering, however, that the prices paid to farmers the previous season only averaged 1s. 10½d. per bushel, there is no reason to complain at competitive value of grain introduced duty free. Flour is in a very similar position. The present quotation is nominally £10 10s. to £11 (£1 per ton duty paid), as against £6 10s. a year ago, so that the import of American flour at a concession of £1 to £1 10s. on ruling rates can hardly be considered a calamity by the local miller. Victoria and South Australia will prove light contributors to local requirements for 1896, so that the advent of American wheat and flour may be regarded as very opportune.

Dried Fruits.

Notwithstanding the fact that this market has had to exist under the burden of a 50 per cent. duty in the past, the volume of business has been very considerable as well as expansive, especially during the latter part of the year just closing. When it is stated that currants purchased at 11s. (f.o.b., London) are sold by importers at 1¾d. to 1⅞d., and elemes or sultanas, first cost of which is 15s. 6d. and 19s. 3d., are quoted at 2⅛d. to 2¼d. and 2¼d. respectively (duty under the existing tariff on which is 2d. additional), it will be seen that profits are not large, and this is considered a good year, as the margin of one-eighth of a penny per pound is about 50 per cent. above the past five years'

average. Dates are sold at 1¾d. as against a cost of 10s. 6d. (f.o.b., London), but on the better classes of dessert fruit the margin is slightly better. It was generally expected that the irrigation schemes which have been floated at Mildura and elsewhere would have resulted in the heavy production of colonial dried fruit, but so far the ventures have not had any appreciable effect on the local market. America has been the only rival to Southern Europe who may be regarded as having appropriated any of the Australian trade, and business with the United States in all kinds of fruits is certainly on the increase.

Preserves.

The reduction in the price of sugar, and the extension of orchard farms throughout the Colony, has had a direct effect on the import of jams and preserves, more especially in the better classes of goods, which have made severe inroads into the volume of business with the United Kingdom, and with a liberal supply of these goods at 5s. per dozen for reputed 1 lb. tins, and 6s. 6d. for English lipped glass jars, local manufacturers have a pretty good hold of the trade. What importation is done lies between Tasmania and Victoria, with a moderate contribution from South Australia, and the balance from the United Kingdom, while the bulk of exports go to Queensland and the Pacific Islands.

Oil-stores.

The import of pickles and condiments has suffered with increased local production of a better article at a lower price, while potted meats have been slightly influenced in a similar manner. The extension of dairy farming has had no visible effect on the importation of condensed milk, for which there is an ever-increasing demand, especially in the droughty areas of this and the northern colony. Several efforts have been made to produce this article locally, but, on the principle "that the imported article must be the best," consumers have not taken kindly to the local production, notwithstanding its superior quality and lower price, which is 5s. 9d. per dozen, as against 6s. 3d. for the imported article (1d. per lb. duty paid). It is worthy of note that a large quantity of pickles and sauces are put up locally, which are represented as English or Eastern pack, and the attractive get-up of these goods has given them extensive sale. No doubt the advent of freetrade will have a salutary effect on trade in these items. Despite such undesirable competition, the import of reputable brands of condiments has held its own fairly well, and for pickles worth from 5s. to (say) 6s. per dozen laid down cost there is an active demand. Business in starch has been chiefly confined to the United Kingdom and the Continent, on a basis of about £25 per ton cost. Local manufacture has not been attended with much success, although a good deal of cornflour has been produced on the spot. America, England, and the southern colonies have contributed liberally to the supply of fancy and special kinds of soap, in addition to extensive manufactures of commoner descriptions on the spot, so that prices have been pretty well levelled to their present limit of 12s. 6d. to 13s. per cwt. for the latter. Preserved fish, especially tinned varieties, have had a good deal of

attention, with an increasing demand for American goods. The consumption of canned salmon in Australia is about 60,000 cases per annum, of which 20,000 are taken by Sydney and 25,000 by Melbourne. Prices this month (December) have reached the satisfactory level of 5s. 6d. for pink, 6s. for red Alaska, and 7s. for Skeena (1d. per lb. duty paid). Cheap sardines have also been scarce and in request at 2s. 9d. for quarters. Demands for these goods have, on the whole, fallen off owing to the lighter observance of the Lenten period, combined with the cheapness of other classes of goods and the larger supply of fresh fish from our local waters, as well as from New Zealand and America, which has largely affected the European trade.

Oil and Kerosene.

English brands of linseed oil have had to meet strong competition with Calcutta. The present position is, as compared with £19 10s. per ton (f.o.b., London), 2s. 6d. per gallon for English and 2s. 4d. for Indian (each half and half raw and boiled). Castor, China and other kinds are on a parity of value ruling in the East, although more often than not they are below the level of the ever-shifting markets at producing centres. The kerosene market has been mainly at the bid of the American Standard Oil Company and American speculators, while local manufactures from shale have had trifling attention at about 2d. a gallon under imported oil. Even protected to the extent of 6d. per gallon, the manufacture of kerosene has not paid except in the matter of by-products. The local market being supplied by sailing ships from New York, provides ample opportunity for local speculation with the 40,000 or 50,000 cases generally held in bond, but the results are not as satisfactory to importers as might be expected, owing to the large number of small holders who keep prices at bed-rock levels.

Candles.

It is a remarkable fact that antipodean manufacturers absorb our tallow staple, and return in the form of candles at lower prices than they can be manufactured for on the spot, and this is even more to be wondered at when it is known that local makers of these goods have laid down the most costly and perfect machinery and plant known to the trade, but without effect so far as competitive prices with Germany are concerned, although the colonial article leaves nothing to be desired either in quality, appearance, firmness, or illuminating power. Prices for the better grades of local stearine candles range from about 5½d. to 5¾d., as against 4¾d. in bond or 6¾d. duty paid for the best imported kinds. A large number of inferior goods are put up on the spot, selling as low as 3½d. Germany, both direct and through London is by far the largest contributor to this Colony's requirements, although, as will be seen above, Victoria and South Australia lend a good deal to our imports. The extension of the use of gas, electric light, and kerosene, and the low charges for these fuels and illuminants, have considerably curtailed the demand for candles, and during the past two or three years especially the falling off in trade has been very pronounced.

Metals and Hardware.

There is no department of trade which has shown such a satisfactory response to improved cost as that of metals. For some years until the middle of that just closing the hardware trade of this Colony, in common with that of Australia, was in a most deplorable condition. Small demand, keen competition, and sacrificial prices often prompted by financial straits, were few of the many drawbacks the larger and sounder import houses had to contend with, and the losses made were very considerable. The present year has led the hardware trade to fresh pastures however, and the general character of business has been most encouraging. Unfortunately stocks have run down so low as to give merchants very little opportunity of recovering much advantage from old low-level cost prices; on the whole, however, the position is very cheering, and this department of the import market has never been in such a satisfactory condition to welcome the return of freetrade as at the present. Some items have shown results far beyond expectations; barbed wire, for instance, has improved to the extent of fully £3 10s. per ton, the present price being £14 per ton in bond. America has quite distanced English and German competitors in the supply of this article, and on all hands the American product has been pronounced superior alike in quality, finish, general utility, and price. Germany has retained the largest share of business in fencing wire owing to the lower prices demanded as compared with English manufactures, notwithstanding the efforts of British makers to introduce "rolled" as a substitute for "annealed steel drawn" wire. Continental manufacturers have also made a strong bid for the supply of baling hoops, both black and galvanised. Spot values for these lines, although greatly improved, are not yet up to a very profitable standard, as the present ruling quotation of £7 7s. 6d. for No. 8 and £7 12s. 6d. for No. 10 fencing wire is fully 5s. under laid down cost. The same state of things prevails with galvanised iron, ordinary brands of which are worth £15 to £15 5s. in bond, although stocks could not be replenished at the price. Iron bars, plates, and sheets, tees, angles, and the like, have found increasing demand at higher prices. Stocks of nails, Muntz metal, zinc, and similar lines have become so completely skeletonised that there is every reason to believe that in spite of the higher range of values ruling the import of these lines will show rapid expansion. Tinplates, too have run up to 13s. as their high-water mark, and anything above 12s. is regarded as a certainty for some time to come. Operations in this line are pretty extensive, and imports are valued at £60,000 per annum. America has proved a lion in the path of English and Continental manufacturers of tools of trade and general ironmongery so far as this Colony is concerned, as will be seen by the figures given above.. In the colonies "lightness combined with strength" seems to be the great desideratum in this class of goods, and the "Utili Dulci" trade-mark, which American goods seem to bear, has threatened to completely displace the more familiar wares of conservative English manufactures, or the common-place goods purporting to be "made in Germany." In this connection too Continental manufacturers have not been slow to adopt the names of English manufacturing centres to furnish their goods with a passport to Australian consumers.

Trade in tools and hardware is certainly inclining towards the United States, and with the increasing communication with that busy manufacturing world the older channels seem likely to become neglected.

Leather.

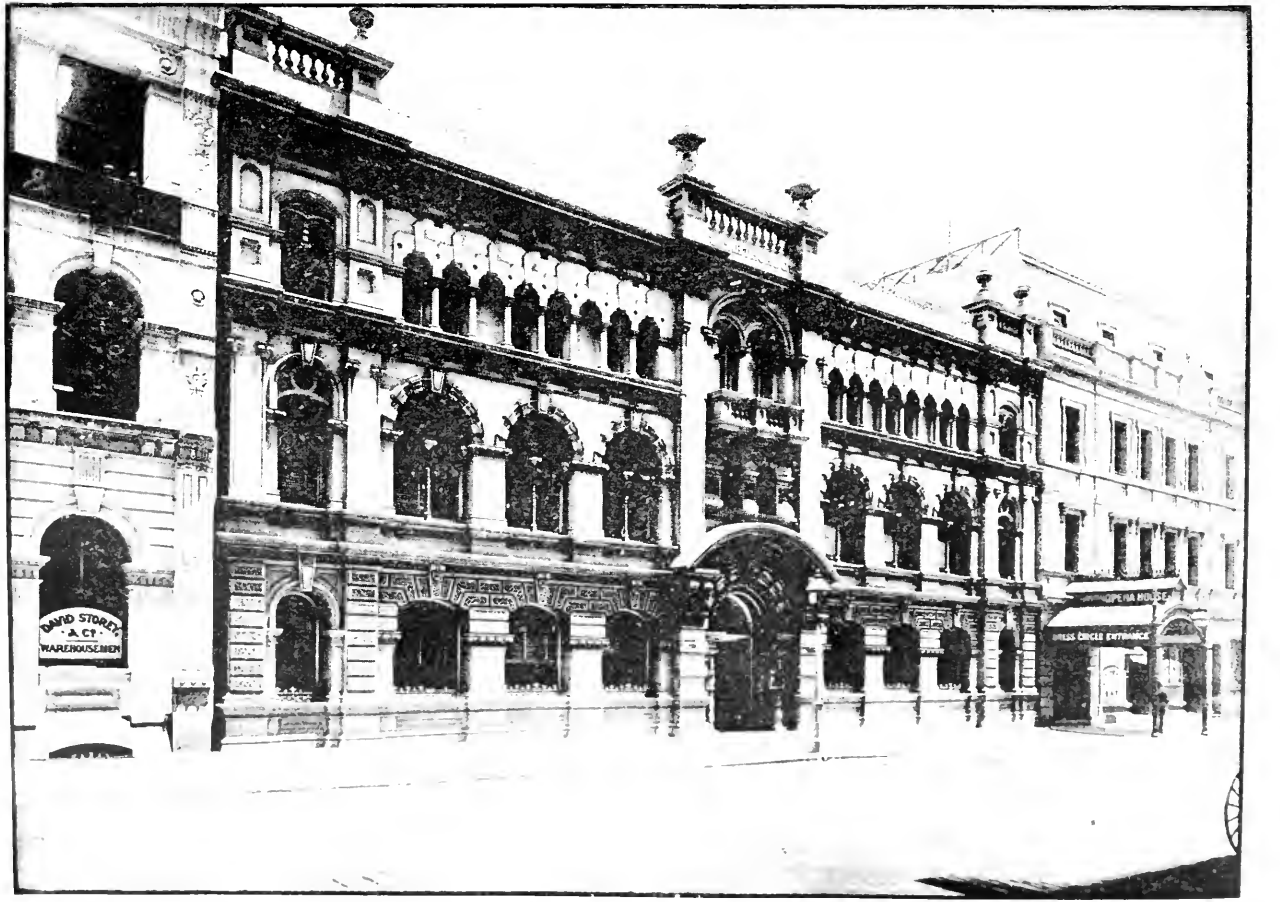
Notwithstanding the important place this and the northern colony hold in the export of hides (and recent operations have been on an increased scale), the local tanneries have failed to grow independent of the outside world. Here again the American manufacturer asserts himself strongly, vieing with the English market for the supply of our wants, which he does by one-third. With an export of three times that of our imports, it is almost a wonder that we should require to approach foreign markets, but no doubt time will effect a great revolution in this particular, as already the local manufacture of leather goods has become an important industry, so much so that some of our factories boast of the most modernised appliances in the world.

Soft Goods.

Reference has already been made to the distribution of the imports of this most important class of manufactures, contributing as it does about one-fifth of the entire revenue of the Colony. The volume of imports has been practically untouched by local manufacture, and even the most optimistic forecast of the manufacturer cannot bring within measureable distance the establishment of self-supporting industries for the absorption of the bulk of our great wool staple locally. Meantime, the supply is practically in the hands of English and foreign houses, and the variety and extent of the requirements of this Colony, as well as the demands made upon its stocks from other consumers, are such as to encourage the importer to believe that in spite of the retail character of the distributing trade, this Colony has an immense future before it, and one which gives promise of placing the port of Sydney at the head of the list of commercial centres south of the line, not only in the import and distribution of soft goods, but in all manufactures which are inseparable from the extension and progress of civilisation.

Import Charges.

Costs incidental to import form an important factor in the import trade, and one which cannot fail to have the closest attention of both importers and producers or manufacturers at sources of supply. The Australian trade presents peculiar advantages in the matter of freight at the opening of the wool season, when bottoms can be secured at English berths at 50 per cent. or even greater reductions on current rates. This was brought under very prominent notice last season when several outward-bound ships to load wool were supplied with cement at the rate of about 1s. per cask, as against 2s. to 2s. 3d. in the ordinary course. This is a matter which is worth the closer attention of English and Continental shippers, and one which would amply repay investigation. Competitive steam rates have done much towards reducing sail freights, indeed so much so at times that fears have been entertained that the white wings of cargo traders will ere long become



M'ARTHUR & CO.'S WAREHOUSE, SYDNEY.

extinct in Australian waters. In prospect of the expansion of trade with Sydney, however, this calamity to shipping should be averted, and although a lower range of freights may be paid than in the past, there is every reason to believe that the actual tonnage required will be much larger. The charges made at the port of Sydney, although lower than at either of the sister colonies, are now having a good deal of attention, and the probabilities lie in the direction of lower rates. The present tonnage charges are 4d. per ton in, one payment holding good for any number of movements in and out for a period of six months. The pilotage charges are 4d. each way, and £3 for each removal within the harbour, to which has to be added other importers' costs, such as wharfage 1s. 8d. per ton dead weight, on the associated and Government wharfs, and by arrangement on private wharfs. Goods which may become subjected to "imperfect entry" are frequently laden with excessive charges in the matter of wharfage. Cartage, 2s. per ton. each way in and out of store; commission, 1 per cent.; discount, 2½ per cent.; and exchange about 3½ per cent. (60 days) comprise the most important charges attaching to imported goods. In the case of transhipment the items of wharfage and cartage are omitted, and that of 2s. per ton lighterage substituted, which is a distinct advantage to the importer selling for export. Bonding and store charges are made upon all goods which are not taken immediate delivery of. The aggregate charges at the port of Sydney are the lowest imposed at any port in Australia, except Newcastle, where concessions are given in the way of remission of wharfage, which is under the control of the Government.

Wool Industry.

By Henry W. Wright.

The development and prosperity of pastoral enterprise in the Australasian group of colonies, and particularly in New South Wales, since the dawn of the present century are not only marvellous in themselves but without parallel in the history of states. The growth of the cotton trade in the southern portions of the United States of North America has undoubtedly been sufficiently remarkable to constitute one of the principal of the many features of industrial expansion which have marked the course of the same period; but even that gigantic industry can show no such stupendous an increase as has been witnessed in the case of the Australasian wool trade, nor can the pecuniary results derived from the growing and exportation of the great vegetable textile fibre in North America be for one moment compared to those which have accrued from the promotion of wool-producing interests on this Continent. Born almost with the birth of the mother colony herself, the national industry—mainly through which it has been possible for Australia to advance—of producing what may justly be regarded as the most valuable fibre used in the manufacture of textile fabrics has gone on expanding decade by decade until for some time past Australia has stood unrivalled among all the countries of the world for the quality and quantity of her wool products.

The handful of sheep in this colony a hundred years ago have given place to countless numbers, which have spread throughout Australasia and are now approximately estimated at upwards of 121,000,000. This rapid spread of the flocks has fortunately been accompanied by a no less surprising growth in the colonial wool trade. Happily truly marvellous advances in the manipulation of raw wool and other fibres of a like kind, and in the manufacture of textiles in the old world, have been coincident with the development of pastoral enterprise in the southern hemisphere. But for this fact such phenomenal progress as that witnessed in the Australian wool trade could scarcely have been possible. The people of these colonies as a body freely acknowledge the debt of gratitude they owe to those who first formed flocks of fine-woolled sheep in New South Wales; but the good which has either directly or indirectly accrued to these young countries through the successful efforts of such captains of industry as Donisthorpe, Lister (now Lord Masham), Isaac Holden, and others, in Yorkshire and Lancashire, is probably less generally recognised and is certainly less frequently referred to. It was mainly through the instrumentality and wonderful ingenuity of these and

A LOAD OF WOOL.

contemporary inventors that it became possible for the manufacturing industries to expand with sufficient rapidity to absorb the ever-increasing supplies of raw material produced in Australia. Not only has the nineteenth century witnessed almost incredible results in the way of mechanical invention, but also in the development of inherent capabilities of taste, and as a consequence, in times of normal trade, the wool products of this continent have always been in great request, and the comfort of woollen and worsted wear has been extended to millions of people who even half a century ago could not have aspired to its use. At the outset all the wool grown in this colony was consigned to London for sale, and this method of dealing with the annual output for long remained the most popular one, notwithstanding the fact that by its adoption growers practically lost all control over the disposal of their produce, and had moreover usually to wait patiently for the best part of a year to elapse before the actual result of the sale of same became known to them. With the progress of modern industrial civilisation, and the improvement and extension of the mechanism of distribution, the isolation of small and remote communities has long ceased, until to-day, through the medium of steam and electricity and trade competition, the whole world has become a neighbourhood so to speak. Nowhere is this more clearly recognised than in Australia, where, as the tendency of commerce to draw the producer and consumer into closer relationship with each other gradually acquired momentum, the old-time system of dealing with the annual wool clip was completely changed, and large local markets for the sale of our principal product were successfully established. Once the wool-combing machine was brought to perfection, people in all parts of the world were encouraged by the increasing supplies of raw material and the facility with which the newest machinery could be obtained from England to seek to fill their own requirements in the way of textile fabrics, and were no longer content to turn to Yorkshire and Lancashire for nearly every stitch of clothing. On the continent of Europe the development of manufacturing interests was especially very rapid, and in the race for commercial success and distinction which followed in the train of the partial shifting of trade from its old and accustomed channels, the movement in the direction of acquiring the raw material at the various points of production was speedily initiated. In having to visit London and buy wool there Continental users soon found themselves at a great disadvantage as compared with their English competitors, whose closer proximity to that *entrepôt* naturally enabled the latter to land their purchases in the factories at a less cost and in less time than was possible in the case of wool bought in London for use in the French and German industrial centres. It gradually became manifest that the only way for the manufacturers outside the United Kingdom to equalise matters was to go beyond London and purchase at least a portion of the wool required at first cost in the colonies. In this way wonderful changes soon came to pass in the colonial wool trade. French and German buyers quickly became staunch supporters of the system of selling wool in Sydney, Melbourne, and Adelaide, and the operations of a comparatively few firms speedily forced others to follow suit or content themselves with running the risk of having to take merely a secondary

position among the textile workers of the world. Once fairly established, the Australian markets grew at a marvellous rate. They came into existence because they filled a natural want, and the business now annually transacted in the leading selling centres is on a scale of such magnitude as to warrant the belief that the time is not far distant when all the wool grown in Australia will be sold locally, prior to shipment. Some colonies there are in which markets have not yet been established; but notwithstanding this, during the past two years 50 per cent. of the total quantity of wool produced was disposed of on the spot chiefly to English, Continental, and American buyers, some small quantities being purchased for the far East, with which latter quarter there is a prospect of a large direct trade being done in years to come. Users have found that by securing the first pick of the clip each year in Australia, and by making their own freight and insurance arrangements for their purchases of wool, important economies are possible; while from the building up of markets at his door, the grower has likewise reaped unlooked for advantages. To the latter, the personal supervision of the sale of his produce, which he is thereby able to exercise, is no small matter, and the promptness with which the whole transaction is completed, and the net proceeds of the sale are made available, is another important consideration. The grower has also derived great good from being brought into close contact with his best customers, with whose requirements he thus becomes more thoroughly familiar. For long past it has been the practice to sell all the wool dealt with in the Australian markets by public auction, and for cash before delivery. Public wool sales were inaugurated in Sydney by Mr. T. S. Mort in the year 1843, at which time the buying was nearly all done on speculative account, but few purchases being made for direct shipment to the mills in Europe and America, as at present. No record of the annual turnover in wool in the Sydney market since auction sales of that product were first held has been kept; but this is a matter of small moment, as it is more particularly during the past decade that the local market has assumed really important dimensions, and for that period the returns are available and are as follows:—

SYDNEY Wool Sales from 1884–5 to 1894–5.

Season.	Bales Offered.	Bales Sold.	Increase in Sales.
1884–5	172,501	112,906	——
1885–6	178,360	116,576	3 per cent.
1886–7	174,924	128,734	10 ,, ,,
1887–8	227,466	162,511	26 ,, ,,
1888–9	268,284	209,252	28 ,, ,,
1889–90	268,790	234,419	12 ,, ,,
1890–1	333,876	251,314	7 ,, ,,
1891–2	361,880	278,304	10 ,, ,,
1892–3	398,010	362,365	30 ,, ,,
1893–4	455,571	401,830	10 ,, ,,
1894–5	485,509	425,135	5¾ ,, ,,

WOOL CHART

COMPILED BY

WRIGHT & ABBOTT,

Lakeside Wool-Scouring Works,

SYDNEY.

Table showing Fluctuations in Prices of Good Sydney Merino Wool in the London Market from 1883 to date.

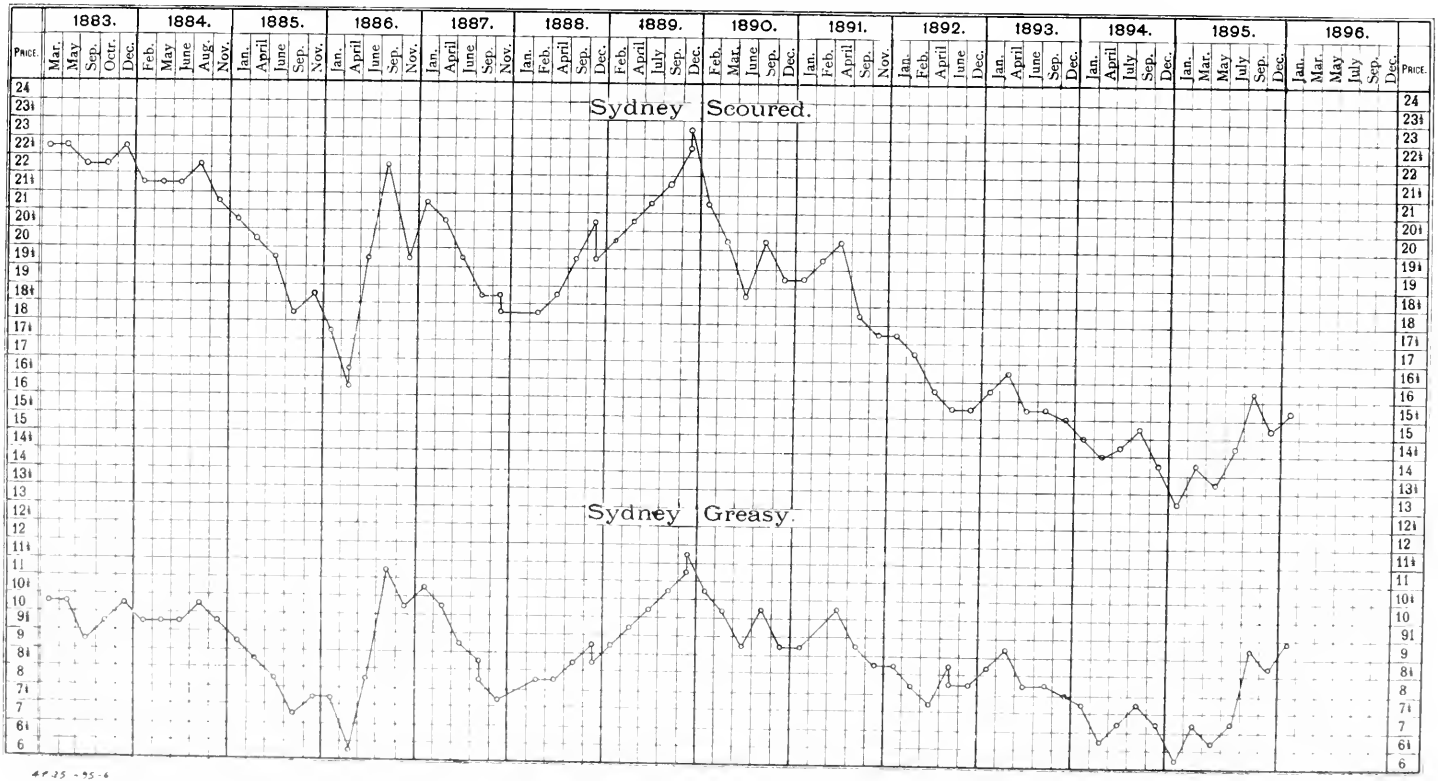


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PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

The foregoing figures afford a striking illustration of the growth of the Sydney wool market, an increase in the sales since season 1888-89 of 100 per cent. being shown. For many years past Sydney has ranked as the principal wool emporium in Australia, and if there is one thing more clearly demonstrated than another in connection with the wool trade here, it is the independence in the long run of this interest of anything like artificial encouragement. That a locality so naturally favoured by its geographical position and splendid shipping facilities as Sydney should year by year accentuate a prominence gradually gained by the possession of these advantages, is perhaps not so very surprising; but it must be borne in mind that a very large proportion —nearly one-third—of all the wool grown in New South Wales still finds an outlet *via* the border, and is either sold or shipped from Melbourne or Adelaide. Large quantities of the staple are also owing to the financial arrangements of growers forced past Sydney every year to other and less important markets, where higher selling charges are, moreover, in vogue. Complaints are constantly being made that many station properties cannot now be worked so as to enable the owners to properly fulfil financial obligations entered into some years ago, and pay interest on mortgages; and there can be no question that so long as the produce of such properties is hauled unnecessary long distances, and saddled with unnecessary intercolonial freightage, the capital employed will naturally be robbed of no insignificant proportion of its legitimate due. A cursory glance round the magnificent wool stores to be found in Sydney will at once show that the commercial principles, energy, and enterprise, which have already built up a colossal trade in wool here, such as has no parallel in any other colony, may be relied upon to accomplish even larger successes in the future than any achieved in the past.

The relative importance of the Sydney market at the present time will be most clearly seen by the following returns, which show the quantities of wool sold in all the Australian markets between 1st July, 1894, and 30th June, 1895:—

AUSTRALIAN Wool Sales.

Market.	Bales sold.
Sydney	425,135
Melbourne and Geelong	329,568
Adelaide	64,765
Total	819,468

The distribution of the foregoing quantities of wool is approximately estimated as follows:—

	Bales.	Percentage of Total Sales.
United Kingdom (Home Trade) ...	210,600	25¼
Continent of Europe	465,600	57
America	47,200	5¾
India, China, and Japan	5,600	0½
Local Manufacturers and Scourers ...	90,400	11
Total	819,400	

The purchasing power has at all times kept steadily abreast of the growth of the local wool markets, to which large numbers of buyers flock from all points of the compass with the approach of each wool season. Many manufacturers now find it to their advantage to be permanently represented in Sydney, where, in consequence of the increasing support accorded to the market by Queensland growers, who shear early, a large business in wool is regularly transacted all the year round. Undoubtedly the most prominent feature in connection with the Sydney wool sales is the ever-increasing direct trade done with Continental users of the staple; and the wonderful development of industrial enterprise on the Continent of Europe is, probably, largely due to the foresight exercised by those by whom it is directed in being so well represented at all the great producing centres of Australasia and South America. In Yorkshire less disposition to move out of old grooves has been shown, partly because the coarser varieties of wool, more peculiarly adapted to the Yorkshire trade, have not hitherto been largely grown here, and partly because English manufacturers, through their close proximity to London, derive some advantages over their foreign rivals. With the industrial centres of the United Kingdom a large direct trade is, however, done every year, and this will, doubtless, expand more rapidly in the future than it has done in the past, owing to the cheapening in transit charges brought about by the building of the Manchester Ship Canal. Tariff tinkering in the United States has hitherto formed an insuperable hindrance to the development, on anything like a satisfactory scale, of reciprocal international trade between Australia and America; and the quantity of wool purchased in Sydney for the latter quarter fluctuates year by year, but, on the whole, remains comparatively small, notwithstanding the efforts repeatedly put forth by American users of the staple to obtain a firm footing in the colonial wool market. The most serious interference to the progress of the American manufacturer of woollens and worsteds has come from his cramped and uncertain position, which renders him utterly unable to compete successfully in the long run with his rivals in other countries who steadily enjoy free access to the world's sources of supply of raw material, and are thus enabled to turn out the soft and supple goods demanded by modern civilization at reasonable rates. Fortunately for growers of wool in Australia no class of manufacturers of such textile fabrics as owe their primary origin to the animal kingdom can afford to even partially close their doors to the productions of this Continent, as without them it is impossible to obtain the best results, whether it be in the manufacture of articles either of utility or ornament. Few creatures are there of greater variety than the genus sheep, and few are so widely scattered over the different parts of the globe. Coming originally, as there is reason to believe it came, from the mountain fastnesses of Western Asia the sheep has spread throughout the world developing distinctive features in different places, and these local variations, engendered by culture, feed, climatic, and other causes, have become permanent characteristics. The requirements of the present age necessitate the unencumbered use of the fine-haired descriptions of wool grown so largely and successfully in Australia. In this wool the individual fibre embraces not only unequalled softness, elasticity, brilliancy, and pliability, but possesses lorications

WINCHCOMBE CARSON, & CO.'S WOOL SHOW ROOM, PYRMONT, SYDNEY.

Sydney and Newcastle; but the growth of the wool export trade as a whole during the past thirty-five years can easily be seen by the following table, compiled by the New South Wales Government Statistician, in which the weights given represent the actual exports, washed and greasy wool being taken together :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	lb.	£		lb.	£
1860	14,962,362	1,454,289	1878	111,833,017	5,723,316
1861	18,171,209	1,768,978	1879	123,710,450	6,491,198
1862	20,988,393	1,801,186	1880	154,871,832	8,040,625
1863	15,842,520	1,316,520	1881	139,601,506	7,149,787
1864	25,827,917	2,294,615	1882	146,221,182	7,433,091
1865	29,858,791	2,283,560	1883	188,161,710	9,598,761
1866	36,980,685	2,830,348	1884	173,986,303	8,953,100
1867	27,327,452	2,125,737	1885	168,151,659	7,246,642
1868	27,067,256	1,960,360	1886	173,985,640	7,028,596
1869	51,269,672	3,162,522	1887	216,450,342	8,911,155
1870	47,440,610	2,741,141	1888	235,848,944	9,089,776
1871	65,611,953	4,748,160	1889	261,853,484	10,620,636
1872	50,233,453	3,342,900	1890	236,322,828	8,991,396
1873	62,998,692	3,936,408	1891	331,887,720	11,036,018
1874	75,156,924	5,010,125	1892	312,225,293	10,211,456
1875	87,534,280	5,651,643	1893	318,782,858	9,675,061
1876	100,736,330	5,565,173	1894	331,774,424	9,011,790
1877	102,150,246	5,256,038			

In the wool trade itself the most popular method of gauging the annual output of wool from New South Wales and its value is to take the quantities exported as furnished by the Customs authorities, and base the total value of the clip on the average value per bale, as ascertained by the actual results obtained for that portion of the clip which is sold in the Sydney market. Looked at from this point of view, the position of the industry during the past three years is shown in the following tables :—

New South Wales Wool Production from 1st July to 30th June.

	Season 1894-5.	Season 1893-4.	Season 1892-3.
	Bales.	Bales.	Bales.
From Sydney to British and Foreign Ports	697,333	661,303	585,086
From Newcastle to British and Foreign Ports.....	58,436	58,133	52,779
From Sydney to Victoria	34,485	34,099	30,793
From Newcastle to Victoria	7,218	8,254	5,633
Borderwise to Victoria	247,404	229,494	201,076
Borderwise to South Australia	56,972	45,854	42,733
Borderwise to Queensland	1,942	1,637	2,766
	1,103,790	1,038,774	920,866
Less imported from Queensland and other places.....	77,299	74,798	44,105
	1,026,491	963,976	876,761

NUMBER OF SHEEP AND LAMBS OF THE PRINCIPAL WOOL-PRODUCING COUNTRIES OF THE WORLD TO LATEST DATES OBTAINABLE.

Compiled by Wright & Abbott, Lakeside Wool-Scouring Works, Sydney.

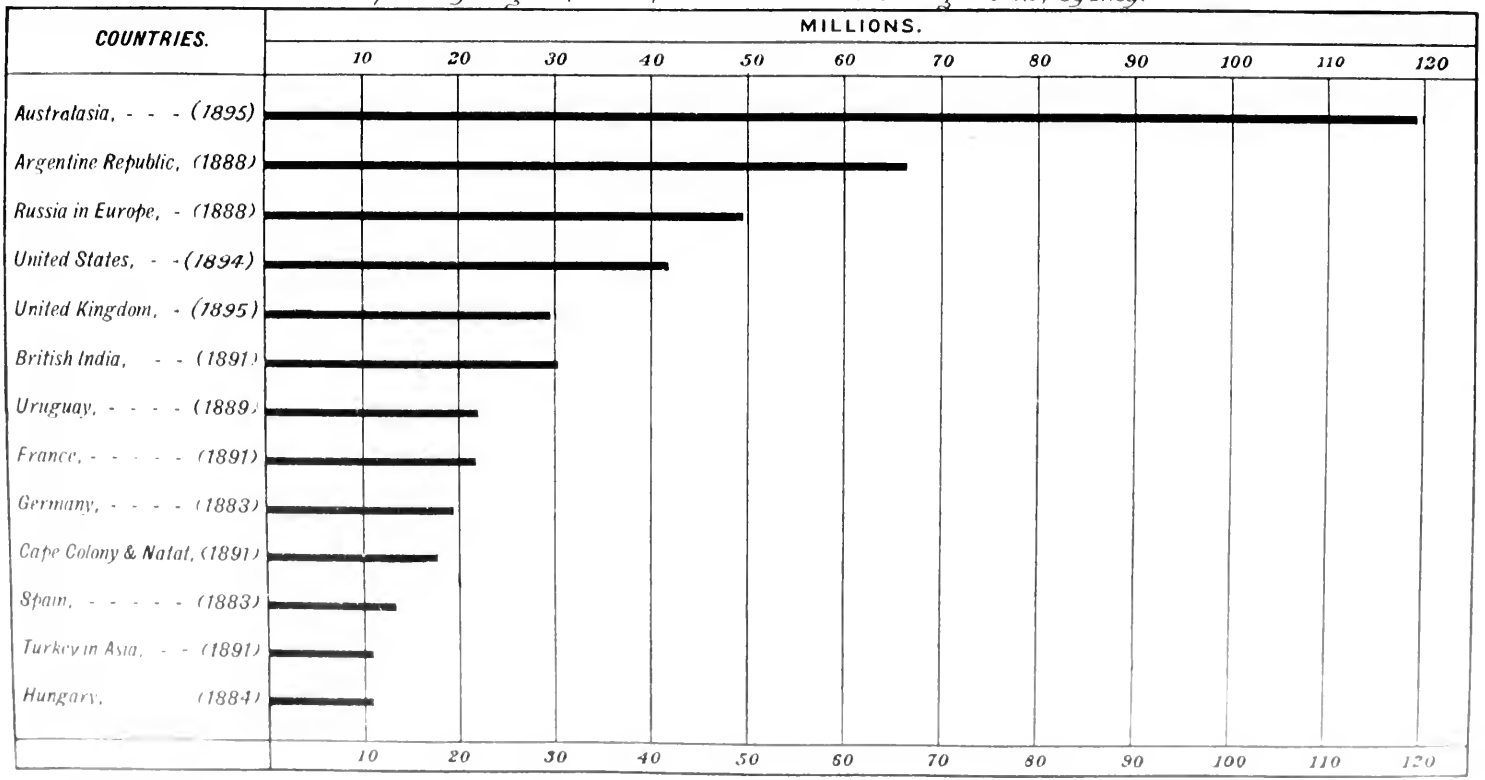


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

APPROXIMATE Average Value per Bale.

Season.	Average value per Bale.	Quantity.	Total Value.
	£ s. d.	Bales.	£
1892-3	10 10 0	876,761	9,205,999
1893-4	10 0 0	963,976	9,639,760
1894-5	8 10 0	1,026,491	8,725,173

NOTE.—The average value of wool per bale in the Sydney market for the six months ending 31st December, 1895, is estimated at £10 5s.

Very valuable information respecting the importation of colonial wool into Europe and America from 1860 to 1894 is furnished by Messrs. Helmuth, Schwarze, & Co., of London, who supply the following returns, from which the general drift of values may be conveniently ascertained :—

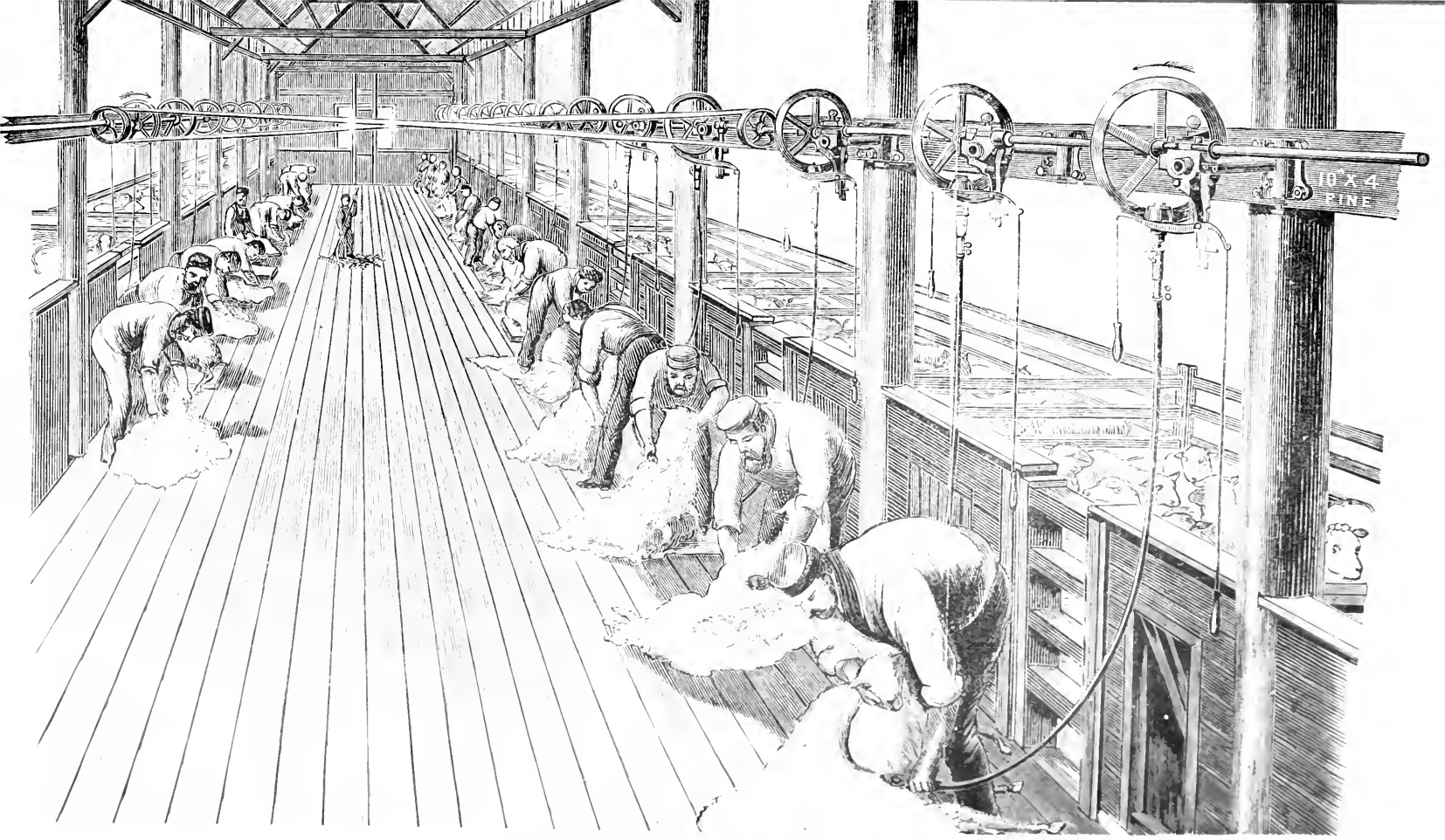
IMPORTS per Season.

Year.	Australasian Bales.	Cape Bales.	Total Colonial Bales.	Average Value per Bale.	Total Value.	
				£	£	
1860 ...	187,000	79,000	266,000	25¾	6,850,000	
1861 ..	212,000	84,000	296,000	23¼	6,882,000	£7,000,000 Period.
1862 ...	227,000	82,000	309,000	22⅝	7,030,000	
1863 ...	242,000	94,000	336,000	22¾	7,644,000	
1864 ...	302,000	113,000	415,000	24½	10,271,000	
1865 ...	334,000	109,000	443,000	23¾	10,521,000	
1866 ...	351,000	128,000	479,000	24½	11,735,000	
1867 ...	414,000	135,000	549,000	20¾	11,392,000	£11,000,000 Period.
1868 ...	483,000	156,000	639,000	18½	11,822,000	
1869 ...	504,000	153,000	657,000	15¾	10,348,000	
1870 ...	546,000	152,000	698,000	16¾	11,691,000	
1871 ...	573,000	186,000	759,000	20½	15,560,000	Year of transition
1872 ...	554,000	189,000	743,000	26½	19,690,000	
1873 ...	571,000	176,000	747,000	24¼	18,115,000	
1874 ...	659,000	170,000	829,000	23½	19,274,000	
1875 ...	720,000	197,000	917,000	22¼	20,403,000	
1876 ...	769,000	167,000	936,000	18¾	17,550,000	
1877 ..	835,000	186,000	1,021,000	18¾	19,144,000	
1878 ...	801,000	169,000	970,000	18¾	18,187,000	
1879 ...	826,000	189,600	1,015,000	16½	16,748,000	
1880 ...	869,000	219,000	1,088,000	20¼	22,032,000	£20,000,000 Period.
1881 ...	957,000	204,000	1,161,000	17¼	20,027,000	
1882 ...	993,000	197,000	1,190,000	17½	20,825,000	
1883 ...	1,054,000	199,000	1,253,000	16¾	20,988,000	
1884 ...	1,112,000	191,000	1,303,000	16	20,848,000	
1885 ...	1,094,000	188,000	1,282,000	14	17,948,000	
1886 ...	1,196,000	236,000	1,432,000	13½	19,332,000	
1887 ...	1,207,000	237,000	1,444,000	14	20,216,000	
1888 ...	1,315,000	289,000	1,604,000	13½	21,654,000	
1889 ...	1,385,000	310,000	1,695,000	15½	26,272,000	
1890 ...	1,411,000	288,000	1,699,000	14¾	25,060,000	
1891 ...	1,683,000	322,000	2,005,000	13½	27,067,000	
1892 ..	1,835,000	291,000	2,126,000	12	25,512,000	£26,000,000 Period.
1893 ..	1,775,000	299,000	2,074,000	12½	25,925,000	
1894 ...	1,896,000	256,000	2,152,000	11½	24,748,000	
1895 ...	2,001,000	269,000	2,270,000	11	24,970,000	

In comparing the London average value per bale in the foregoing returns with the Sydney average previously given regard must be paid to the fact that freight and other charges have to be added to

the latter in order to arrive at a fair comparison. In addition to this some allowance must also be made for the difference in the quality and condition of the wool dealt with in London and in Sydney. Large quantities of the more inferior portions of the clip, intended for sale in the Home market, are scoured prior to shipment, and in this way the London average value per bale is raised to a point relatively higher than the Sydney average.

Since 1891 there have been unmistakable indications in the sheep returns of our colony that the expanding power of this great centre of wool production is, at least, for the time-being, reaching its limits. A reference to the export returns and the actual money-value of same brings out no less clearly the unpalatable fact that the wool-growers of the colony are now called upon to depasture increased numbers of sheep in order to keep up the gross returns received for wool. Nor can the decrease in the income arising from the sale of surplus sheep of late years be ignored. It may be urged that a decrease in the flocks does not necessarily imply a decrease in the quantity of wool produced; and that, as a matter of fact, up to the present time the falling off year by year in the number of sheep has not been accompanied by a corresponding shortage in the wool export. That, on the contrary, while the flocks have latterly steadily decreased, the output of wool has gone on increasing so much so that the 1894–5 clip topped all its predecessors, and reached the magnificent total of 1,026,500 bales. This is perfectly true; but, at the same time, a shortage in the output of wool for the current statistical year—1st July, 1895, to 30th June, 1896—as compared with that of the two or three preceding seasons, is imminent, and while this retrograde movement is mainly attributable to the recently prevailing partial drought, it nevertheless serves to disclose the real position of the pastoral situation in New South Wales at the present time. The late drought—1895—was not only partial, but it in no degree equalled many of its forerunners either in point of severity or duration. Its effects, however, have been sufficiently disastrous to show that, due regard being paid to their present capabilities, nearly all the more important sheep areas of the colony are stocked up to an extent which is nothing short of perilous, and to demonstrate with much force the impracticability of further progress on those lines which have heretofore been most widely adopted. The cost of production has of late years been reduced to some extent to meet the shrinkage in wool and sheep values; but the reductions possible have not been such as to afford anything like adequate relief and place the profit and loss account of the pastoral industry on a perfectly satisfactory and healthy basis. At the present stage in the history of the pastoral and wool industry of New South Wales the question as to what steps should be taken to ensure future advancement is indeed a very pertinent one. A survey of the past warrants the belief that no limit can be placed on the productive powers of the enormous area of pasturage contained in this Colony, and yet it is clear that the pastoral productiveness of the country is just now being barely maintained. Flock-masters themselves may be relied upon to do much to remedy the existing condition of things, and prepare the way for future prosperity. The skill and genius of breeders are, in an ever-increasing number of cases, being brought most successfully to bear in improving



SHEEP-SHEARING WITH MACHINE-SHEARS.

the quality and character of the general flocks; and the remarkable results attained in several instances, that could be cited if space permitted, show that in this direction there remains a wide field for enterprise and perseverance to labour in with the certainty of a rich reward attending their application. The best sheep are at present usually found on the larger properties. The contrary should be the case, and the time is, probably, not far distant when the small flock-owners, by the aid of subsidiary industries, such as agriculture, smaller paddocks, and closer attention to breeding, will reverse the position, and materially assist in augmenting the wool supply. Future progress would seem, however, to rest mainly upon the successful solution of the problem as to how to provide a more regular food supply for the flocks. The results already achieved in the chilling and freezing of meat leave no room to doubt that any grave difficulties which now stand in the way of finding a profitable outlet for surplus stock will, ere long, be removed; but the great fault of the Australian natural pasture has ever been the irregular nature of the supply. This drawback now forms a serious obstacle to further extension, not only in the sheep-raising industry, but to the proper development of the meat export trade, from which so much is expected. Fortunately, there are resources within the Colony which as yet remain almost wholly undeveloped, and which may, in years to come, enable New South Wales to accentuate her present pre-eminence as a wool centre. Comparatively little has as yet been done to tap the subterranean sources of water supply known to exist, or to stay the hasty rush of the product of the thunderstorm to the ocean. The bunds and tanks of Hindostan and the "awais" of Mesopotamia are monuments of ancient enterprise and ingenuity. What was possible to the Assyrians thousands of years ago should be capable of accomplishment in Australia in times to come. Money is both cheap and plentiful; but those to whose care the destiny of this splendid pastoral country is committed will do well to ever bear in mind that capital is, above all things, timid. The time would seem to have arrived when producers in New South Wales will have to be both encouraged and enabled to seek to co-operate more intelligently with the forces of nature. Progress in the future must inevitably be slower than it has been in the past; but there is good ground for the anticipation that with thoroughly sound land legislation, of a nature that satisfies capitalists, the second century of wool-growing in this Colony will become an epoch of improvement; and certainly no reliable forecast of the probable sheep-carrying capacity of such a colony as New South Wales can be made, providing proper attention be bestowed on irrigation, water conservation, and forest conservancy.

Pastures, Grasses, and Forage Plants.

By Fred. Turner, F.L.S., F.R.H.S., &c.

Introduction.

The area of New South Wales is estimated at 310,700 square miles, or 198,848,000 acres. If the surface covered by rivers, creeks, and lakes be excluded, the area would be 306,066 square miles or 195,882,150 acres. When it is taken into consideration that the greater portion of this area is devoted exclusively to grazing and raising stock, it will be readily understood that the pastures are of considerable magnitude. According to Mr. T. A. Coghlan's "Wealth and Progress of New South Wales for 1894," the capital value of the pastoral property, including land, improvements, and plant, as well as stock, was estimated, in 1894, to be £116,140,000, of which £46,000,000 represented the value of the land, £47,840,000 that of improvements and plant, and £22,300,000 that of stock. The number of stock at the close of the year 1894 was approximately as follows:—Sheep, 56,977,270; cattle, 2,465,411; horses, 518,181. The total quantity and value of the wool produced in, and exported from, New South Wales in 1894, was 331,774,424 lb, valued at £9,011,790.

An examination of the preceding figures at once shows how important and valuable the pastoral industry is in this Colony, indeed, it is the principal source from which the inhabitants derive their greatest wealth.

The grazing areas of New South Wales may be divided into three climatic zones. The coastal districts embracing an area of 38,200 square miles, the high tablelands covering an area of 84,900 square miles, and the country lying west of the Dividing Range with an area of 187,600 square miles. In the coastal districts the herbage, on most of the grazing areas, is of a rich and varied character, and provides feed for an immense number of dairy cattle; the dairying industry being a very extensive and important one. In other parts of the Colony, in favourable seasons, dairying is also carried on, but to a much less extent than in the districts just referred to. On a greater part of the tablelands, the pasturage is, in an ordinary season, of a rich and varied character, and immense numbers of sheep and cattle graze and fatten during the summer months in that portion of the Colony. The western division is, for the most part, devoted to immense sheep stations. In that portion of the Colony a considerable

percentage of the herbage is, on some areas, composed of the famous salt-bushes, while over nearly the whole of this immense area there is a varied assortment of grass and other herbage of a highly nutritious character.

The climate of New South Wales, except on some of the higher portions of the tablelands, where animals require shelter against inclement weather that sometimes prevails during winter, admits of stock of all kinds being left out in the open air the whole year round. There are few countries of an equal area to New South Wales where the climate is so favourable and the herbage so suitable and nutritious for raising and depasturing stock. To give even a synopsis of the valuable herbage growing in this country would require a very lengthy treatise. As the space available is limited to a few pages, a popular description of a few of the best kinds of grass, salt-bush, and other herbage which are found in varying proportions on the pastoral areas of this Colony, together with the three accompanying illustrations, will give an excellent idea of the character of the herbage as a whole. The descriptions, which will explain the habits and habitats of each plant, give its economic value and time of seeding, will be as concise as possible to ensure accuracy. To facilitate reference, the herbage will be referred to in the order named.

Grasses.

As far as is at present known, there are one hundred and ninety eight species and thirty three well-defined varieties of grass indigenous to New South Wales. Out of this number there are sixteen species which, when old, are somewhat dreaded by pastoralists in the interior on account of their long seed awns, or sharp-pointed seeds or leaves. This is not a formidable array, it must be admitted; still, of sufficient importance to make their position felt and disliked by sheep-owners. Most of these undesirable grasses are really good pasture plants whilst young, and it is only at the season of ripening their seeds that they become troublesome to sheep. The following species are amongst the best of the native grasses.

Agrostis scabra, Willd. "Bent grass." A slender, tufted grass, growing from 6 inches to 1½ feet high, which, together with two other species of the same genus, forms a considerable percentage of the herbage in some pastures on the high tablelands, more particularly in the southern portion of the Colony. During the summer months these grasses yield a fair amount of rich herbage, which sheep eat with avidity. The seeds usually ripen during November, December, and January.

Andropogon affinis, R. Br. A "Blue grass." A perennial species usually growing from 1 foot to 2 feet high, and is generally found in the coastal districts and in the colder parts of the Colony. It grows on various soils, but it appears to succeed best and yield more herbage on those of a moderately strong loamy nature. This species is a valuable pasture grass, and in sheltered situations will make considerable growth during the winter months; therefore, it is doubly valuable

to the grazier. All herbivora are remarkably fond of the herbage, and it will stand close and continuous feeding. It makes capital hay, if cut when in flower. The seeds usually ripen during the summer months.

Andropogon erianthoides, F. v. M. "Satin heads." An erect, glaucous, perennial grass, growing from 2 to 3 feet high. It is generally found on the rich plains in the interior, and is capable of withstanding a long period of dry weather. Under ordinary conditions it produces a great amount of rich, succulent herbage, which stock of all kinds are remarkably fond of, and fatten on. It makes capital hay. The seeds of this grass usually ripen during November and December.

Andropogon sericeus, R. Br. "Blue grass." An erect, perennial species, usually growing from 1 foot to 2½ feet high. It is generally found on good soils over a greater portion of the Colony. It is a most productive grass, and during the summer months yields a bulk of rich, succulent herbage, much relished by all herbivora. The "blue grass" is one of the best and most favourably-known of all the native grasses. In ordinary seasons it perfects a great amount of seed, which usually ripens during October and November in the interior, but in the coastal districts and on the tablelands, one month or two months later. Five other species of *Andropogon* are found in varying proportions in the pastures in different parts of the Colony, and all of them are excellent forage grasses.

Anthistiria ciliata, Linn. "Kangaroo grass." A perennial grass, often growing 6 feet high on rich soils. It is found all over the Colony. In the coastal districts and on the tablelands it is very plentiful in places, but in the interior it is more sparingly distributed. It has a wide reputation, and many pastoralists consider it one of the most useful of the native grasses. Stock of all kinds are fond of it, and working horses will keep in good condition when fed on it. The "kangaroo grass" makes excellent hay, if cut when the flower stems first appear. Although this grass develops a number of flowering stems, yet it does not perfect a great amount of seed. What there is, however, usually ripens during the summer and autumn months. Two other species of *Anthistiria* are found in the Colony, and both of them are excellent pasture grasses. They are peculiar to the interior.

Astrebla triticoides, F. v. M. "Mitchell grass." This perennial species usually grows from 2 to 3 feet high, and is generally found on rich soils over nearly the whole of the interior, though not too plentifully. Pastoralists and stockmen hold this grass in high repute, and it is said that cattle will fatten on its dry, broken stems and leaves. The seeds, when ripe, are like small grains of wheat, and at one time formed an important article of food for the aborigines. The variety *lappacea* of this grass has ears 6 inches long, resembling large wheat-ears, which contain a well-developed grain which separates easily from the chaff. The seeds usually ripen during October, November, and December. Two other species of *Astrebla* are found in the interior of New South Wales, and they are highly prized, both for their drought-enduring qualities and their fattening properties. All these species are commonly called "Mitchell grasses" by pastoralists.

Chloris truncata, R. Br. "Star," or "Windmill grass." A perennial species, which is generally found growing on the richest of soils over nearly the whole of the Colony. In some situations it grows 3 feet high, with the inflorescence a foot across. In other situations it grows only from 6 inches to a foot high, with the inflorescence only 4 inches across. In all its varied forms, however, it yields a rich, succulent herbage, which is much relished by all herbivora, sheep being particularly fond of it. On loose soils it tillers well, and forms a good sward. It makes capital hay. The seeds usually ripen in October and November in the interior; in the coastal districts one month or two months later, though occasionally in autumn. Two other species of *Chloris* are found in different parts of the Colony, and form a good percentage of the herbage in some pastures. They are good forage grasses.

Danthonia robusta, F.v.M. "Oat grass." A perennial species, found on the southern mountains, where it forms a large percentage of the alpine herbage. Its stout stems rise from a thick, horizontal root to a height of 4 or 5 feet. It is the largest species of the genus found in Australia, and forms large patches of rather coarse-looking herbage; this, however, when young, is rich and succulent, and in that state is greedily eaten by all herbivora. The seeds usually ripen during December, January, and February.

Danthonia semiannularis, R. Br. "Wallaby grass." A perennial species found over nearly the whole of the Colony, from the coast to the far interior. It also grows on some of the high mountain ranges where snow falls occasionally. It is very variable as regards stature; on good soils it grows 3 feet high, on those of a poorer description it rarely exceeds a foot in height. In all its varied forms, however, it is one of the most nutritious grasses in the Colony, and, unlike most other species of the genus, will grow more or less all the year round. It makes splendid hay. In the interior the seeds of this grass usually ripen in October, but in the coastal districts, and in the colder parts of the country generally one month or two months later. There are eight other species of *Danthonia*, found in different parts of the Colony, some of them fairly plentifully in many pastures. All of them are excellent pasture grasses.

Deyeuxia billardieri, Kunth. "Bent grass." This species has an extensive range of growth, being found in the coastal districts and on most of the high tablelands. It usually grows from 6 to 18 inches high, according to soil and situation. It is a capital winter and early spring grass, and on good soils yields a fair amount of rich, succulent herbage, of which sheep are very fond. It produces a quantity of seed, which usually ripens in October, November and December. Eight other species of *Deyeuxia* are found in the Colony, principally on the high tablelands, where they form a good percentage of the herbage on some areas. Only one species (*Deyeuxia forsteri*, Kunth.) extends to the interior, where it makes most of its growth during the winter and early spring months, and is a valuable addition to the pasturage.

Eragrostis brownii, Nees. "Love grass." A perennial species growing from 1 foot to 4 feet high. There are several varieties of this excellent grass found in different parts of the Colony, both on rich

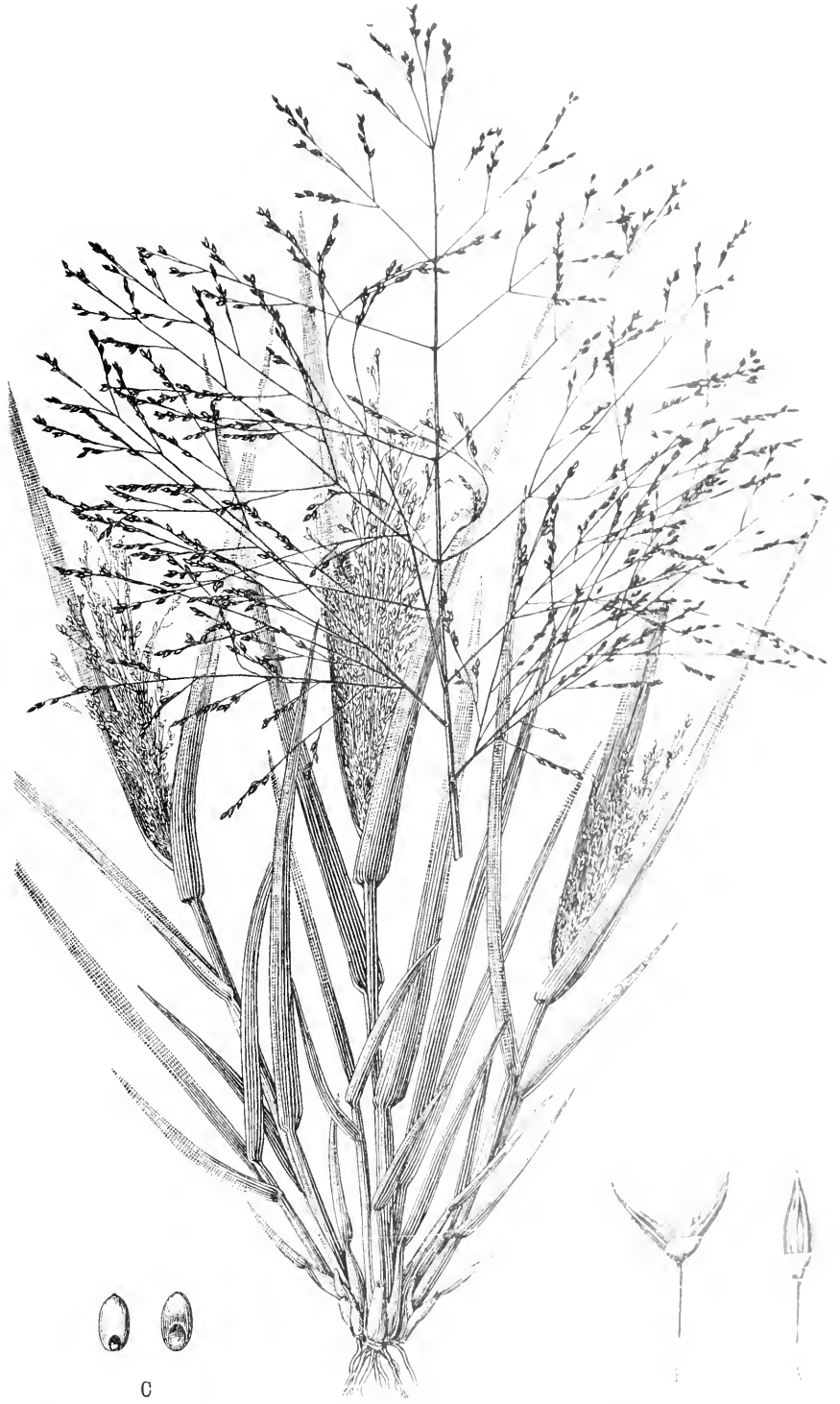
and on poor soils. When growing on good land these grasses yield a great amount of rich, succulent herbage, of which all herbivora are remarkably fond, and fatten on. The seeds usually ripen during the summer months. Twelve other species of *Eragrostis* are found in the pastures in varying proportions over nearly the whole of the Colony. Stockmen call certain of them "never fail," on account of their drought-enduring qualities. Many of them will withstand a phenomenal amount of dry weather, and most of them are excellent pasture grasses.

Panicum decompositum, R. Br. "Australian millet." This valuable grass is found over nearly the whole of the Colony, from the coastal districts to the far interior, and in some places it is very plentiful. In moist places, and by the side of watercourses, this grass grows 4 feet high, but on the plains it rarely exceeds 2 feet in height. In all its varied forms it yields a most valuable herbage, which stock of all kinds are remarkably fond of, and fatten on. It makes splendid hay. The seeds usually ripen during the summer and autumn months. At one time the aborigines used to collect the seeds in great quantities, grind them between stones, make the meal into cakes, and use them as an article of food.

Panicum flavidum, Retz. "Yellow-flowered panick grass." An erect, perennial species growing from 1 foot to 3 feet high, and generally found on the Western plains. On good soils it produces a great quantity of rich, succulent herbage, which stock of all kinds are particularly fond of, and it is said to be one of the best fattening grasses in the interior. It produces an enormous amount of seed; in fact, the panicles are often so full and heavy with grain that they are weighed down to the ground. The seeds usually ripen during October and November. Twenty eight other species of *Panicum* are found in the Colony, and they form a large per centage of the herbage in the pastures in the coastal districts, on the high table-lands, and in the interior. Most of them are excellent forage grasses, and are held in high repute by stockowners.

Pollinia fulva, Benth. "Sugar grass." A perennial grass which attains sometimes a height of 4 feet, and is found from the coastal districts to the far interior. It is much more common, however, in the latter than in the former portion of the Colony. When in flower the "sugar grass" is easily recognized amongst other herbage by its rich, brown, silky spikes. It is generally found growing on the richest of soils, and often on deep alluvial flats bordering rivers and creeks. During the summer months, in an ordinary season, it produces a great bulk of rich, succulent, sweet herbage, which is much relished by all herbivora. This grass is held in high repute amongst pastoralists and stockmen. The seeds usually ripen during November and December.

Sorghum plumosum, Beauv. "Wild sorghum." This perennial grass is found principally in the coastal districts, and in the colder parts of the Colony, where it attains sometimes a height of 5 feet. In the New England district it is, when in flower, quite a feature in the pastures, and is regarded as a valuable grass. Horses are said to eat the seeds with avidity, and to thrive on them. In the colder



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Panicum decompositum, R. Br.

"Australian Millet."

A, showing the relative size of the outer glume to the spikelet. B, a spikelet opened out, showing the position of the four glumes and two paleas. C, grain, back and front views. All variously magnified.

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portions of the Colony the "wild sorghum" is essentially a summer-growing grass, but in the warmer parts it grows more or less all the year round, and during an ordinary season will yield a bulk of valuable herbage, which the larger herbivora eat with avidity. It makes good hay if cut when the flower stems first make their appearance. The seeds ripen during the summer and autumn months. Besides the species referred to, there are the famous "early spring grasses," (*Eriochloa* spp.); meadow rice grass," (*Microlæna stipoides*, R. Br.); "native millets" (*Setaria* spp.); "Mulga grasses" (*Neurachne* spp.); "tussock grasses" (*Poa* spp.); "wheat grasses" (*Agropyrum* spp.); and numerous other valuable species which are found on the pastoral areas of this Colony.

Salt-bushes.

Very few plants so useful for forage purposes could exist under such adverse conditions of drought and heat as do most kinds of the salt-bush family. There are abundant proofs that when sheep are depastured in country where plenty of salinous plants are growing amongst the native grasses, fluke and other distoma diseases are almost unknown. There are very few plants of the salt-bush family which are not available for forage purposes, though exception might sometimes be taken to the following species. During protracted droughts balls of cotton-like substance form on *Kochia aphylla*, R. Br., *Enchylæna tomentosa*, R. Br., and a few other allied plants. It is generally supposed that this adventitious growth is caused by some insect. The fulvous tomentum on some species of *Sclerolæna*, and the woolly covering of the fruits of some species of *Chenolea*, have been known to kill sheep when they have partaken too freely of this indigestible stuff, along with parts of the plants. The dorsal spines on the fruits of all species of *Anisacantha* often cause some trouble to the salivary glands of sheep and other small herbivora, if they eat too greedily of these plants when the fruits are near maturity. *Anisacantha muricata*, Moq., when dry, makes the troublesome "roley poleys" on some of the western plains. Altogether there are eighty six species of salt-bush, arranged under thirteen genera, at present known in this Colony. Some are found on the littoral sands, but the great majority grow in the interior, and are remarkable for their drought-enduring qualities.

The following species are amongst some of the best of the native salt-bushes:—

Atriplex nummularia, Lindl. "Round-leaved salt-bush," "Cabbage bush." This is a tall-growing shrub, usually attaining a height of from 6 to 10 feet, though occasionally it may be seen growing 15 or more feet high. It is peculiar to the inland plains, though it is only moderately plentiful in places where it used to be very abundant. All kinds of pasture animals eat the succulent stems and leaves with avidity, and seem to thrive on them. The tender shoots and leaves make a fairly good table vegetable when cooked and served in the ordinary way. When allowed to grow undisturbed for a time the "cabbage bush" produces a great amount of seed which ripens at different times of the year.

Mr. W. A. Dixon gives the following analysis of this plant :—

Oil	2·18
Carbohydrates	42·85
Albuminoids	16·45
Woody fibre	7·24
Ash $C.O._2$	31·28
	100·00

Woody parts of plant	10 per cent.
Edible	90 per cent.

Atriplex semibaccata, R. Br. "Half-berried salt-bush." A prostrate-growing, many-branched, slender, perennial plant, with herbaceous stems spreading 2 feet or more. It is found in many districts from the coast to the far interior; it is much more common, however, in the latter than in the former portion of the Colony. On the stations in the Lachlan and Darling River districts pastoralists hold this plant in high esteem and consider it a most valuable herb for sheep. All herbivora are remarkably fond of the plant, and fatten on it. This salt-bush bears a great amount of seed, which ripens during the summer and autumn months.

Atriplex vesicaria, Hew. "Bladder salt-bush." An erect, bushy shrub, growing about 2 feet high, and is found on the arid plains in the interior and in some districts very plentifully. It is regarded as an excellent forage plant, and both sheep and cattle thrive well on it, the former particularly so. The "bladder salt-bush" produces a great amount of seed, which ripens during the summer and autumn months.

Thirteen other species of *Atriplex* are found in varying proportions on the pastoral areas of this Colony, and most of them are excellent forage plants. The tender shoots and leaves of a number of them are a good substitute for spinach.

Chenopodium atriplicinum, F.v.M. "Atriplex-like goosefoot." A perennial plant branching freely at the base only, the numerous stems usually attaining a height of 1 foot. This plant is peculiar to the arid plains of the interior, and in some districts it is fairly plentiful. It is a capital forage plant, which all herbivora eat with avidity, and pastoralists look upon it as a valuable and nutritious herb at all seasons. It bears an abundance of seed, which ripens during the summer and autumn months.

Chenopodium auricomum, Lindl. A "Blue bush." An erect-growing, perennial plant of from 3 to 5 or more feet high. It is peculiar to the inland plains, though not abundant anywhere. This "blue bush" is an excellent forage plant which sheep and cattle are particularly fond of, and fatten on. The tender shoots and leaves when cooked make a good table esculent. There are six other species of *Chenopodium* found in different parts of the Colony, and most of them are good forage plants. All of them bear plenty of seed, which ripens during the summer and autumn months.

Kochia aphylla, R.Br. "Cotton bush." A rigid-branched, scrubby shrub, growing from 2 to 3 feet high, which is found on the western plains, and in some districts it is very plentiful. Its presence is always an indication of good country. The "cotton bush" will withstand a

Atriplex Nummularia, Lindl.

"Round-leaved Salt-bush." "Cabbage Bush."

A, a small branch of female flowers. B, fruiting perianth. C, section of fruiting perianth, showing the seed. D, section of a female flower showing the ovary, and two styles. E, male flower showing the five stamens. All variously magnified, with the exception of A which is much reduced.

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phenomenal amount of heat, and grow through the most protracted drought. During such times it often proves of great value on stations, and great quantities are cut for fodder. Stock of all descriptions are remarkably fond of the plant, and thrive on it. It is sometimes given to stock in the form of chaff, and after it has been cut for a few days it smells like "new mown hay." Horses and bullocks are said to not only work well on this feed, but to fatten on it. Balls of cotton-like substance sometimes form on this plant, hence stockmen call it "cotton bush." Generally speaking, however, only one shrub in a thousand is subject to this cottony "gall," except in very protracted droughts, when the "galls" are more plentiful. These "galls" are generally supposed to be caused by some insect. The "cotton bush" produces plenty of seed, which ripens during the summer and autumn months.

Kochia pyramidata, Benth. "Grey Bush." This shrub usually grows from 3 to 4 feet high, and is found only in the western country. It will withstand a phenomenal amount of dry weather, and in adverse seasons often proves a good stand-by for stock.

Mr. W. A. Dixon gives the following analysis of this plant :—

Oil	2·14
Carbohydrates	32·63
Albuminoids	19·94
Woody fibre	8·04
Ash $C.O_2$	37·25
	100·00
Nitrogen	3·19
Woody parts of plant	37 per cent.
Edible	63 per cent.

There are twelve other species of *Kochia* found in different parts of the Colony, but principally in the interior. All of them withstand drought to a marked degree, and in consequence often prove useful as feed for stock in dry seasons when the more tender herbage is scarce. Most of them bear plenty of seed, which ripens at different times of the year.

Rhagodia hastata, R. Br. "Salt-bush." A shrubby plant usually growing about 3 feet high in a natural state, but under cultivation attaining a height of from 5 to 7 feet. It is found in different parts of the Colony, but principally in the interior. Stock of all kinds eat this "salt-bush" with avidity, and thrive well on it. Under ordinary conditions this plant bears plenty of seed.

Rhagodia parabolica, R. Br. "Old-man salt-bush." An erect-growing shrub, usually attaining a height of from 5 to 10 feet. It is generally found growing on rich soils in the interior, and sometimes near swampy places, but not very plentifully. It is a good forage plant, but is more readily eaten by cattle than by sheep, the former animals, however, can reach the tall branches much more easily than the latter. Rabbits eat the bark of this shrub, and grass-hoppers are particularly fond of its foliage. Five other species of *Rhagodia* are found in different parts of the Colony, from the coast to the far interior. All of them are excellent forage plants, and most of them bear an abundance of seed when allowed to grow undisturbed for a time.

Miscellaneous Herbage.

In addition to the valuable grasses and salt-bushes, there are a number of herbs and shrubs which grow in varying proportions on the pastoral areas of this Colony, and provide excellent feed for stock at nearly all seasons of the year. During seasons of drought the branches of certain trees are cut, the leaves of which provide feed for a great many animals. Amongst a number of herbs, shrubs, and trees that are favourably known to pastoralists and stockmen, the following may be enumerated as illustrative of the varied character of the vegetation that is suitable forage for stock :—

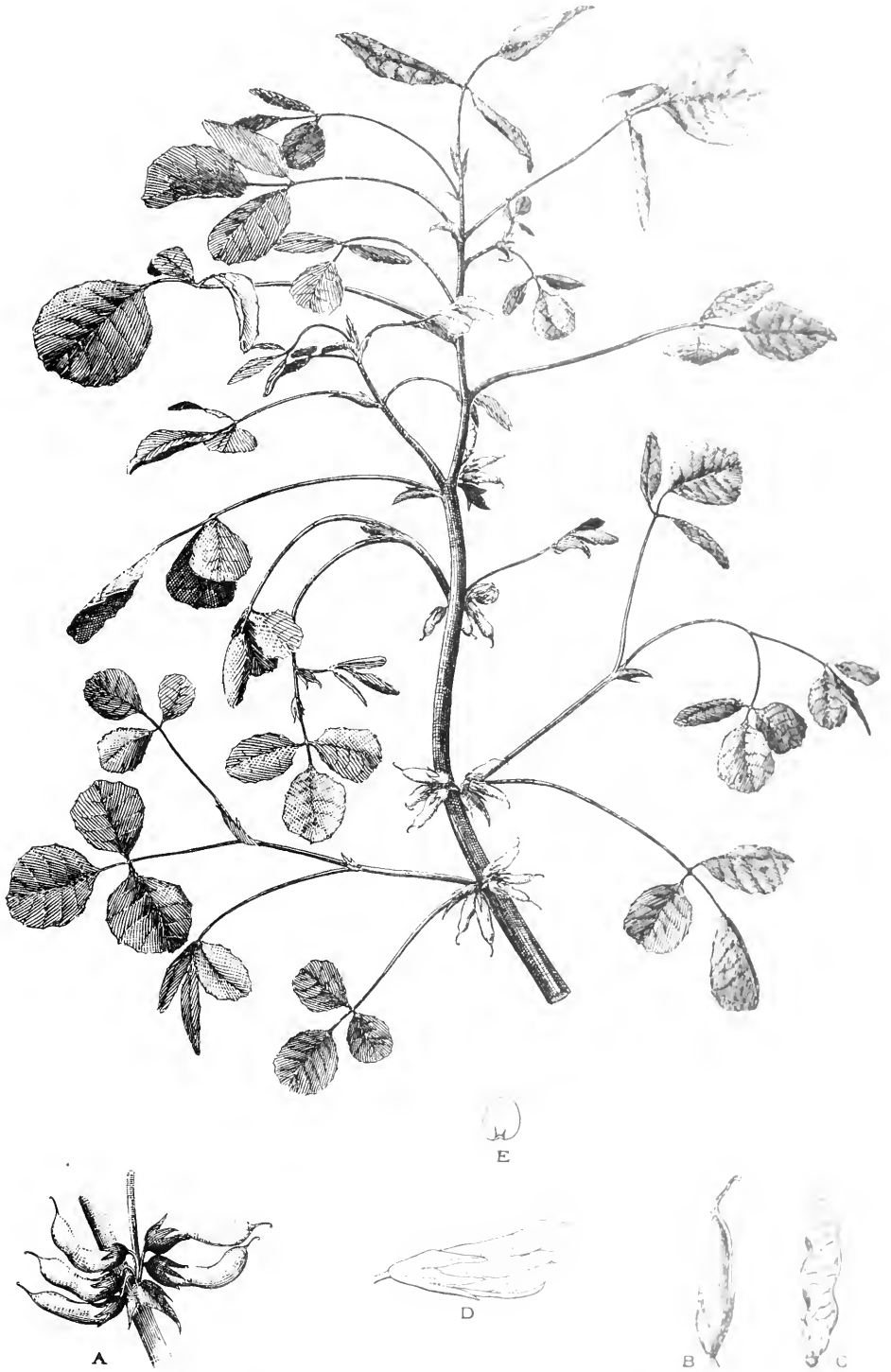
Herbs.

Daucus brachiatus, Sieb. "Native carrot." An annual plant with erect or decumbent, slender or stout, herbaceous stems. It is generally found on rich soils all over the Colony, but more particularly in the interior, where it often attains a height of 2 or 3 feet. When young, this plant is exceedingly good forage, which stock of all descriptions are remarkably fond of; sheep particularly so, and they thrive well on it. The fruits are covered with fine bristles, and when near maturity are called "carrot burrs" by stockmen. These "burrs" adhere to the fleece with great tenacity, and it is troublesome to get them out of the wool. The "native carrot" produces plenty of seed, which usually ripens during the summer and autumn months.

Tetragonia expansa, Murr. "Warrigal cabbage." The decumbent or prostrate stems of this annual plant often grow to several feet in length. It has a wide geographical range, being found from the brink of the ocean to the arid interior, and in some districts it is fairly plentiful. It is a valuable pasture plant, and in an ordinary season yields a great amount of succulent herbage, which sheep and cattle eat with avidity. The "Warrigal cabbage" is sometimes grown as a summer vegetable in gardens, and when properly cooked, it makes a good table esculent. This plant produces plenty of seed, which ripens during the summer and autumn months.

Trigonella suavissima, Lindl. "Scented," or "Darling clover." The prostrate or ascending stems of this plant are generally from 1 foot to 3 feet long. It is peculiar to the western country, and in some districts it is fairly plentiful. When growing on rich soils that are subject to periodical inundations, it produces a great amount of herbage, which stock of all descriptions are particularly partial to, and fatten on. Though this plant grows best, and produces more herbage, on rich soils, still it is often found growing on stony rises, and in such situations makes considerable growth, which is a valuable addition to other herbage. The succulent stems and leaves of the "Darling clover" make a good table esculent when cooked and served in the ordinary way. This plant produces an abundance of seed, which usually ripens during the summer and autumn months.

Besides these, there are "crow's foot" (*Erodium cygnorum*, Nees.); "crow's foot" (*Geranium dissectum*, Linn.); "hogweed" (*Boerhaavia diffusa*, Linn.); "native mallow" (*Lavatera plebeia*, Sims); "native cress" (*Blennodia nasturtioides*, Benth.); "native plantain" (*Plantago*



Trigonella Suavissima, Lindl.

"Scented, or Darling Clover"

A, cluster of young pods. B, young pods. C, matured pod D, side view of flower E, seed
All variously magnified.

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varia, R. Br.); "native parsley" (*Apium leptophyllum*, F.v.M.; "nardoo" (*Marsilea drummondii*, A. Br.); "purslane" *Portulaca oleracea*, Linn.); and several other plants, which form a good percentage of the herbage on some of the pastoral areas of this Colony.

Shrubs.

Dodonæa attenuata A. Cunn. "Hop-bush." A viscid shrub, usually growing from 8 to 10 feet high. It is peculiar to the arid western plains, and in some districts is moderately plentiful, especially on soils of a sandy nature, and the sand-hills are often covered with it. During seasons of drought this shrub is a valuable stand-by for stock, and large quantities are cut down when other feed is scarce. *Dodonæa lobulata*, F.v.M., also grows in the interior, and on some stations in the Lachlan district it is considered one of the best shrubs for forage. In the early days of settlement the fruits of both these shrubs, as also of some allied ones, were largely used as a substitute for hops, hence the common name "hop bush." These shrubs bear plenty of seed.

Eremophila longifolia, F.v.M. "Berrigan." A tall, erect shrub sometimes growing from 10 to 20 feet high. It is peculiar to the interior, and in some districts it is fairly plentiful. In adverse seasons it is largely cut down as forage for stock, and cattle and sheep eat it readily. It is said that rabbits eat the bark of this shrub in preference to the bark of any other tree or shrub. The "berrigan" bears plenty of fruit, which is eaten by emus, and on this account is often called "emu bush"; but under this appellation many berry and drupe-bearing trees and shrubs are known in the interior. Besides these there are "butter bush" (*Pittosporum phillyraeoides*, DC.); "cassias" (*Cassia* spp.); "emu-bushes" (*Eremophila* spp.); "rose-bush" (*Heterodendron oleæfolium*, Desf.); "silver-bush" (*Trichinium oboratum*, Gand.); "Sturt's cotton plant" (*Gossypium sturtii*, F.v.M.); and several other shrubs found in different parts of the Colony.

Trees.

Flindersia maculosa, F.v.M. "Leopard" or "Spotted tree." An ornamental tree of somewhat pendulous habit, and grows to a height of from 30 to 45 feet. Its trunk is remarkably spotted by the falling off of the outer bark in patches, hence its common name "leopard" or "spotted tree." From its trunk and branches large quantities of an amber-coloured gum of a pleasant flavour exudes, but as far as the writer is aware, this has never been put to any economic use. During very dry times, when feed is scarce, this tree is largely cut down and fed to stock. Sheep are very fond of it, eating both the leaves and young twigs.

Sterculia diversifolia, G. Don. "Kurrajong." An exceedingly ornamental tree often attaining a height of 60 feet on the eastern slopes of the Dividing Range, and from 20 to 30 or more feet in the interior. As a rule, when feeding stock on the leaves of this tree, the branches only are cut off by thoughtful persons, leaving the trunk standing, which soon throws out a fresh supply of branches and leaves, thus providing a supply of fodder for future contingencies.

Cattle and sheep are very fond of the leaves, and they thrive on them. The roots of the young "kurrajong" trees, which resemble turnips in consistency, but are sweeter to the taste, were at one time used by the aborigines as an article of food. Water in considerable quantity can also be obtained from them, and this, too, in the driest of seasons. If the "kurrajong" seeds are roasted, pounded, and macerated in hot water, and a little sugar added, a capital beverage is obtained. In addition to these trees, there are the "belar" or "bull-oak" (*Casuarina glauca*, Sieb.); "cattle-bush" (*Atalaya hemiglauca*, F.v.M.); "Wilga" (*Geijera parviflora*, Lindl.); "Yarren" (*Acacia aneura*, F.v.M.); and several others found in the interior.

All the grasses, salt-bushes, and miscellaneous herbage mentioned in the preceding pages have been figured and fully described in the writer's works on the "Indigenous Forage Plants of Australia" and "Australian Grasses."

Live Stock.

By Alexander Bruce, Chief Inspector of Stock.

Horses.

The number of horses in the Colony since its foundation at the dates here mentioned was as follows:—

Year.	Number.	Year.	Number.
1788	7	1871	337,597
1825	6,142	1881	398,577
1842	56,585	1891	459,755
1851	132,437	1894	500,068
1861	251,497		

The larger proportion of our horse stock is to be found in the coastal, mountainous, and western slopes divisions. Their number is less in the intermediate division, and much less in the salt bush.

Their Breeds and Grades.

Breed.	Grade.		Total.
	Ordinary.	Thoroughbred.	
Draught	131,438	22,406	153,844
Light-harness	115,228	18,360	133,588
Saddle	179,489	33,147	212,636
			500,068

The Draught Horse.—It was estimated that at 1st January, 1895, there were in the Colony 153,844 horses of the draught breed, one-fifth of which may be fairly described as pure breds. If we except the draught horses in the valleys of the Hawkesbury and Hunter Rivers, where there were a few representatives of the heavy draught breed, the draught horses of New South Wales some thirty-five or forty years ago were more of the large sized light harness type than of the true draught horse. They were light, clean legged, active, and hardy, and were treated and driven like bullocks—six, eight, and ten in a team—their food while carrying on the roads being only the grass they could get by the way. Since that time, however, a very great improvement has taken place in our draught horse by the importation of first-class heavy draught sires, principally Clydesdales, with a few Shire horses. Of the active farm-horse type, again, there have been a good many importations of the Suffolk Punch, which have made a great change for the better in that class also. And now, our draught horses as a whole will compare favourably with those in any part of the world, while they are much better cared for, and fewer horses do the work and do it better.

Light Harness Horses.—The number of this class of horse was estimated at 133,588, one-tenth of which may be ranked as pure-bred. In the early days of the Colony only a few representatives of this breed were to be met with; but within the last thirty years, but especially within the last fifteen, a good many Cleveland entires, some Yorkshire coaching horses, and American trotters, with a few German coaching horses, have been introduced, which have brought about a large increase in the number of the better class of our light harness and coaching horses, and a considerable improvement in their carriage and action. The number of ordinary light harness horses has also been increased by putting light weedy well-bred mares to the Suffolk Punch and smaller Clydesdales, the result being a light harness horse of a very useful stamp, but lacking in style and character.

Saddle Horses.—It was estimated that our saddle horses at the 1st January, 1895, numbered 212,636, one-tenth of which may be said to consist of thoroughbreds and first-class hacks. In the early days of the Colony our saddle-horses were greatly improved by frequent introductions of thoroughbreds from England; but the thoroughbred was then a different stamp of horse from the racehorse of the present day. He had a great deal more bone and muscle; and in substance and shape the thoroughbred was a far more suitable sire for producing saddle-horses than the racehorse now is. A good many high-class Arabs were also imported, and when put to large well-bred mares they left some very superior upstanding saddle-horses, fit to carry a man, and carry him well, day after day perhaps 40 or 50 miles for a fortnight, with nothing by the way but the natural grasses they had at night, and at times but little of that. In fact, some forty or fifty years ago our saddle-horses, taking them as a whole, were among the best, if not the very best in the world; for it was no uncommon thing then to find horses which could do a journey of 80, or even a hundred miles in a day. With the outbreak of the diggings our saddle-horses began to deteriorate, and from one or other of the following causes:—(1.) Through the hands on the station leaving and going off to the diggings, and the horses being neglected. (2.) Through putting draught entires to the upstanding mares of the saddle breed. (3.) Through the use of light weedy racing entires. (4.) Through the over supply of horses of an inferior sort, and the want of a sufficient export trade in horses.

Improvement, or an Export Trade in Light Harness and Saddle-Horses.

Within the last twelve or fifteen years, however, very much more attention has been paid to the sires used in breeding light harness and saddle-horses, greater care has been taken in the selection of the mares, and there have been frequent importations of Norfolk and American trotters, Irish hunters, and Yorkshire coaching and saddle-horses, and more recently of the English hackney. With, therefore, such an excellent climate, and country so well adapted as ours for breeding light harness and saddle-horses, we may, in the course of the next few years expect, with proper care, to regain the position we lost, and to be able to say that if our light harness and saddle-horses are not the best in the world, no other country can produce better, and at so little expense.

The increased prices which the right stamp of horses of the light harness and saddle breeds bring in our own market is sufficient to

induce our breeders to persevere in the improvement of their studs; but the very high prices which the really first-class, thoroughly broken, and well framed light harness and saddle-horses bring in London, and the reasonable freights now charged on the large cargo steamers trading between London and Sydney, add very much to this inducement; and there are good grounds for believing that our breeders will before long be producing high-class horses of both these breeds in considerable numbers, and finding a ready sale for them in London at remunerative prices.

Market Prices of Horse Stock.

First-class heavy draught, for breeding purposes.—Entires, £80 to £100; mares, £20 to £30.

First-class heavy draught, for ordinary purposes.—Unbroken, £12 to £18; broken, £20 to £30.

First-class farming horses, for breeding purposes.—Entires, £30 to £80; mares, £15 to £25.

First-class farming horses, for ordinary purposes.—Broken, £10 to £18.

Second-class draught horses.—Unbroken, £5 to £8; broken, £7 to £14.

Pure-bred coaching horses.—Entires, £40 to £150; mares, £20 to £40.

First-class light-harness horses.—Unbroken £10 to £20; broken, £15 to £30; well-matched pairs, £50 to £150.

Second-class well-bred light-harness horses.—Unbroken, £5 to £10; broken, £6 to £12; well-matched pairs, £30 to £60.

First-class saddle-horses.—Unbroken, £10 to £18; broken, £18 to £30.

Second-class saddle-horses.—Unbroken, £4 to £7; broken, £6 to £10.

Thoroughbreds for racing purposes.—Yearlings, £20 to £500; mares, £20 to £70.

Cattle.

The number of cattle in the Colony since its foundation, at the dates here mentioned, was as follows:—

Year.	Number.	Year.	Number.
1788	6	1871	2,014,888
1825	134,519	1881	2,597,348
1842	897,219	1891	2,046,317
1851	1,738,965	1894	2,290,112
1861	2,271,923		

The great falling off in the number of the cattle stock from 1861 to 1871 was attributable partly to losses through pleuro-pneumonia, but principally to owners changing their cattle-runs into sheep-stations. This was, to some extent, from a dread of the disease, but chiefly because sheep paid better than cattle. Thus, while the number of cattle at the 31st December, 1894, was only about the same as in 1861, the sheep during that time have increased from 6,119,169 in 1861 to 56,977,270. In other words, while in 1894 there were very few more cattle in the Colony than in 1861, there were more than nine times as many sheep.

Still there have been considerable fluctuations in the number of our cattle during the period mentioned. In the first place, there was a heavy decrease through the losses from pleuro-pneumonia in the period between 1861 to 1871. From the latter year, again, through a rise in the price, the number was fairly maintained till 1881, when it once more began to decline, with a fall in the price occasioned by a heavy influx of cattle from Queensland, which up to nearly that time had been taking considerable numbers from us to stock up new country. This decrease continued till 1889, since when, through the increase of selection, and the adoption of the practice now generally followed of running small lots of cattle in the sheep paddocks, cattle are again gradually increasing.

General Description of Cattle.

At one time there was a great lack of uniformity in our cattle in quality and form, and much room for improvement. These defects were to a large extent attributable to the great variety of breeds from which they were descended. There is in them more or less of the blood of almost all our British and Irish breeds, and even of the cattle of the Cape Colony; and, as if this was not enough of "differentness," a good many breeders in the early days, under the false notion that such a course was necessary to the proper management of their herds, kept up a continual round of changes in their bulls, to the perpetuation of this incongruity and the deterioration of their cattle. The unenclosed state of the country and consequent impossibility of keeping the different breeds separate also tended to check improvement, aided as it was by the scarcity of labour which followed on the outbreak of the diggings.

Within the last twenty-five or thirty years a great change has taken place for the better; sounder ideas, too, on the principles of breeding, and the really valuable points of the cattle have come to be held; the runs have been enclosed and subdivided, heifer paddocks have been formed, and large numbers of pure-bred stock of higher quality, for which long prices were paid, have been introduced. The result is that the beef cattle both in this Colony and Queensland will now in ordinary good seasons compare most favourably with those of any other part of the world. Nevertheless, our owners have still a good deal to do to be in a position to carry out a profitable export trade in either live cattle or beef; and among other things which will call for their attention, the following may be mentioned:—

(1.) They should continue to increase the early maturity, and improve the quality of their cattle, and adopt a sound system of cross-breeding for fattening purposes.

(2.) They should see that their cattle are supplied not only with sufficient natural pasture, but also, in those portions of the Colony where tillage can be profitably followed, with such cultivated food as the lucerne, English, and other grasses and green crops, so as to become thoroughly prime at an early age, and furnish a steady supply of prime chilled and frozen beef for the English and other markets.

(3.) They should de-horn their young stock, and accustom those of them intended for shipment to being tied up, and to take cultivated food.

The course here indicated with respect to providing cultivated food to supplement the natural pasture, must eventually be followed in the eastern and more temperate portions of the Colony, for it is impossible that wheat-growing can be profitably carried on year after year without manure, that is without stock; and besides, as a rule, it pays better to consume a large portion of the crops grown on a farm with stock, than to send the crops to market.

Shorthorns.—Of the different breeds in this Colony the Shorthorns blood is the most prevalent. By far the larger proportion of the imported cattle have for the last forty or fifty years been of that breed; and there is little doubt, considering the improvement which has been made in the quality of our cattle, that this was the best single breed that could have been introduced. Here, as in every other part of the world, the Shorthorns are allowed to be superior to every other breed in size, squareness, compactness, early maturity, and imposing appearance; while the pure bulls of this breed possess the power in an eminent degree of marking their progeny, even when put to inferior cows of other breeds, and conveying to them the size, substance, and quality for which they are themselves so justly distinguished. In fact, they supply the very qualities which colonial cattle generally lack. There have been repeated and frequent importations of high-class pedigree Shorthorns from England during the last fifty or sixty years, interrupted at times by prohibition. In some years as many as 100 head of the different breeds, principally Shorthorns, were introduced from Great Britain.

Herefords.—Herefords have proved themselves in Australia to be an excellent race of cattle, with distinctive type, characteristics, and form, thoroughly established and capable of being transmitted to any other races with which they may be interbred. They are especially remarkable for their weight, hardihood, and good meat. They are principally located to the north of Sydney, in the eastern and north-eastern portions of the Colony. The importations of Hereford pedigree cattle from England have also been continuous, more particularly by Mr. Reynolds, of Tocal, whose herd is the oldest established and, it is believed, the best in the Australian Colonies.

Devons.—Both Devon bulls and cows were imported as early as 1832–3, and their progeny made excellent crosses with the cattle then in the Colony, both for meat and milk; but they did not gain favour with stock-owners on account of their wildness. Further importations were subsequently received, but they also were mixed with and lost in the general herds; and it was not till some forty-five to fifty years ago, when Captain Holder formed a pure Devon herd on the Hunter, which afterwards passed into the hands of Mr. Reynolds of Tocal, that the Devons came into favour. Regular, though not frequent, importations of this breed from England have been kept up. When we consider the good travelling qualities, and the excellence of the meat of the Devons, there is no doubt they will ere long be found on many of the runs on the back country; and as fencing progresses we may expect to find herds in these outlying districts with Devon cows breeding to Shorthorn and Hereford bulls, the progeny being fattened off and not bred from.

Black-polled.—Importations of the Black-polled breed have at various times been made, but, as in the case of the Devons, they were at first all but lost in the general herd. Within the last few years, however, several breeders in this and the neighbouring Colonies have formed Black-polled herds, principally from importations from New Zealand, where the breed is now fully established. As beef cattle, the Black-polls, whether bred and fattened as pure, or used for crossing with the Shorthorn, cannot be excelled; and although they are being introduced by some of our breeders into their herds, this is not taking place so rapidly as was to be expected. Having been accustomed in breeding Shorthorns to cut out any that were black or of dark colour, our breeders are unwisely prejudiced against the Black-polled; but this prejudice cannot continue in the face of the fact that the Black-polls and their crosses with the Shorthorn regularly "top" the London market, and that no cattle pay their breeder and fattener so well.

Red-polls.—The Colony is indebted to Mr. Philip Charley, of Belmont, Richmond, for the introduction of this excellent breed of cattle. Although they do not carry the same depth of flesh, nor mature so early, nor make such heavy weights as the Black-polls, their meat is first-class, and brings very nearly as high a price in the London market. The Red-polls are also fairly good dairy cattle, and this accounts for their lightness of flesh as compared with the Black-poll. An addition of four head from England has recently been made by Mr. B. Osborne, of Jugiong.

Crosses.—It will be seen from the foregoing statement that the number of cattle described as crosses is very large, the Shorthorn breed taking, as it does in all other parts of the world where it obtains a footing, the premier place among the crosses. There is no doubt that crosses bred from pure or fairly pure cattle on both the sire's and dam's sides are very profitable stock, especially for fattening; and this our cattle-breeders have discovered; but unless crossing is carried out in accordance with the correct rules of breeding, and as far as possible stopped at the first cross, at any rate in beef cattle, it will not be attended with success.

The Australian Dairy Cattle.—For many years the districts from which our dairy produce came was from the country on the upper waters of the Hawkesbury River, and from the farms on the Coast Division, but principally from Camden, Wollongong, Illawarra, and Ulladulla districts. Latterly, however, with the introduction of the Laval Separator and other improved dairying appliances, and the formation of co-operative dairy factories, for which the country is largely indebted to Mr. Dymock of Kiama, a paying export trade in dairy produce has been established; and not only has the number of our dairy-farmers greatly increased, but many of our larger cattle-owners in the Coast and Mountainous Divisions, and even in the next division—the western slopes—who are within reach of steam carriage, and who formerly devoted their attention to fattening cattle, have gone extensively into dairying, and find that dairy produce pays them better than beef. This industry is bound to increase, for although extensive tracts of the Colony are well adapted for grain-growing, the same country is specially so for dairying and fruit-growing. There are some 384 dairy factories in the Colony, and their number is being steadily increased, while well-appointed

creameries with artificial cold, and all the latest improvements in dairying, are also being established. The output of dairy produce is yearly on the increase, and large numbers of cattle are required to improve and maintain the character and strength of our dairy herds. It was estimated that at the 31st December, 1894, there were 138,211 dairy cows in the Colony, and they principally consisted of what may be termed the Grade Shorthorn, with not unfrequently a dash of the Ayrshire, obtained from the early importations of that breed. In some few instances the herds are almost pure Shorthorns. Of late years, however, considerable numbers of Ayrshire and some Alderney bulls have been introduced into what may be termed the Australian dairy herds with good results, so far as the dairy produce is concerned, though not as regards the steers. Still, as dairy produce pays better than veal or beef, the introduction of the pure milking breeds—or, at least, the breeding of cattle for milk instead of beef—is bound to go on and increase, especially as our dairymen are coming to see that if they are to make their business pay, they must go very much more extensively than they have been doing into providing cultivated food for the cows during winter. Our dairymen in many parts of the Colony have been altogether too slow to see and attend to this, and it is not an unusual thing to find that even in districts in which dairying is the principal industry only a very few dairymen provide winter food for their cows. The results are, that the owners have little or no butter to dispose of when it brings the best price; their cows, if they have not died of starvation, are "bags of bones" by the end of winter; and the spring has run into summer before they are in a condition to give a full yield of good milk.

The Ayrshire, Alderney, and Holstein Breeds.—Although during the last forty or fifty years several Ayrshire and some Alderney and other Channel Island cattle were introduced from Great Britain, it is not more than fifteen or twenty years ago that pure herds of these breeds were formed in this Colony. Two or three were so about that time, and several others have been established since, the owners of which have imported some highly-bred stock of both breeds, but more Ayrshires than Alderneys. A good many Ayrshires have also been introduced from New Zealand, where large numbers of Ayrshires of the best types were imported from Scotland. We have also several representatives of the Holstein breed, which has such a strong hold in the dairies of Holland, Germany, and Denmark, but as yet in too few numbers for our dairymen to know how the breed will be liked.

Market Prices of Cattle Stock.—First-class pedigree cattle—Bulls, £20 to £100; cows and heifers, £10 to £40. Well-bred good herd cattle—Bulls, £6 to £12; cows and heifers, £2 10s. to £5. Store cattle—Bullocks, 40s. to 60s.; cows, 30s. to 40s. Fat cattle—Bullocks, £4 to £7; cows, £2 10s. to £5. Dairy cows—£4 to £10.

Sheep.

The Establishment and the Maintenance of our Merino Wool-growing Industry.

There can be no question whatever that to Captain Macarthur we owe the establishment of this industry, which has done, and is doing, and must continue to do so very much for the Colony.

The sources from which the stud sheep have been drawn from the time the fine wool industry was initiated by Captain Macarthur—and that was almost from the foundation of the Colony—may in a general way be stated as follows:—

The Sources from which our Merino Studs have been Drawn.

The Camden Flock.—The first pure-bred merino sheep introduced into this Colony were the small lot of Spanish merinos brought from the Cape of Good Hope—but originally from the Escurial or Royal flock in Spain—by Captains Waterhouse and Kent in 1797, at the instance of Captain Macarthur, who asked them, when they were leaving Sydney for the Cape, to procure provisions for the Colony, to obtain, if they could, some wool-bearing sheep. Then we had the importations from the Royal Spanish merinos kept at Kew, in England, usually termed the "George III flock," by Captain Macarthur, in 1804. From that date till 1823, there is no definite information on the subject; but we can gather from the history of some of the leading flocks that, although most of those who formed pure flocks at that time purchased sheep from Captain Macarthur, several breeders imported high-class rams from Germany, and some of them introduced German ewes as well as rams; while several merinos from the Royal flock at Kew, and a few of the Rambouillet blood from France, were also imported.

The Mudgee and Merriwa Flocks.—From 1823 to 1833, although Captain Macarthur's Camden flock still held the premier position in the estimation of the majority of sheep breeders, the flocks of the Hon. George H. Cox's grandfather, Mr. William Cox—who had purchased some of the pure Spanish sheep and their progeny from Captain Waterhouse—and that of Mr. Riley, of Rabey, which was founded on high-class imported German sheep, came into very general favour, and several of the other Mudgee pure flocks also began to be appreciated, and sheep from them to be in general request. It was during this period also that the now famous Collaroy flock was founded by Messrs. Jones and Davidson by the importation of Saxon rams and ewes, to which some ewes from the Camden flock were added. During the seventeen years from 1833 to 1850, while the Camden flock had, mainly through the deterioration of the pasture, brought about by the comparatively small area of the country on which the sheep were kept, and its continuous stocking, lost ground, the Mudgee and Merriwa flocks, favoured as they were with a better climate, especially for wool-growing, more extensive pastures, and in the hands of equally able and experienced breeders, gained in position and favour, and the majority of our sheep-breeders then began to get their stud sheep from the flocks in these districts. During that interval there were several German and Rambouillet sheep introduced.

Mudgee, Merriwa, Riverina, Victorian, and South Australian Flocks.—From 1850 to 1870 there were only a few importations of German sheep, and fewer still of French; and it may be said as regards the central, the northern, the north-eastern, and the eastern portions of the Colony, almost all the breeders went to Mudgee or Merriwa for their stud sheep. They did so also to a considerable extent in Riverina; but during that time there were several local flocks in that

WINGADEE STATION.

portion of the Colony—such as Wanganella—of very high merit, from which a good many of the breeders there drew their stud rams, while a few introduced Victorian blood. In the extreme south-western portions of Riverina again, and in the middle and lower Darling country, South Australian rams were generally used.

The Tasmanian, Mudgee, Merriwa, Riverina, Victorian, and South Australian Flocks.—Early in the seventies, our breeders began to introduce Tasmanian merino rams, which, while most of them had Camden blood as a foundation, were very largely descended from imported German sheep. So well did these rams mate with our own ewes, that they were afterwards brought over in large numbers, and in 1875 sales of stud sheep, principally Tasmanian, were established by Messrs. Mort & Co., and have continued ever since, at which as many as 3,000 Tasmanian sheep, with perhaps, 300 or 400 bred in this Colony, and, say, 100 from Queensland, Victoria, and South Australia, were sold annually in Sydney. Latterly the number of sheep brought to these sales has greatly increased—in 1894 some 9,000 were offered—through the introduction of large numbers of the different long-woolled or English breeds from New Zealand, and some from Victoria and Tasmania. This increase is partly due, also, to an increase in the number of merino, stud, and flock rams now offered at these sales by breeders in this Colony.

The American Merino.—Some twenty-five or thirty years ago several American merinos were imported into this colony, but with the exception of one ram which was used in Riverina they failed to find favour with our breeders. About 1881, however, a few first-class rams of this breed were brought from America by the Messrs. McFarland, of Barooga, which they put to properly selected Australian ewes with excellent results. This led to American sheep being imported in considerable numbers; and so far as regards increased density and yolk, and heavier and better covering, there is no doubt they improved our sheep. They are also straighter on the back and shorter on the leg, but they are often sharp on the shoulder and narrower in the chest, which shows they are less robust than the Australian merino. It is questionable, therefore, considering the comparative harshness and roughness of the wool in many of the American sheep, whether, notwithstanding the increased weight of fleece which the get of the American sheep give, their introduction in a large and general way would be advantageous, and whether their use should not be confined to men who are acknowledged breeders and can engraft the desirable qualities of these sheep on their flocks without introducing the undesirable.

The Victorian Merino.—The Victorian merinos have also on several occasions been introduced into this Colony; but although it would be to the advantage of our sheep-breeders if they could engraft the brightness, softness, and high combing qualities of the best flocks in the western portions of that Colony on their own, it has been found from experience that these Victorian sheep do not maintain their character with us, and, except, perhaps, in a few instances in Riverina they are not now used in this Colony.

The South Australian Merino.—It is different with respect to the South Australian studs. Considerable numbers of them are annually purchased by our sheep-owners for their stations on the Darling, and

in the western portions of the Colony, for which they are well adapted, being of the strong merino combing type, with good sized carcase, and carrying a fleece of very saleable wool.

The Queensland Merino.—Some excellent stud merino sheep have also been brought to our sales from Queensland, where several of the breeders have for many years maintained pure bred stud flocks of high merit.

The Present Sources of Supply of Stud Sheep.

The merino stud rams required by breeders in this Colony now come principally from Tasmania, Mudgee, Merriwa, and Riverina; but of late years several other breeders of this class of sheep in New South Wales have made steady progress in improving their position, and their sheep have taken good places on the show-ground and at the sales. This, in many instances, is largely due to the introduction of the American merino which has taken place since 1883, and which still continues, and there is no question as to the success of that blood at the show-yard whatever the ultimate effect of its introduction on the stamina and constitution oft the sheep and the quality and price of the wool may be.

We are still also receiving some merino stud sheep of high quality from Queensland at our annual sales; and our sheep-owners in the western and south-western portions of the Colony as a rule continue to obtain their studs from South Australia.

So far, again, as regards our flock rams, a good many of them also come from Tasmania, but the majority of that class of sheep are bred in the Colony.

Progress and Future Prospects of the Wool-growing Industry.

The number of sheep in the Colony at the dates here mentioned was as follows:—

Year.	No.	Year.	No.
1788	29	*1861	5,615,054
1803	10,157	1871	16,278,697
1825	2,376,622	1881	36,591,946
1842	4,804,946	1891	61,831,416
1851	13,059,324	1894	56,977,270

* In 1851 the separation of Victoria took place, and involved the loss of more than 6,000,000 sheep; while in 1860 Queensland became a separate Colony, which led to another large reduction in the number of sheep in this Colony, and these losses account for the heavy decrease in the number of the sheep returned for 1861.

It will be seen from the foregoing statement that from 1861 to 1891 there was a large, and, upon the whole, a steady increase in the number of our sheep, principally because our stock-owners found that sheep running at large in paddocks, instead of being shepherded, paid very much better than cattle. This "turning out," as it is termed, of the sheep led to a radical change in station management, which commenced in this Colony about the end of the sixties. The runs were enclosed and subdivided, and better provision was made for water by putting down additional wells and constructing more dams and tanks. In these ways the carrying capacity of the runs was increased by at least one-third; the expense of working the improved runs was reduced by one-half; the sheep were healthier; the fleece was better, both as regards quality and weight; and owners, instead of having the greater part of

their time taken up in the management of large numbers of shepherds and hut-keepers, could then devote the necessary portion of it to the improvement of their runs and sheep.

Since 1891 the increase in the number of sheep has stopped, and last year (1894) there were about 5,000,000 less sheep than in 1891. This has arisen from several causes, of which the following are the principal:—

1. The carrying capacity of the runs in the present state of their improvement had been more than reached.
2. The system of breeding for numbers and wool, and selling breeding and store sheep, had ceased to pay, as the Queensland markets had practically closed through the increase of the sheep in that Colony.
3. Through the fall in the price of wool and the want of an export trade in mutton.
4. The uncertainty and high cost of labour.
5. The prevalence of the rabbit pest.
6. The comparatively high rents charged for Crown lands, considering the uncertainty of the seasons and the very low prices of mutton and wool.

As to the probability of our sheep once more increasing, that can be only looked for, to any great extent, if the rise which has recently taken place in the price of wool be maintained; if the long-looked-for export trade in mutton of an extent at all in proportion to the number of our sheep be established; if the labour question be put on a satisfactory footing; if more effective and continued action be taken in dealing with the rabbits; and if the rents of Crown lands are fixed at reasonable rates, and sufficient encouragement be given to the Crown tenants to make improvements, especially by subdividing and clearing their holdings of scrub and in artesian boring.

If these things take place, then we have a right to expect that improvements, which are now practically at a standstill throughout the Colony, will be proceeded with and the carrying capacity of the land largely increased, especially on the eastern side of the Colony, where the adoption of a system of supplementing the natural pastures by cultivated food for the stock is urgently called for, both to make our fat stock really prime at an early age, and to keep up a steady supply for export.

Sheep in the Australasian Colonies.

As will be seen by the following statement, this Colony in 1894 possessed nearly as many sheep as all the other Australasian Colonies—*i.e.*, about half the sheep in Australasia.

Colony.	No.
New South Wales	56,977,270
Victoria	13,180,943
Queensland	19,587,691
South Australia	7,325,003
Western Australia	2,132,311
Tasmania...	1,727,200
New Zealand	20,230,829
Total.....	121,161,247

Merino—Combing and Clothing.

There are two principal divisions of merino sheep, "Combing and Clothing," and the returns show that in this Colony on 1st January last, out of 56,977,270 merino sheep, 38,429,679 of the whole were classed as "Combing," and 15,641,102 as "Clothing."

Prior to 1870 a large majority of the merino sheep belonged more to the "Clothing" than the "Combing" division; but about that time a change in the manufacture of woollen fabrics took place in the United Kingdom from clothing to combing.

This of course led to increased demand for combing wool; and as the change was to the advantage of our sheep-breeders, inasmuch as it led to a considerable increase in the weight of the fleece, while the price of the wool was at least maintained, they lost as little time as possible in making the required change in the sheep. To do so they introduced merino rams of larger frame, with wool stronger and longer in the staple, and more of a combing type; and to such an extent has this change been carried that there is scarcely a flock of any size in the Colony with the fine and superfine short dense clothing wool which about 1870 was grown in several parts of the Colony. It is true that considerably more than one-fourth of the sheep of the Colony are returned as clothing; but although this is the case, they might, according to the true distinction between combing and clothing, be classed as combing, if they possessed the necessary soundness and elasticity; so that there are much fewer sheep of the true clothing type in the Colony than the returns show.

The Different Grades of Merino Sheep, and the Country for which they are each adapted.

In the returns referred to, the merino sheep in each of the two main divisions of clothing and combing are given as being of the different types or grades, *i.e.*, (1) "Fine and Superfine," (2) "Medium," and (3) "Strong;" and as the size of the sheep, speaking in a general way, regulates the diameter of the fibre of the wool, it follows that the "fine and superfine" will be the smallest framed sheep, the medium the next, and "strong-woolled" the largest.

This, again, speaking of the eastern portion of the Intermediate division and the Western Slopes and Mountainous, will, if the management is correct, be found generally to correspond with the description of country in which the several types are kept. For instance, on country where the soil though kindly is light, and the pasture comparatively thin, the small framed fine and superfine type of sheep should be found; where, again, the soil is stronger and more fertile, and the pasture closer and more nutritious, the next larger sheep of the medium type should be kept; and when the soil is very good, and the pasture very nutritious, the largest type of merino, and also the cross-bred, should be kept. In this way it will be seen that the class of country, the class of sheep, and type of wool in the portions of the Colony indicated, to a large extent run on similar lines, where the owner —as he should do, if he is to make the most of his holding—selects the class of sheep for which his country is best adapted. No sheep-breeder can expect success if he does not keep this rule constantly in view.

While making this statement, the fact is not overlooked that the circumstances which are here mentioned as settling that question can be altered by the owner supplementing the natural pasture to a greater or less extent with cultivated food; and this must eventually be done in the portions of the Colony here alluded to, and especially in those nearest the seaboard, if we are ever to establish an extensive paying export trade in meat.

There is an exception, also, to the rule here laid down as regards the Salt Bush division, because the great heat and dust at times in that description of country have a much more deteriorating effect on wool of the fine type than on the strong; and the owner there finds it more to his advantage to keep the large-framed, strong-woolled sheep, whereby he not only obtains a heavier and sounder fleece, but a much weightier carcase of mutton.

Long-Woolled Sheep.

It is scarcely necessary to say that the long-woolled sheep are bred and kept almost exclusively for crossing purposes. The term "Long-woolled" which is generally applied in the colonies to the British breeds of sheep, is without doubt correct when we compare the length of staple of even the South Downs, the shortest woolled of these breeds, with that of the merino. It was at one time the custom with breeders as well as manufacturers in the old country to divide the sheep and wool of the British breeds into two classes "Long-wools" and "Short-wools"; but as the merinos are really the "Short-wools," they have lately been known as such; and the term "Medium-wools" is now generally applied to those breeds of British sheep at one time known as "Short-wools." The "Long-wools" include the English Leicester, the Lincoln, the Border Leicester, the Devon, the Cotswold, the Wensley Dale, the Romney Marsh, and the Roscommon; and the "Medium-wools" include the South, the Shropshire, the Hampshire, the Suffolk, and the Oxford Downs, together with the Clune Forrest, the Dorset Horn, the Ryeland, and the Cheviot, and the British and Merino Cross-breds. As, therefore, it would be likely to lead to confusion if we in these Colonies continued to apply as we now do the term "Long-woolled" to all British sheep, it should be dropped and the term "British" used instead.

Lincolns.—The detailed statement given of the different breeds which make up the above number of pure bred and "long-woolled" sheep shows that more than half of what are termed Long-woolled Sheep are Lincoln.—This has arisen principally through the Lincoln cross giving considerably better returns as regards wool than any of the other British breeds, while the mutton of the first cross of the Lincoln and merino is very good, if marketed in prime condition and at an early age; and this it can be on really good pasture, or with the aid of cultivated food.

The English Leicester.—The breed with the next largest number of representatives in the Colony is the English Leicester; and while the first cross of this breed and the merino has a good paying fleece, and the sheep themselves come early to market, the mutton does not bring the highest price as it carries too much fat and is wanting in red meat.

The Border Leicester.—In 1894 when the last available returns were made, very few sheep of this breed were to be met with in the Colony; but since then a considerable number have been introduced from New Zealand; and as they are hardy, good sized, well shaped sheep with a comparatively good fleece of saleable wool, and do better on second-class country than the Lincoln, it is to be expected that they will in many cases be used by our breeders for crossing with the merino, although their cross-breds are somewhat short of red meat.

The Romney Marsh.—During the last two or three years several owners, whose flocks have been suffering from fluke and foot-rot, have introduced Romney Marsh rams; and they have acted wisely in doing so, for while the Romney Marsh is an exceptionally hardy sheep, and will no doubt lessen the number of losses these owners have lately been sustaining from the cause mentioned, the Romney Marsh crosses will clip fairly weighty fleeces of good useful wool, and give a saleable carcase of, say, 60 lb. of two-year old mutton, if well cared for.

The South Down.—This breed, which has a fair number of representatives in this Colony, was one of the earliest British breeds introduced; but although the quality of the mutton of the first cross with the merino is superior, the shape of the sheep excellent, and its hardness and constitution all that could be desired, the great falling off in the weight and quality of the wool in the cross has prevented the South Down ram from coming into anything like general use for crossing purposes. Still it will pay well to put the South Down rams to cross-bred ewes, especially the Lincoln and merino cross, to breed lambs for the London market—a business in which it is believed an extensive remunerative trade will before long be established.

Shropshire Downs.—Although the number of sheep of this breed now in the Colony is small, there is no doubt but it will rapidly increase; for while the shape of the sheep (a very important consideration in the London market) and the quality of the mutton are very nearly equal to the South Downs, the Shropshire cross kills heavier, and the fleece in this cross both weighs more and is more valuable than the South Downs. Like the South Downs, the Shropshire will be principally used for breeding lambs with the first cross ewes got by rams of some of the British breeds out of merino ewes; but even with merino ewes the Shropshire ram gets first-class lambs of fair weight and prime quality.

Cross-breds.

Previous to 1883 it may be said that it was not practicable to put either beef or mutton in a fresh state on the London market; but since that time this has all been changed, and there is not now, nor has there been for the last ten or twelve years much more risk in placing fresh beef and mutton on the London market than in shipping tinned meat, or even wool.

This being the case, sheep-breeders in New Zealand have during that time been taking advantage of this altered state of things, and doing a trade in frozen meat, which, taking the relative number of sheep in the two Colonies, was more than ten or eleven times the

magnitude of that done by our sheep-owners; and they have been enabled to do so mainly through using British rams, and breeding and exporting cross-bred sheep.

To show the result of this, it has only to be stated that while sheep-owners in New Zealand were during the period alluded to making from 15s. to 18s., and sometimes 20s. each for their fat cross-bred two-year old wethers, and from 10s. to 12s. for their fat six-months' old lambs, breeders in this Colony, by clinging to the merino, although in many cases holding country suitable for cross-breds, have only made from 7s. to 10s. for their fat three and four-year old wethers, and from 5s. to 7s., or less, for their seven to eight-months old fat lambs. During the last few years, however, with the low price of both merino wool and merino mutton, a good many of our sheep-owners have introduced British rams into their flocks, and it is to be expected that many more, where the country and circumstances admit, will follow their example, and take to cross-breeding.

When it is remarked that the country has to be suitable for the large-framed sheep, it must not be thought that this refers only to the country in which the climate and soil are similar in all respects to those in New Zealand, where the cross-breds have been such a success, for we have in this Colony at least three classes of country well adapted for cross-breds:—

(1) That in which the natural pastures are very nutritious, and the water supply ample.
(2) That with the climate and soil like those in New Zealand, well adapted to the growth of root crops and cultivated grasses.
(3) That in which lucerne is a paying crop; and it is believed that even in comparatively poor country green crops and other cultivated food will in many parts of the Colony be eventually grown to supplement the natural pasture, and carry and "top off" the larger framed sheep; for if the agricultural settlement is to be a success, a system of mixed farming and rotation of crops must be adopted.

The production of cultivated food for stock has in some parts of the Colony been already begun, and will, it is believed, before long be generally taken up in those districts which are adapted for that system. This is absolutely necessary if we are ever to establish a steady paying export trade in chilled and frozen meat. But there is still another very important reason why this system should in many localities be adopted. A great deal of the land suitable for cultivation, situated in the higher and colder portions of the Colony, is in its natural state unsound, and the sheep there are in many cases afflicted with fluke, foot-rot, and worms. This arises mainly from the prevalence of surface water on a great deal of the best feeding ground in those portions, and the lack of nutrition in the natural grasses. Cultivation will to a large extent remedy both these evils; for if it is properly carried out the land will no longer be, as in many cases it now is, a breeding ground for fluke and worms, for the water will no longer lie upon it, and the cultivated grasses, clovers, and other crops will not only have sufficient nutrition to keep the stock sound and in robust health, but will enable their owners to turn off a large share of them fat and fit for export, which they now find all but impossible.

MARKET Prices of Sheep—Stores Delivered on Station.

Class of Sheep.	Merino.	Lincoln.	Leicester.	Downs.
First-class, pure-bred Stud Sheep.				
Rams	£150 to £200	£15 to £40	£12 to £30	£12 to £35
Ewes	£20 to £40	£10 to £15	£8 to £12	£8 to £12
Good, pure-bred Stud Sheep, to Breed Flock Rams.				
Rams	£10 to £20	£7 to £15	£6 to £12	£6 to £12
Ewes	£4 to £12	£3 to £6	£2 to £5	£2 to £5
Good Flock Sheep.				
Rams	£2 to £5	£2 to £4	£2 to £4	£2 to £4
Ewes	4s. to 6s.	6s. to 12s.	6s. to 10s.	6s. to 10s.
Good Store Sheep.				
Merino wethers	3s. to 5s. 6d.	.....	.....	.....
Do. ewes	3s. to 4s.	.....	.....	.....
Crossbred wethers	5s. to 7s.	.....	.....	.....
Do. ewes	4s. to 6s.	.....	.....	.....
Prime Fat Sheep.				
Merino wethers	6s. to 8s. 6d.	.....	.....	.....
Do. ewes	4s. to 6s. 6d.	.....	.....	.....
Crossbred wethers	7s. to 10s.	.....	.....	.....
Do. ewes	5s. to 8s.	.....	.....	.....

DISEASES IN OUR LIVE STOCK.

Looking at other parts of the world we can say that the live stock of the Colony are comparatively free from infectious or contagious disease. Happily such deadly and costly ailments as glanders, farcy, rabies, rinderpest, sheep pox, and foot and mouth disease have never obtained a footing among our stock. Stringent measures are adopted by us in conjunction with the other Australasian Colonies to prevent the introduction of such diseases: An effective code of regulations has been agreed to which is strictly carried out and no stock are introduced from places outside the Colonies except in terms of these regulations, which, among other things, provide that no cattle or sheep can be introduced into Australasia which have not come from Great Britain or Ireland, and then only when accompanied by certificates that they had been repeatedly inspected previous to shipment. On arrival they are inspected and have to undergo sixty days quarantine before being allowed to land.

Horses.—Our young horses at times suffer from strangles, but usually of a mild type. In country which is subject to inundations, or where the ground is wet and unsound, the horses at times become infested with parasites which bring on what is known as Australian stringhalt, and also—it is believed—the blindness which attacks them when running on inundated country in some of the hottest portions of the Colony. There have been, too, epizootic outbreaks of influenza, but they occurred at considerable intervals. We have also occasional deaths in horses from anthrax, and a troublesome horse mange affects the horses in the northern portions of the coastal division.

Cattle.—Some three or four years ago there were many cases of tuberculosis among our cattle, but its true nature has become known, and owners are by killing and boiling down those showing symptoms of the disease gradually lessening the number of affected animals. They are adopting the same course with regard to cancer and actinomycosis with like results. We have at times outbreaks of pleuro-pneumonia (mostly traceable to Queensland cattle) which are stamped out by inoculation. There are also occasional losses from blackleg and splenic apoplexy, but the losses from these ailments are, as a rule, slight.

Sheep.—The diseases which have caused the heaviest losses in sheep are fluke, worms, and foot-rot, for which owners are now generally applying the most effective remedies, *i.e.*, surface draining, burning off old pasture, and giving proper licks and drenches. A few years back a good many sheep were lost from liver-rot, brought on by a series of wet seasons; but this disease has now almost disappeared. The most deadly disease among our sheep is anthrax, but it is not generally prevalent, and is to a large extent kept in check, and it is hoped will be eventually reduced to a minimum by the system of vaccination introduced by the late Mons. Pasteur, and carried out in the Colony by one of his pupils, M. Momont, and by Mr. J. A. Gunn, an Australian expert, who prepares his own vaccine. There has been no scab in the Colony since 1868, but the sheep suffer from tick, and in a few instances from lice.

Annual Return from the Live Stock of the Colony.

Prepared by Mr. Government Statistician Coghlan.

Live Stock.			Value.	Total Value.
Sheep.			£	£
Wool			8,810,829	
Sheep slaughtered and preserved ...		£1,509,100		
Lambs ,, ,, ,, ...		46,340		
			1,555,440	
Boiled Tallow		£438,600		
Tongues, Oil, Shank, Skin, Wool ...		153,500		
			592,100	
Surplus of Export over Import			99,621	
Total from Sheep				11,057,990
Cattle.				
Total number of Cattle killed was.....	376,406			
Deduct number imported...	143,746			
Net Cast	232,660	... ...		900,000
Horses.				
Cast of Horses was ...	100,500			452,000
Total Value			£	12,409,990

Agriculture.

By J. L. Thompson, Principal of Agricultural College.

Agriculture, which has been described as "the foundation on which all civilisation rests," is one of our leading industries.

Climate.

Consequent upon the remarkably varied climates found in New South Wales, the products of cold, temperate, and sub-tropical countries can be grown within its limits.

For farming purposes we may consider three distinct climates—

(a) *Coastal.*—Area, 38,200 square miles; average annual rainfall, 44·98 inches, varying from 64 inches on the coast to 31·48 at foot of dividing range. The northern portion is sub-tropical; chief crops, maize and sugar-cane. From Macleay River to the south, with a cooler climate, the chief summer crops are maize, oaten hay, potatoes, lucerne, pumpkins, melons, grapes, and other fruits; winter crops, wheat, oaten hay, and potatoes, whilst dairying is largely followed.

(b) *Tablelands.*—Area, 84,900 square miles; average annual rainfall, 30·84 inches, varying between 35 inches on the east to 25 inches on the west. The northern tableland, New England, grows sugar-beet and general English crops. To the south wheat is the chief crop, whilst dairying is extensively carried on.

(c) *Western Districts.*—Area, 187,600 square miles; rainfall varying between 21·6 inches at foot of the range and 9 inches west of the Darling. Characterised by dryness, long hot summer, cool winter, irregular rainfall, and want of uniformity in the seasons. Near the range wheat is largely grown, especially in the Riverina; lucerne does well, exceptionally so under irrigation. The region is eminently suited for drying fruit, of which many kinds grow luxuriantly; cost of transport is, however, detrimental to growers.

In surface contour, Eastern Australia may be compared with a portion of an unturned plate; the ridge representing the dividing range forming the table-lands, with, outside, the coastal zone, and inside, the western districts or interior.

History of Agriculture.

The earliest attempt at agriculture in New South Wales was made by Captain Phillip, who, in 1788, endeavoured to raise wheat and other crops at Sydney, with but indifferent success. In 1789 James Ruse started farming at Parramatta. Later attempts were constantly

being made with varying success. In 1791 there were 700 acres under cultivation; in 1792, 1,400 under crop, and 161 cleared. In 1795 Governor Hunter established successful farms on the Hawkesbury, 30 miles from Sydney, wheat and maize being the chief crops. In 1800, 7,677 acres were under cultivation; in 1821, 32,267; in 1877, 513,840; in 1887, 975,471. For many years agriculture was confined to the coastal zone and tableland. To-day over 2,000,000 acres are under agricultural operations in all parts of the Colony; only about 0·7 per cent. of the total area of New South Wales being, however, actually devoted to the growth of agricultural produce. At present cultivation is secondary to stock-breeding. There is plenty of good, though variable, land; whilst the crop yields are large when compared with those of other countries. Communication with the central market, difficult in the past, is improving yearly; and there has been a steady increase in the surface cleared for future use.

Establishment of the Department of Agriculture.

A new era dawned for agriculture in New South Wales when, in February, 1890, a Department of Agriculture was established under Hon. Sydney Smith, M.L.A.; a Director was appointed, and immediate steps were taken to organise and get into working order a comprehensive scheme of agricultural education, based on the best points in the systems in vogue in Great Britain, Germany, and the United States. Since 1890 operations have gradually extended; the main objects in view being—

1. Dissemination of such information as will be likely to benefit growers, looking to the position and needs of the different districts.
2. Introduction of new useful crop plants.
3. Investigation of crop diseases, and recommendation of suitable measures for relief.
4. Formation of a museum of agricultural products and a library concerning the industry.
5. To educate farmers by lectures, demonstrations, and experimental farms.
6. To educate young agriculturists in the sciences related to, and the practice of, the art; by establishment of farm schools and a central College.
7. To encourage growth of imported products so as to enable us to supply our own wants.
8. To endeavour to show how to grow good products, and best prepare them for the market.
9. To assist in opening up new markets.

To carry out this programme various experts have been appointed, who advise when required as to the best methods of procedure. An official organ, *The Agricultural Gazette*, containing articles dealing with every branch of agriculture, is published monthly, bringing the Department into touch with growers; manuals, dealing with dairying, forage plants, grasses, and bulletins on various cognate subjects, have been published and distributed freely.

Hawkesbury Agricultural College.

Perhaps the great importance attached to education of the people in agricultural matters is best evidenced in the establishment of the Hawkesbury Agricultural College, at Richmond, 38 miles from Sydney. Opened in March, 1891, with 25 students, six months later the number was doubled; and the new building, to be occupied February, 1896, will accommodate 98. Three thousand acres of bush land have been converted into a first-class farm, with cultivation paddocks (600 acres), orchard (30 acres), vineyard (10 acres), mulberry plantation for silkworm-rearing (10 acres), bee and poultry farm (15 acres), grass (1,000 acres), the balance being uncleared at present. The buildings contain lecture halls, chemical and botanical laboratories, museum, library, offices, houses for principal and resident masters; each student has a separate bedroom-study; and electric light is to be used throughout. All necessary farm buildings are provided. The dairy is most complete, and the stock varied. Carpentering, blacksmithing, farming, orchard, dairy, and other kinds of work are constantly in full swing. The crops are varied and extensive, including wheat, oats, maize, tobacco, potatoes, sweet potato, pumpkins, melons, buckwheat, turnips, mangel, and rape. Experimental work is always going on, and large numbers of economic plants are to be seen growing. The orchard contains stone-fruits, pomes, fig, guava, citrus fruits, persimmons, and a large vegetable garden. An irrigation farm of 100 acres is in contemplation. Students take out-door work and lectures on alternate days; the latter comprise principles of agriculture, agricultural chemistry, botany (including vegetable pathology), geology, physics, mechanics, surveying, entomology, farm book-keeping, veterinary science and practice, arithmetic and English. The course of study covers two years, and to take a diploma, examinations must be passed in eight subjects; the three first-named being compulsory, together with practical work and good conduct.

Experimental Farms.

Experimental farms are to be established in every distinct climatic region in the Colony; at Wagga Wagga (southern tableland), Lismore (sub-tropical coastal), and Bathurst (central tableland), work has been commenced; tests are being made as to the best crops and methods of work for the special district.

The water running from numerous artesian bores, put down by Government in the western districts—chiefly west of the Darling—has been largely made use of for demonstrating possibilities of cultivation in the dry interior, 500 miles from the coast, and with gratifying results; lucerne, maize, wheat, tobacco, bananas, melons, pumpkins, stone-fruits, quinces, date palms, poplars, willows, and other plants grow remarkably well, showing that the hot interior, when water is available, can be made to support a large population.

It may be remarked that, as yet, town sewage and ashpit refuse are rarely used for irrigation and manurial purposes; there is great room for the utilisation of this material, properly prepared, as an economical and useful fertilizer.

In forestry much has been done, by planting and thinning, to improve the natural forests, a most important matter to the farmer, in equalising the flow of rivers and giving protection from the strong, hot, drying winds frequently prevalent. The establishment of shelter belts of useful trees, and new timber-producing areas, must come about in the future. At Booral, on the Hunter River, a plantation of mulberry trees is in the hands of an expert appointed to encourage silk production.

The Agricultural Societies, subsidised by Government, have done good work in stimulating rivalry, and encouraging the breeding of good stock, and the raising of first-class products. Conferences are periodically held for general discussion in matters relating to farming, orchard, and related industries.

A travelling dairy for some years conveyed to dairymen the most approved methods of butter and cheese making. National prizes have been freely offered, and awarded, for the best farms, orchards, products, or new implements; to encourage such a system of cultivation as will give best results, and improve the general standard of crops, stock, and holdings alike. This object is being assisted by an effort now being made to secure correct names for our chief products; when we know what we are growing, growers can be advised what to discard as poor and useless, and every effort made to induce the growth of varieties suitable both for home consumption and export.

Such, in outline, is the important work initiated for an excellent purpose. Distinct benefit has undoubtedly been derived from the work already done; there may be seen in agricultural circles, by such as are interested, an awakening to the fact that scientific knowledge applied to agriculture enables growers the better to meet those, often, enormous difficulties found in variable seasons, insect and fungus pests, commercial depression, and such influences as, in the past, have kept cultivators from realising the maximum of return from a minimum of labour.

It should not be forgotten that, under the Minister for Education, instruction is given in agriculture at the Technical College, Sydney, with such practical lessons as circumstances permit.

The Land.

Total area fit for occupation, about 190,000,000 acres; of this, 22 per cent. is alienated, held by 54,428 owners. The best land is said to have been already taken up; in the past, however, position with regard to water was the first consideration. There is plenty of good land suitable for cultivation if water were only available. With regard to conservation of water, surveys are being made throughout the districts most requiring it, for the purpose of framing a feasible scheme; when water is extensively conserved, millions of acres of the interior will be yielding crops second to none in the world. Several irrigation colonies have already been commenced, with great prospect of success; already 40,000 acres are irrigated by private enterprise.

Most of the available land requires clearing; this costs from 15s. per acre in sparsely timbered country, up to £30 in the dense forests of the northern districts; various labour-saving appliances have been introduced for pulling down trees and extracting stumps.

The system of partially clearing land is sometimes followed; scrub and small trees are cut out, large trees being ringbarked. This accelerates the ultimate clearing, for when they become dry they are easily burned. Meantime the ground is cropped. Such a proceeding is mostly followed by persons with limited capital, and such country has not an attractive appearance; moreover, the roots, stumps, and trees left in render cultivation difficult. Metayage (lessee paying a share of the produce to lessor, in lieu of a money rent) is carried out here and there, in some cases with advantage. Direct ownership by the cultivator is, however, of greatest benefit to him.

Fences of various types are used in subdividing the land; those most commonly erected being post top-rail and six wires (costing up to £80 a mile), post and three or four rails, post and five or six wires (costing as low as £18 per mile where droppers are used for keeping wires apart, the posts being further apart than usual); sometimes logs are laid dog-leg fashion. Where timber is plentiful fences can be erected very cheaply. Barbed wire is now largely used, and is invaluable for keeping in animals having a tendency to stray.

Chief Crops—Cereals.

Wheat is largely cultivated on the tableland and its western slopes. Area* (1895), 647,483 acres, being much below that of 1894. Rust prevents its cultivation in the coastal district. Average return for thirty years, 13·26 bushels per acre, ranging between 4·75 bushels, in 1889 (a rusty year), and 17·37, 1887. Cost of growing depends on size of holding. On large farms, with first-class appliances, approximately 15s. 6d. per acre; medium-sized farms, 20s.; small, 27s. Average return per acre—if grown for grain, £2 5s.; for hay, £3 10s. Excellent grain is grown; an average weight of average samples from various parts of the Colony gives 66¾ lb. to a bushel. Our production does not fulfil requirements. There are signs, however, that a great increase in wheat production will shortly take place. Strong efforts are being made at Wagga Wagga Experimental Farm, where there are 400 varieties under cultivation, to produce rust-resistant wheats with good gluten contents, and with every prospect of success.

Maize.—Area under cultivation, 1894–5, 208,308 acres; average yield for thirty-three years, 31·5 bushels per acre—higher than that of any other country. In 1894 we consumed 5,671,827 bushels and imported 46,294 bushels. One of our most valuable products, being used for a great variety of purposes—green, as food for dairy stock and pigs and for silage; green cobs as a vegetable, either fresh or canned; dried grain, or the whole cob ground pith and grain together, for stock food; ground as maize-meal for man; starch is extracted from it; whisky and schnapps are distilled from it; and sugar can be obtained from the stems. Land is ploughed 7 to 9 inches deep; seeds (soaked in copper-sulphate solution as a precaution against smut, or in tar-water to keep away birds and vermin) are planted in September and October, even later, singly by the Farmer's Friend Seed Drill about 16 inches apart, in rows 4 feet apart, manure being dropped by the same machine; sometimes sown by hand, four to six seeds in a hill, 4 feet 6

* All statistics based upon "Coghlan."

inches apart each way, the former method preferable. After-cultivation is constant; as showing the benefit of frequent shallow cultivation in our dry climate (a plan that should be extensively followed), at the Hawkesbury Agricultural College:—

Maize not cultivated yielded	...	35·22	bushels per acre.	
,, once ,, ,,	...	38·50	,,	,,
,, twice ,, ,,	...	41·37	,,	,,
,, three times cultivated yielded		60·41	,,	,,
,, four ,, ,, ,,		61·42	,,	,,

The plant should be left undamaged whilst growing (no tasselling, topping, or suckering). A rainfall of 30 to 35 inches per annum is needful, but irrigation gives good results. Harvesting and husking are done by hand. The stalks are not burned, but are cut up by a roller fitted with steel blades and ploughed in to rot, returning much valuable plant-food to the soil. Pests are numerous both in growing crop and store, weevil, army-worm, and smut being the worst. Cost of production, exclusive of rent and interest on capital, approximately £4 2s. per acre; average return, £5 2s. 6d.

Oats.—This cereal is much neglected. Area (1895) for grain, hay, and green fodder, 130,481 acres; average yield of grain for ten years, 20·9 bushels per acre. Chiefly grown for hay; it should be much more largely grown for grain, as it is the best of all grains for horse-feed.

Barley.—Area, 1894–5, 13,336 acres; yield, 17·2 bushels per acre. A sample of malting barley, grown in the Riverina district and forwarded to England to test its value for malting purposes, was pronounced by Messrs. Truman, Hanbury, Buxton, & Co. "Of first-class quality and equal to the best Chilian." 150 acres are being grown at the Wagga Wagga Government Farm, in order to further test the English market.

Rye.—1895, only 1,359 acres sown, yielding 15·2 bushels per acre.

Millets.—1,585 acres of various kinds grown in 1895 for grain and green food; grain return, 11·2 bushels per acre. Sorghum is almost entirely grown as green food for cattle, but experience shows that maize is much better, whilst young or stunted sorghum acts deleteriously upon stock.

Root Crops.

Development of the *Sugar-beet* industry bids fair to put an end to the necessity for importing sugar (31,245 tons imported in 1891). Roots grown at Hawkesbury College Farm yielded up to 15·61 per cent. sugar, whilst others grown on the northern tableland went as high as 24·75. Land is ploughed deep or subsoiled; seed, soaked in rain-water and urine, to hasten germination, sown 16 to 20 lb. per acre 1 inch deep if ground be moist, a little deeper if dry. To obtain roots from 1½ to 2½ lb. in weight (the richest in sugar) careful thinning and after-cultivation are necessary. Care must be taken in manuring, as freshly-dunged soils tend to decrease quality of the root as a sugar producer. Roots should be stored, at a temperature of about 50° Fahr., if inconvenient to extract juice at once. Plant (sufficient to cope with the produce of a fairly large district) can, however, be laid down for washing roots, pulping, extracting juice, and evaporating to a condition carriageable in bags, for £150. Approximate cost of

producing 1 acre, £7 12s., exclusive of rent and interest on capital. Average return, 15 tons at, say, 16s. per ton, £12. Sugar-beet makes a good rotation crop with cereals and lucerne, clover, or grasses, whilst the refuse pulp makes excellent stock-food, especially if mixed with chaff.

Potatoes.—Grown both as winter and summer crop.* Area in 1895, 30,089 acres, yielding an average of 2·83 tons per acre. Sometimes 15 tons are dug per acre. As a field crop, about 15 cwt. seed used per acre, ploughed under every third furrow; kainit, superphosphate, and bone-dust mixed, largely used as a manure; 1 to 2 cwt. per acre. Cost to grow, £5 to £6 per acre; average return, £10 9s. per acre.

Turnips.—Commonly grown in winter; ½ to 1lb seed used per acre, drilled in with manure. Yield, up to 30 tons per acre.

Mangold.—A valuable heavy yielding crop, coming in when turnips are nearly done. Cultivation of this and the preceding root is greatly neglected; they should be extensively grown in a rotation as stock food.

Various Crops.—Onions, Arrowroot (Canna edulis), *Chicory* (average yield, 40¼ cwt. dried root per acre), *Carrots* (a useful field crop, good horse-food) are also grown, but to a very limited extent.

Leguminous Crops.

Lucerne (Medicago sativa), perhaps our best fodder plant, does remarkably well wherever the natural rainfall is sufficient or irrigation can be applied; keeps green and luxuriant during hottest months of summer if roots are within reach of moisture; stands drought well if soil is deep; frequently yields 7 or 8 tons per acre, and as many as eight cuts in the year, and it will last twelve or fifteen years. By means of a box apparatus fitted on a wheelbarrow, 35 acres have been sown by one man in a day. Broadcasting is better than drilling, using about 12 lb. seed per acre. It should not be fed down close the first season, and the best results are undoubtedly obtained by cutting, and carting it to the animals. Dodder, its chief enemy, is readily kept in check by timely eradication. Every stock-owner in the country should grow it; and as a paddock runs out it could be put under rotation (legumes improve the ground much more than other plants if ploughed under) and another paddock laid down. *Red Clover* and *Tares* are grown (largely with rye-grass) for dairy food; and to assist the former in setting its seed humble-bees have been introduced from New Zealand. *Lentils, Field-peas, Beans,* and other pulse crops should be extensively grown for stock food. Our leguminous crop plants, and many wild forms, possess root nodules, indicative of the presence of soil bacteria, now known to extract nitrogen (the most expensive of manures) from the air and store it in such a way as renders it available for the host-plant.

Sugar-cane.—Productive area in 1895, 14,204 acres, confined to north-east portion of the Colony. Average production, 18·6 tons cane per acre; five years ago it was 24 tons. The decrease is largely due to the prevalence of disease, believed to have been induced by constant crop-

* The seasons run, roughly—*spring*, September, October; *summer*, November to March; *winter*, June July, August.

ping of cane without change. The Departmental Pathologist diagnoses the disease as a clogging of the vessels by a gummy substance, the result of a Bacillus present in the plant. Steps are being taken, by burning diseased plants, improved methods of cultivation, careful rotation, importation of new clean varieties, and raising of seedlings, to stamp out the disease. Average return per acre, £12.

Pumpkins and Melons are largely grown as field crops. Average yield 3¾ tons, though 20 tons may occasionally be obtained from an acre. They command a ready sale; the former largely used as stock food and as a vegetable, the latter for jam-making and eating fresh.

Tobacco.—Tobacco-growing was attempted in the early days of settlement, and a few years ago attained some importance; of late, however, it has gone out of favour. In 1895, 716 acres yielded 11·4 cwt. per acre (against 4,833 acres in 1889). Mostly grown in small areas. It requires constant attention to keep it in good condition and free from insect pests. To revive the industry energetic steps are being taken, and as good quality of leaf can be grown, there is no reason why the bulk of our home requirements could not be grown, and possibly a surplus exported; instead of, as at present, importing nearly all we require.

Hops can be grown on the tableland, and, if near towns, the necessary labour for picking could readily be obtained at reasonable rates. We imported in 1894, 841,938 lb.

Flax.—Owing to the fall in prices in many kinds of farming produce, other newer crops should be tried, such, for instance, as linseed flax. In 1894 we imported various products of this plant to the extent of £85,832. Very good samples of seed and fibre have been grown at the College, Richmond.

Castor Oil does extremely well. *Sunflower* gives great variety of useful products, is very easily grown, thrives everywhere, and consequently is available for the dry interior: it is a good bee-plant, as also is *Buckwheat*. There are numerous other useful plants that ought to be more widely grown, looking to future needs as well as immediate returns; in fibre plants, oil producers, perfume plants, tanning materials, dyes, starch plants, insecticides (pyrethrum and hellebore are both largely used here), willows (an inquiry was lately made for wood from a particular species to the extent of £200), which can be planted along watercourses, and are useful in a variety of ways. All shelter trees might be of return-giving kinds.

Other Fodder Plants.

Of our other fodder plants, rape is most useful. We hear of sheepsburnet thriving where other plants failed. Lately, a species of Polygonum (sachalinense) has been introduced as a marvel for weight of crop (80 tons greenstuff per acre); so far, however, this, with prickly comfrey and other belauded inferior plants, has not proved a success. Of introduced grasses little need be said; certain species are largely sown for improving pastures in the cooler districts. In warm districts greater use is being made of the native grasses and fodder plants for

the same purpose, they being accustomed to the climate, and more likely to do well than the generality of exotic forms, though a few of the latter thrive almost anywhere. 26,080,814 acres have been ring-barked (trees killed by cutting through the bark and Cambium layer with an axe), in order to encourage growth of grass for grazing purposes: over much of this country great improvement would take place if suitable seed were scattered at seasonable times and paddocks given a periodical rest: the natural herbage is not allowed time to shed its seed, owing to country being fully or over stocked. The saving of seed from good kinds of native grasses would bring in profitable returns.

Orchard and Garden.

As an adjunct to farming, orchard and garden are too often neglected. In no district in the Colony need the farmer be without fruit and vegetables; all house water could be used for irrigating. Tree-planting is of much greater importance to farmers than they generally imagine, and profitable trees might be just as well put in as unprofitable.

Olives.—We can grow fine olive trees, though only a few exist, at Camden, Mudgee, and Inverell. At Albury and Wagga and other places in the Colony, the soil and climate are almost exactly similar to that at Dookie in Victoria, where I made olive oil that took prizes wherever shown. There is always a sale for pure olive oil. The trees might be grown 24 or 30 feet apart in clumps in corners of paddocks, the land subsoiled 15 to 18 inches deep; giving beauty, shade, shelter, and profit. Easily propagated, they grow in any soil except heavy clay or where wet. Irrigation can be advantageously applied where the rainfall is short of 30 inches annually. In our hot, dry climate mulching is necessary. They require pruning, keeping the inside well open, in order to obtain the best fruit, which is borne on two-year-old wood only. Many other useful trees could with advantage be planted round the paddocks or homestead.

Weeds.

Of weeds, native and introduced, we have legions; the climate suits them, and, unfortunately, little or no notice is taken of them when first seen. Where energetic measures are taken to stamp out the first arrivals little trouble is experienced. Over 250 introduced species are scattered over the country; some, *e.g.*, prickly pear and sweet briar, reducing large areas to such a condition that many pounds per acre must be expended in clearing, possibly for the second time.

Pests.

Fungus pests and noxious insects are numerous; our annual loss must be hundreds of thousands of pounds, largely preventable. It is satisfactory, however, to know that the practice of trying by spraying and other measures to lessen or prevent such evils is rapidly on the increase. Growers are finding out by experience that it pays to spend a little money to save crops that would otherwise be lost; and it may

be noted that at the Agricultural College over eighty lectures (with suitable practical work) are devoted to this subject during a student's two years' residence.

Large numbers of noxious animals are destroyed every year, whilst, unfortunately, we have many native plants possessing properties poisonous to stock.

Stock.

The best farmers' *Sheep*, for carcase, is the cross-bred; for low-lying, undrained land Romney Marsh should be tried, or a cross between Merino and Romney Marsh. Merinos are pre-eminently wool-producers.

Our best *Dairy Cattle* are Ayrshire, Jersey, and Holstein; for beef, Shorthorns and Herefords; for workers, Devons. Other breeds and crosses, however, give good general-purpose cows. The average yield is, with separator, 200 lb butter or 500 lb cheese from 500 gallons or more of milk. The factory system is well established, and dairying may be looked upon as one of our most paying industries. Shipments of dairy produce are now regularly sent to England. Cheese sent from the Hawkesbury Agricultural College was pronounced by experts "equal to the best English Cheddar." College butter sent to the British Dairy Farmers' Association, Islington, was reported by the Colonial Consignment and Distributing Co. "as being of real choice quality with fine aroma," realising 128s. per cwt. It is satisfactory to note that this butter was made by a student of the College.

Polled breeds of cattle are coming more into prominence, or dishorning is resorted to—a hot iron or caustic potash being applied to the horn-bud when a few weeks old. The chief advantages lie in the greater gentleness of manners and security in travelling. It is unnecessary to house stock in winter except in the cold parts of New South Wales, but shelter should be provided against sun heat. One very important matter, especially so in a country with variable seasons and subject to drought, is provision of winter food for dairy stock, in the shape of ensilage, hay, or green food. Nothing can surpass the first-named; any plant that stock will eat, including such things as spotted thistle, mangold and turnip tops, and all surplus fodder, can go into the silo. Chaffed maize, cut when the cobs are fully formed but before they ripen, makes excellent silage.

The chief farm *Horses* are Clydesdales. Much orchard and light farm work is done by the product of thoroughbred stallions and clean-legged draught mares. Suffolk Punch is used to a small extent. The climate is well adapted for horse-breeding, and of late a good trade has been developed with India in horses for military purposes. Cleveland Bay or hackney stallions with good-actioned, sound, medium-sized draught mares should give the stamp of horse required. Small holders could bring up such horses with advantage, as they would be much more docile than if reared on a large run.

Pig-breeding and bacon-curing are largely carried on, and make a profitable industry. When farm produce is low in price, or inferior in quality, it pays well to fatten pigs for market. Berkshire, Poland-China, and Tamworth are our chief breeds. Every farmer should keep pigs, and if in dry-curing, half coarse salt, half sugar, with ½ oz. saltpetre to each pound of the mixture be used, a sound, sweet bacon results.

Poultry-breeding is largely carried on, both for home consumption and export. Eggs and birds have been sent to England from the Agricultural College with great success. A large trade will result if care be taken that all birds are of the finest quality, large, young, and regular in size and condition. Indian game are now largely used for crossing with Dorkings and Houdans. Plymouth Rocks and Brahmas are also greatly fancied.

Bee-farming is successfully carried on ; the annual yield of honey being sometimes extraordinarily large, though largely dependent upon the season.

Future of Agriculture in New South Wales.

Our agriculture must become of greater and greater importance to us, and probably to Great Britain also, as years go on. Southern position enables us to market products when northern countries are lacking, whilst we can produce the very best class of products. As to future success, much depends on farmers keeping abreast with the times with regard to crops, methods of growing, use of labour-saving appliances, harvesting, and packing for the market. Small farmers are at some disadvantage compared with large owners, but many minor industries can be carried on concurrently, "Many a mickle makes a muckle." A good living can be made off the land and a fine free healthy life enjoyed. In this country land can be obtained on very reasonable terms, farming operations can be carried on almost continuously, hay is ready to stack the third or fourth day after cutting, manures, in many cases, need not be largely used, winter and summer crops can largely be grown, whilst the mild and varied climate gives extraordinary variety of crops. Of drawbacks there are many, most of them surmountable. Notwithstanding difficulties, found wherever the soil is tilled, there has been an all-round advance in farming the last few years. Matters are fairly prosperous, and prices, which show great range of variation during the year, have now an upward tendency. An export trade in produce is being developed, and cool storage provided ; water is being conserved, and will be much more largely so as time goes on ; scientific knowledge relating to farming is rapidly spreading. It is recognised that cultural methods must be improved, cultivation made more intensive, and only the best class of products raised ; whilst under a good system of rotation and careful husbanding of resources the soil will improve greatly, resulting in better returns. Pests must be battled with : America and France have shown that it pays well to carry on a systematic and persistent war of extermination. Not the least important point, a careful system of bookkeeping needs to be followed, "double entry" being the most suitable.

When we remember, in the light of the foregoing statements, that Great Britain alone imports in one year food-stuffs to the value of over ninety millions sterling; that our own requirements are yearly increasing, whilst we import food-stuffs to the extent of over one and a-half millions ; we may safely conclude that there is ample room for expansion of the farming industry, with no need to fear for its future success.

Fruit Culture.

By Albert H. Benson, Department of Agriculture.

Few parts of the world possess greater natural facilities for the production of fruit in greater variety than the Colony of New South Wales. Owing to the extent of country, and the great differences in climate, ranging from that of the temperate regions on our higher table-lands to that of the tropics on our north-eastern seaboard, from a moisture laden atmosphere and a rainfall of over 100 inches per annum to a dry desiccating air and a rainfall of from 6 to 10 inches per annum, and with every graduation between these extremes, we are able to grow every kind of fruit from mangoes to gooseberries, or, leaving out a few extreme tropical fruits, all the cultivated fruits of the world. Not only are we able to grow this great variety of fruits, but many of them of such quality and to such perfection, that they cannot be excelled if equalled in any other part of the world.

On the north-eastern seaboard of the Colony, we have a climate and conditions that are almost tropical, and in a few favoured localities quite tropical. Here the rainfall is heavy—the air is laden with moisture, and in sheltered positions frosts are almost unknown. The soil generally is of great natural fertility, and the land in its virgin state is covered with a dense impenetrable scrub composed of masses of most luxuriant vegetation with immense trees interspersed. Here all the fruits of the semi-tropics flourish—the mango, custard apple, banana, and pine-apple, grow side by side, and the passion-fruit and guava grow wild, and produce an abundance of the finest fruit without any cultivation whatever. These fruits spring up every where that they have a chance in the scrub, as the fruit is eaten readily by birds, and the seeds are distributed widely in their castings.

The orange, lemon, and citron, grow here with very little attention, and though many of the trees are found to be badly infested by scale insects and other pests owing to an entire lack of attention, there are in my opinion few districts where they will pay better or where they can be grown to greater perfection, provided that only the choicest varieties are planted, and that the trees and orchard are thoroughly attended to. The common or rough lemon and the citron, grow without the slightest trouble, and it is not at all an uncommon thing to meet with these fruits growing in the scrub from chance seedlings producing fruit in abundance, and holding their own against the indigenous vegetation, thus showing the adaptability of citrus fruits to the soil and climate, and the ease with which they can be grown.

In the central seaboard district, which embraces the Hunter and its branches on the north, and extends to about Kiama on the south, we have a large tract of country where the orange and other citrus

fruits still flourish, but where the place of the tropical fruits of the north-eastern seaboard is taken by the peach, nectarine, apricot, oriental plum, pear, early varieties of apples, and several varieties of plums, as well as table grapes. In this district the soil generally is of a much poorer character, but with occasional rich tracts of alluvial land, such as that of the Hunter and Hawkesbury. The rainfall, though still large, is much less than that of the north-east, and the conditions are only subtropical. This district is essentially the home of the peach, as it grows wild wherever the stones are deposited along the banks of creeks, and anyone who takes a trip up the Hawkesbury will see numbers of large peach-trees, bearing heavy crops of fine fruit, that have never been planted, cultivated, or pruned, and that have been grown from chance peach-stones that have been carried down and left by floods. When cultivated the peach is very prolific; in fact, it is much given to overbearing, as are also plums and apricots, with the result that the quality of the fruit grown often suffers from the number that the tree has to bear. Where, however, the trees are properly attended to, and only allowed to bear as much fruit as they can bring to perfection, the quality of the fruit is good; grown with an ease that is probably unsurpassed in any other part of the world. Here the pear, when once established, is as hardy as a native tree, and large numbers of old pear-trees can be seen in the neighbourhood of Sydney which are growing without the slightest attention, and, when not attacked by the Windsor pear blight, bearing heavy crops of fruit. These old neglected pear-trees are often of large size, and they usually mark the site of old orchards from which all other varieties of fruit-trees have long since disappeared, the pears alone remaining and defying neglect. This is the oldest fruit-growing district of the Colony, and it grows fully three-quarters of all the fruit raised, its nearness to the Sydney market enabling the fruit-growers to readily dispose of their fruit, as Sydney always has been, and probably will continue to be, the greatest consuming and distributing market for fruit in the Colony. Here in the past fruit-growing, when properly carried out, has been a very paying industry, and many growers have succeeded in building up comfortable homes and in saving considerable fortunes, and more money has been made from well-kept orchards, taking into consideration the amount of land occupied and the capital expended, than from any other branch of husbandry. Now, however, the times are somewhat changed, owing to the great increase in the production of fruit, which has been caused by the planting of many new orchards, not only in Cumberland, but throughout the Colony, and this increase of production has caused the supply at times to be in excess of the local demand, so that the markets are glutted, and inferior fruit is hard to dispose of at any price. Good fruit, however, still meets with a ready sale, and often at prices that are rarely equalled in other great fruit-growing centres, as the Sydney market has hitherto been able to absorb all our first-quality fruit, and is so far the best market for such fruit. As I purpose dealing more fully with the disposal and utilisation of fruit later on, I will pass on to other districts of the Colony, but before doing so I must say that in many cases fruit-culture has been carried out in a very slovenly manner in this district. Though the oldest and largest producing district, it contains at the

same time the dirtiest, most neglected, and most diseased orchards in the Colony, and grows a large proportion of the greatest rubbish, which is due in a great measure to the prevalence of the insane system of trying to grow every possible variety of fruit in the same orchard, instead of confining the attention to the growth of those varieties that the soil and climate are capable of producing to perfection.

In the table-land districts of the Colony there are large tracts of country widely separated from each other, but which have a climate and rainfall that is just suited to the production of the fruits of the temperate regions, including apples, pears, plums, quinces, cherries, and all kinds of berry fruits and hardy nuts. In these districts the winter is more or less severe, snow being not uncommon, and frosts of frequent occurrence. The summers are generally bright and warm during the days, but always cool at night, so that though there is sufficient sun-heat to put plenty of sugar in the fruit, the fruit does not ripen as rapidly as in warmer or more humid districts, and the fruits grown possess much greater firmness, and are much better keepers and shippers. In these table-land districts the rainfall is usually sufficient for the successful growth of all the fruits adapted to the climate, but the rainfall is often badly distributed, and there are longish spells of dry weather, which necessitate the orchards being kept in a high state of culture in order to obtain the best results. No trees in this district require irrigation, but where berry culture is gone in for extensively, it will always be advisable to have a supply of water to fall back upon during a dry spell. Most of the table-land districts are well supplied with water, and contain numerous running streams, the water of which could easily be conserved for use in a dry time, as the hilly nature of the country gives many opportunities for the formation of natural reservoirs by damming up gullies, so that, should water be required for berry culture, there is often little difficulty in conserving it. Apples, pears, plums, and cherries, when planted in suitable soils and properly looked after, are usually heavy bearers in these districts, and the fruits are of firmer texture, higher colour, better flavour, and better keeping qualities than the same fruits when grown in other parts of the Colony. Cherries do remarkably well in many parts, the red Kentish cherry growing almost wild and without the slightest cultivation, and yet bearing heavy crops of fruit; in fact, this variety is such a hardy grower that it is planted in hedges to form a breakwind or protection for the orchard against the prevailing winds of the district.

In the central districts of the Colony we have an enormous extent of country that is suited for fruit-culture but of a totally different type from that of the districts I have already mentioned. Here we have a soil and climate that are best adapted to the growth of the vine, the olive, the fig, the apricot, the prune, and drying peaches, in fact, for nearly all varieties of drying fruits. Here the rainfall is much smaller, the summers hotter and drier, and the winters much milder than in the table-land districts, but everywhere throughout this district, where the rainfall exceeds 20 inches per annum, all the fruits that I have mentioned can be grown to great perfection without irrigation, provided that suitable soil is chosen, and that the right varieties are planted. Here the success of fruit-culture depends mainly on

thorough cultivation and the retaining in the soil for the trees' use of as much of the rainfall as possible. On this retaining of moisture in the soil the whole success of fruit-culture in this district depends, and the retention of moisture is accomplished by a thorough system of cultivation. For example, after every rain the surface of the ground is broken as soon as the land will carry horses without injury; this prevents the formation of a crust on the surface, as well as of the capillaries right to the surface, and it is by means of the capillaries, or rather through them, that heavy surface evaporation takes place, and consequently dries out the soil. The breaking of the crust after rain is followed by deeper cultivation, the implements used stirring but not turning the soil, and if this is continued throughout the dry time the land will retain all the moisture required for the proper development of the trees and fruit. In order to show the result of thorough cultivation in this district, the following illustration will give some idea of the growth of Muir peaches at the Government Experimental Farm at Wagga Wagga, sixteen months after planting, which have been grown in the average soil of the district entirely without irrigation, but under a system of culture such as I have just described. During the past winter the trees were pruned back to within 8 inches of the main trunk, and all the growth shown in the illustration has been made in sixteen weeks, and during an unusually dry season. The trees are planted 25 feet apart each way.

The cultivation of the olive both for oil and for pickling is destined to be a great industry in this district. The tree is a rapid and vigorous grower, cropping heavily and bearing good fruit, and, in addition, coming into bearing in much less time than it does in Europe; in fact, the conditions prevailing in this district are, as a whole, much more favourable to the growth of the olive than the most favoured districts of Spain, Italy, or Southern France. In addition to the fruits men-

tioned, apples and pears, cherries, and citrus fruits in favourable situations do well, though the quality of the pomaceous fruits is not equal to that of the same fruits when grown in our table-land districts, and the citrus fruits are inferior to those grown in more suitable situations; where cherries will grow they are usually very early and of large size, but are, as a rule, inferior to the same fruit grown in the colder districts.

Our dry western country also grows good fruit, but here its successful culture depends largely on having water available for irrigation when necessary. With irrigation on suitable land, apricots, peaches, almonds, figs, grapes, olives, oranges, and lemons can be grown to great perfection, those varieties of deciduous fruits that dry well being the most suitable. Citrus fruits do well, and produce fruit of exceptional quality; in fact, I question if finer citrus fruits were ever grown or seen in Australia than the collection of citrus fruits grown by Lord Ranfurly at Old Mildura and exhibited in Melbourne at the Mildura Citrus Fair held during August, 1895. Though Old Mildura is not in New South Wales, it is only separated from it by the river Murray, and we have many places in our western country that are capable of producing citrus fruits equal to those grown at Old Mildura.

As artesian water has now been found over a large portion of our western country, and as there is every reason to believe that the supply is practically inexhaustible it is impossible to say to what extent fruit-culture may be carried by its use. This district contains immense areas of perfect fruit soils that are easily irrigated as they possess good natural drainage, and respond well to the application of water when it is properly and judiciously applied. Experimental fruit-culture is now being carried out by the Department of Agriculture at Pera Bore, near Bourke, with every prospect of success, and in my opinion there is practically no limit to the quantity of fruit that this district is capable of producing under a combined system of irrigation and thorough cultivation.

I have now dealt with all the different parts of the Colony, and have endeavoured to show that owing to the wide range of climate a very large number of fruits can be grown here successfully. I have also endeavoured to show the class of fruit that are best adapted to the different districts, and to give some slight idea of the capabilities and possibilities of the Colony as a fruit-producing country.

In the early days of the Colony, fruit-culture was looked upon more as a hobby of the rich than as an industry suitable to the Colony and capable of supporting a large number of persons, the soil and climate of the first settled districts being considered unsuitable for fruit-growing. The trees planted, however, did so well that the cultivation of fruit soon increased largely in and around the older settled districts of Cumberland, with the result that the industry often turned out to be a very profitable one, and many of the growers became comparatively wealthy men, as the demand for the fruit was in excess of the supply, and the prices obtained were consequently highly remunerative. The fruit trade remained in this condition until some ten years ago, since when the area under fruit-trees has been very largely increased, and the production of some kinds of fruit is now in excess of the demand,

the result being that the prices realised, as a whole, are now much lower than they used to be. It is, however, only inferior fruit that is over-produced and is unremunerative, as first-quality fruit always sells well in our markets, and is easily disposed of at satisfactory prices. In the past the growers have simply looked to one market, viz., the market for fresh fruit, and now that this market is occasionally over-supplied there are many complaints from the growers that the trade is overdone, and that there is no longer any money in it. Now, because one market happens to be overdone for a short time during the summer season, that is no reason at all that the industry, as a whole, is overdone, and anyone who looks at the imports of fruit into this Colony, both green fruit and preserved fruit, either in the form of canned fruit, dried fruits, jams, or jellies will see at a glance that we are still very far from supplying our own requirements, and that there is still a considerable scope for an increase in the production before we need to talk much of over-production or have fruits for export. In the past the fruits grown have usually been those that have produced the heaviest returns with the least trouble, quality being usually of secondary consideration; the fruit has been grown simply to supply the green fruit market, and now that this market is overstocked during the height of the season these fruits which are usually valueless for any other use, should be supplanted by varieties valuable not only for the green-fruit trade, but, which, if this market is over-supplied may be utilized by drying, canning, jam-making or otherwise.

Fruit-growing in the future will have to be carried out on totally different lines from what it has been in the past if our growers intend to keep even our own markets; and before we can hope to compete in the world's markets with any chance of success, and be able to hold our share of these markets we must grow better fruit than we are doing at present, and when grown market it in such a manner that it will be a credit to our Colony, and hold its own on its merits. There has been an enormous increase in the production of fruit throughout the world during the past ten years, and the following figures, which I have taken from *The Californian Fruit-grower* for 21st September, 1895, will give some idea of the immense production of fruit in California alone, and of the rate at which production is increasing there. In 1894 the following quantities of fruit were shipped from California, viz.:—

	lb.
Fresh fruit	179,576,500
Citrus fruit	118,125,300
Dried fruit	103,500,400
Canned fruit	106,125,200
Raisins fruit	94,112,350
Nuts fruit	7,901,112
Total	609,340,862

Which is equal to 25,391 carloads of about 24,000 lb. or 12 tons American each.

The total shipments in 1890 were only 330,313,900 lb., or only a little more than half of 1894, so that the output has nearly doubled in a period of five years, and it is estimated that the gain for the next five years will be equal to that of that of the period shown. This enormous increase in the production of fruit is not confined to California alone, but many other of the United States are becoming heavy fruit-

producers as well. The Cape of Good Hope is paying considerable attention to fruit-culture, and in all the colonies of Australasia the industry is very much on the increase.

With this very great increase in the production of fruit the only chance of making fruit-growing pay in the future will be to grow nothing but the best varieties, and only such as the district is suited to, and which it will produce to the greatest perfection. If this is done I believe that we will be able to hold our own markets easily, and I also believe that it is possible for us to raise fruit of such quality that even with the great increase in production it will be able to hold its own in every market. In order to do this the fruit-growers of the future will have to be a very different individual from the fruit-grower of the past. He will have to conduct his business on the strictest commercial lines, and use his brains as well as his hands. He will have to employ improved methods of culture, systematically prune and thin his trees, keep his orchard in a state of vigorous health by the eradication of all insect and fungus pests, and by the application of manures when necessary; grow nothing but the finest fruits that it is possible to produce, and when he has grown them market them in the best possible manner. The fruit-growing of the future will be a science, and no one will make a success of it unless he keeps abreast of the times, and takes advantage of all the assistance that improved machinery can give him, as well as of all the information on diseases, &c., published by scientists in all parts of the world. Fruit-growing in New South Wales, if properly conducted, will, I believe, have little to fear from foreign competition, as we possess several advantages that the older fruit-growing countries do not. In the first place, we can grow a greater number of fruits to perfection than any other country of the same size on earth. Secondly, we have a large area of the best fruit-growing land which is available for fruit-culture at a very low price. Thirdly, the rainfall over a large portion of the country adapted for fruit-growing is sufficient for the successful culture of deciduous fruits without irrigation, provided that the land is kept in a state of perfect tilth.

Fourthly, our large belt of artesian country with its probably inexhaustible supply of water, and water that can be utilised with the least expense, is capable of producing all kinds of drying fruits at a rate that few countries if any can compete against.

Fifthly, if our growers will lay themselves out to grow the right kinds of fruit for exporting to Europe, we have a large market for choice fruits during the European winter when the local fruits are out of season. Owing to the reverse of the seasons here, their off season is our harvest, and we can thus supply them with fruit at a time that there will be little European or North American fruit, save oranges, on the market, and in the case of citrus fruits, the same rule applies as our fruits ripen at the time that these fruits are scarcest in Europe.

Despite the advantages this Colony possesses for the building up of a big fruit industry, it will depend entirely on the energy of our growers whether this Colony will take the place that it should in the fruit production of the world, or whether it will be pushed aside by the more energetic growers of other countries, who even though they may

be growing fruit under less favourable conditions than those possessed by our growers, yet lose no chance to extend their industry, and find a market for their produce whenever and wherever they can. In our own Colony we should endeavour to popularise the consumption of fruit as much as possible, and this can only be done by supplying the general public with good fruit at low rates. At present fruit is looked upon more or less as a luxury, instead of which it should be considered as an essential part of every meal, as it is nature's greatest remedy for keeping the mind and body in vigorous health, it is especially valuable in a climate like this, and should take the place in a great measure of the large quantity of animal food consumed by all classes of the community.

In conclusion, I can only state that there is still a good opening for energetic fruit-growers in this Colony—men who will not be contented with "good enough," but who will have the push and energy to take advantage of any information that will tend to advance their industry, and who will never be satisfied till they are able to turn out fruit second to none in the world, which will go direct from the orchard to the consumers whenever it is possible to do so. This can only be accomplished by an active co-operation of all of our growers, as it is by this means only that we can minimise the cost of production and distribution, and be able to compete successfully against other fruit-producing countries. Keen competition and low prices have compelled the Californian growers to co-operate for their own protection, and the same causes will compel our growers to co-operate if they intend their industry to prosper.

Viticulture.

By P. F. Adams.

The following paper is designed to show the capabilities, in both soil and climate, of New South Wales as a wine-producing country; that the pests to which the vine is subject to are controllable, and to give reasons why the wine trade is not more prosperous, and suggest the remedy :—

Soil.

In soil, New South Wales possesses all the elements of a great wine-producing country.

Commencing in the south, the valley of the Murray is formed of hills of Silurian formation, abounding in the most important elements of mineral plant-food—potash and phosphate. Even in the alluvium of the river these elements are in such abundance that, taken together with the nitrogenous matter of the alluvium, vines planted therein will go on producing heavy crops for twenty years without manure.

Here and in the Upper Murrumbidgee Valley are thousands of acres of land capable of producing the thin wines required for making brandy. By the adoption of viticultural machinery, and judicious design in planting, the maximum quantity could be harvested with a minimum expenditure of labour. Yet until legislation removes existing restrictions nothing can be done in distillation, and these unrivalled capabilities remain in abeyance.

The foot hills adjacent so abound in potash, lime, and phosphate, that they only require nitrogenous manure or humus in small quantities to go on producing crops for all time.

The only drawbacks to the upper valleys are late frosts, but the fertility is so great that if two crops out of three are harvested the result will be greater than that of most other districts.

Lower down, the valleys of both rivers open into undulating ground, possessing all the principal mineral elements, and at Corowa the soil is further enriched by nodular concretions of sulphate of lime.

The wealth of these valleys lies in the natural endowment of the very mineral elements which are the most expensive to supply artificially.

Travelling northerly, the country rises, and the tablelands are too cold for viticulture; but on their western border a margin, ranging from 50 to 100 miles, exists, all more or less suited to the vine.

At and around Forbes, on the Lachlan River, the watershed of that stream embraces a considerable area of soil well suited to viticulture, although not to the same extent as in other western valleys—again in consequence of the encroachment of the high tableland thereon the area is limited.

At Dubbo the valley of the Macquarie River and its tributaries opens out; enormous areas exist, principally of upper Silurian or Devonian origin, containing the mineral constituents of wine, with limestone in abundance.

Nearly all the tributaries of the Macquarie River above Dubbo pass through country of this character, and upon the higher waters are thousands of acres suitable to the production of wines of a very high character, the climate being also favourable.

Passing northward to the watershed of the Namoi and its tributaries, we find in the neighbourhood of Quirindi, both in soil and climate, every thing that could be desired, and very promising wine has been sent to Sydney for exhibition from this part. It is surprising that the growers of the Hunter River Valley do not avail themselves of the opportunity of acquiring vineyards north of the Liverpool Range, and grow a sufficient quantity of full-bodied wine to supplement the product of the Hunter vineyards in wet seasons by blending. The best soil for viticulture will be found on the eastern margin of the great black soil areas of the Liverpool Plains, especially where the waters rise in granite country. This also applies to the watershed of the Peel River; scattered all over this area are innumerable sites for vineyards.

Of the district watered by the upper tributaries of the Gwydir River the writer has not sufficient personal knowledge to describe, but he believes that a large tract suitable for wine-growing may exist, and has also seen promising samples of wine produced there.

The last area to be described on western waters is the Macintyre River and its tributaries, on which unlimited areas exist so rich in potash and phosphate that the vines grow and produce to excess, but the product, although admirably suited for blending, and of great value for that purpose, does not find the favour with the public it merits. Some very excellent samples have been produced in these localities, particularly where the basalt had thinned out and exposed the underlying granite or other old formations.

The geological character of the district is granite of several varieties overflowed by a general volcanic outburst, from which the potash and phosphate are derived.

Of the vast areas westward of the country already described, there is any quantity of land in which the soil is all that can be desired, and where the vine grows luxuriantly if supplied with a very small amount of water. The fruit is luscious and excellent in flavour, but the climate is unfavourable to the production of wine of delicacy.

Having described the climate of the western slope of the Main Dividing Range we now take its eastern watershed Here we find a vast extent of excellent soil, but the prevalence of rain during the season of vintage deters vignerons from planting. However, exception may be taken to the western waters of the Clarence.

The same drawback exists as far south as the Manning River, although on the Upper Macleay some very good wine has been produced in favourable seasons.

At Port Macquarie the only grape which flourishes is the Isabella, and wine is made from it, but it does not find much favour with the public.

We next come to the Hunter and its tributaries, where the greatest variety of geological formation is found; consequently in the alluvium of its lower waters there is a great and favourable mixture of soil, and heavy crops of light wine are harvested. Higher up the soil of the hills improves, and wines light in character and in certain seasons of excellent quality are produced. In fact, as far as soil goes, this district has everything required within a comparatively short distance of navigable water. The Paterson district is of Devonian formation; the Lower Hunter carboniferous and sub-carboniferous, with occasional volcanic remains, which supply potash, iron, and phosphate. The valleys of Black Creek, the Wollombi Brook, Mulbring Creek and Goulburn River are sub-carboniferous, and abound in lime. At Singleton, beds of old alluvium exist, rich in all the vine requires, and on the Upper Hunter, Fal Brook, and Isis, wherever the coal measures have been either worn away or have never existed, the soil derived from sub-carboniferous formation and further supplemented by the washing down of Devonian formations, is admirably suited to the production of high-class wines.

Of the counties of Cumberland and Camden, except in a few localities where the remains of volcanic outbursts exist, the soil is not favourable to wine-making. Further south, beyond the coal measures, the soil is good all the way to the Victorian boundary, but the humidity of the climate about vintage time prevents it being availed of for wine-growing.

It has now been shown that for quality of soil, and extent thereof, New South Wales has certainly no reason to complain, having in fact all that can be desired in that connection.

Climate.

We now pass on to climate, of which this Colony has indeed every variety, but weighted with an uncertainty of season, which has exercised a depressing effect on the wine industry and caused other colonies having a more equable climate to pass her in the race of development.

How this has occurred, and the action proposed in remedy, will appear later on.

Success or failure depends on rainfall. If it occurs in fair quantity, at the proper time, all is well. If rain is denied altogether, or abundant at the wrong season, failure occurs.

In winter, rain is required to enable the vine to absorb its mineral plant-food. In spring, to bring down nitrogen from the atmosphere and enable the vine to assimilate its plant-food. The summer or "Tropical" rain continues the action of the spring rain, and finally swells the fruit before ripening. This rainfall occurs usually in January, and is an absolute necessity in the elevated districts of the west, where vines are later in ripening than in the east, and the summer climate is less dry.

As in describing the soil, we begin with the climate of the valleys of the Murray and Murrumbidgee. Excepting for late frosts, the climate of the upper parts of these valleys is all that can be desired; but as we proceed downwards these frosts are scarcely felt. The winter climate is excellent; the cold causes the vines to shed their leaves early and bud late, giving the vines a long rest, which appears to brace them for the work they have to perform in summer. At an elevation of 800

feet the late frosts occur in October, at a time when the canes are nearly 12 inches long, and so frequently that in one year out of three the crop will be lost unless precautions are taken by raising a smoke before sunrise. To provide the necessary straw or litter, and distribute it, is no great work, and it need only be burned to save the crop.

Many intending vignerons are deterred from planting in districts so affected, never considering the advantages accruing on the other hand. I believe that the time will come when existing restrictions to distillation will be removed, and, despite late frosts, the upper valleys of the Murray and Murrumbidgee will become the great brandy-producing areas of New South Wales.

In the lower valleys if the spring rain is not sufficient the tropical rain generally falls in time to save the crop.

As we proceed westward down these valleys, the tropical rains decrease in volume, and if absent the result on the vintage is disastrous—the grapes wither and can with difficulty be pressed, and the result is coarse, inferior wine. The remedy for this is watering; no plant returns so much profit for the cost of watering, and no plant gives such results from so small an expenditure of water, and yet no precaution against failure is so much neglected. In the districts in question facilities for obtaining a supply by pumping are frequent. The time will come when one of the principal objects to be kept in view in designing new vineyards will be water and a free flow of it along the rows of vines by easy and gentle grades. A little attention to this will save labour eventually.

Northward from the Murrumbidgee the belt of climate suitable for vine-growing is narrow and confined to an elevation from 600 to 1,000 feet; below this the tropical rains do not generally reach, having been intercepted by the high tablelands over which they pass.

The valley of the Lachlan at and about Forbes possesses a dry but even climate, with command of water within certain limits; with a supply of water to the vineyard, wine of a very saleable character could be produced in almost any season. The quantity of land on the Upper Lachlan is limited, the country falling from the tableland too rapidly, leaving but a narrow belt of available land.

Continuing northerly to the valley of the Macquarie, the climate at Dubbo, elevation 800 feet, is drier still, and admirably suited to the production of raisins, but without watering the wine produced has a tendency to strength and coarseness.

Ascending the river to Wellington, 1,000 feet elevation, the climate improves, and the tropical rain falls generally at the right time and in fair quantities. The valley of the Cudgegong from Wellington to Mudgee. 1,500 feet and upwards, has a climate almost unequalled in the Colony, the tropical rain falling in sufficient quantity to secure an abundant yield, capable of producing excellent light wine. If ever a true hock is made in the Colony, it, in all probability, will reward the grower who plants in this district the German Riesling grape, the only vine capable of producing a true hock. The next western water is at the heads of southern tributaries of the Namoi River, about Quirindi, elevation 1,300 feet, and extending northerly on this watershed is an area not extensive, being limited to a certain geological formation, but, for both soil and climate, unequalled for the production of wine

by any other district in New South Wales. The Great Northern Railway passes through it, and the produce is therefore readily available for blending with the wines of the Hunter. Nature has done so much for this district that, with the most ordinary care, bad wine ought never be made, nevertheless the writer had, up to 1891, never tasted a really well-made wine from it, and unless an improvement has since been effected, it is a pity to see such capabilities wasted.

The main branch of the Namoi, the Peel River, from its junction, flows through a country having great capabilities. Tamworth, 1,300 feet elevation, is situated near the lower extreme of the viticultural area, but all the country drained by the Peel River and its affluents below an altitude of 2,500 feet possesses a climate as nearly perfect for viticulture as any that can be found in New South Wales, and being well watered ought to produce some of the most saleable wine in this Colony. The grapes ripen here as at Mudgee and Quirindi, after the tropical rain, the elevation being sufficient to counteract the effect of low latitude. Tamworth, on the Great Northern Railway, is the entrepot and outlet of this promising district, and situated near its lower boundary.

The next valley is that formed by the tributaries of the Gwydir River, which fall rapidly from the high tableland of New England, and in all probability it includes a belt of good viticultural soil and climate; but of this the writer has no personal knowledge.

The next western watershed is that of the Macintyre River and its tributaries, with Inverell at an altitude of some 1,600 feet as its centre. The climate being dry during the ripening of the grapes, the wines have a tendency to richness which will in time make them valuable for export to Europe for blending with light wines of bouquet from the Mediterranean. The recent reduction in the rate of railway freight charges will be a great boon to this district.

Having described the climate of the western watersheds, we now take the eastern. Very little can be said however, as the tropical rain occurs on or about the time of ripening, therefore success is the exception rather than the rule. There are, however, on the upper waters of the Clarence places where high lands intervene, and intercept the tropical rain before it reaches them; it is probable that good wine may be produced here in dry seasons.

From the Clarence to the Hunter the influence of the tropical rain is so great that only the Isabella grape thrives; this vine retains its fruit in spite of wet and mildew, which decays the produce of all the European varieties.

We now come to the valley of the Hunter, and its tributaries, which extend from one to two hundred miles from its mouth. Here, as at the Clarence, high lands intervene between its northern affluents and the coast, and attract the tropical clouds which discharge the bulk of their rain before reaching the valley.

Until a distance of 30 miles is attained from the sea board the climate is too moist for a certain crop each year.

As we progress westerly to the neighbourhood of Gresford and Singleton, although at only a trifling elevation above sea level, the climate improves, becoming more regular, so much so that several wine-growers have succeeded by blending together the vintages of certain years in

producing wines so nearly resembling each other from year to year that buyers have no reason to complain in this respect. However, the large amount of capital locked up in this kind of business increases the cost to the buyer.

Higher up these rivers the climate is dryer, and in localities favoured with a suitable soil, wines of considerable strength are produced.

Climate alone will not produce good wine, and, with the exception of the old alluvium, all the good wines of the Hunter are grown on soil derived from geological formations below the coal-measures.

The climate of the Counties of Cumberland and Camden is unsuited to wine-growing; excepting in their most western parts very little good wine is made, and further south the tableland approaches too near to the coast, the heat and tropical rain preventing the slow process of ripening so necessary to the production of wine.

Those good wines which have been made in Cumberland and Camden are the result of the skill and attention which have been brought to bear upon them, and no person unless thoroughly qualified through having made wine in a similar climate, in Europe for instance, should engage in wine-making in these parts.

Pests, Diseases, and Treatment.

In late years the Australian viticulturist has to contend with plagues unknown to early colonists. About twenty-five years ago the *Oïdium Tuckeri* spread over all the grape producing countries of the globe, and has never left. However, it is now understood, and may be fought by preventive measures. The best known is sulphur applied *before* the fungoid is visible. Once seen treatment is too late for the spot observed, because the fume of sulphur is only fatal to the germ as it floats in the air, therefore it is in an invisible state that the fungoid can only be successfully fought. During rain and immediately afterwards the spores abound and multiply; therefore as soon as the leaves are dry is the time to apply sulphur with greatest effect. Treatment should commence when the first leaf breaks from the bud, and if the weather is dry at the time, the sulphur will remain effectual for many days, perhaps until rain falls. If applied after every rain until the grapes are as large as peas, no injury by Oïdium will result. The smallest quantity of sulphur fume present in the air is fatal to the spores. The quantity required is small. If ten pounds weight could be equally and evenly distributed over an acre it would be as effectual as a hundred weight. Some vignerons mix their sulphur with equal parts finely sifted lime, wood ashes, or even road dust, and this is supposed not only to help to distribute the sulphur but to have a curative effect mechanically.

Next comes the black spot, or anthracnosis. This is also a fungoid pest, attacking the muscat tribe and several other valuable vines. The treatment is spraying with Bordeaux mixture. Full directions for preparing and applying the remedy will be found in Vol. 2, page 421, of the *Agricultural Gazette*.

The first spraying should be administered when the young shoots are about four or five inches long, and continued every three weeks, or oftener, if the weather is wet or the black spot appears. Spraying should not be done during the blossoming of the vines, at which time sulphur should be applied instead. When the berries are formed

continue spraying till they are as large as peas, at which time the disease ought to be got under. But if the spot still shows, the treatment must be changed, and Eau Céleste substituted.

If caterpillars are troublesome, the addition of Paris green at the rate of a teaspoonful of the powder to every 22 gallons of the Bordeaux mixture will destroy them at once. The above-mentioned treatment, if persisted in, will be found effectual with black spot, Oidium, and caterpillars, and sulphuring except during flowering is not required.

We now come to the most dreaded of all plagues, the phylloxera. In this the writer had recent experience, and an opportunity of observing, all of which leads to the belief that vigorous action in inspection and treatment will eradicate it in a short time.

In this connection there are two important facts. First, as an insect the phylloxera is easily killed; its vitality is nothing compared with peach or apple aphides. Secondly, it is transmitted in the course of nature only in the winged stage. Of course the insect in its under-ground stage may be carried, but this can only be by either wilful or gross negligence; therefore, practically we have to take measures to destroy it before it has time to reach the winged stage. This can only be done by careful and repeated inspections, and when found, destroy at once by application of specific in such quantity as to kill the vine itself. A few hours after such an application all mature insects die, and the eggs, if they hatch, find nothing but dead roots. Vitality will remain in the stock, and, after a time, if not removed, fresh shoots and roots will sprout. It is therefore necessary to dig out the stocks and burn them. After destroying all infected vines, and a belt of apparently sound ones round them, a preventive dose of specific should be administered to all the vines left. The remedy lies in constant and vigorous inspection and prompt destruction wherever the disease is found. Enough money has been spent in trenching out vineyards in this Colony to have maintained inspectors sufficient to deal with all the vineyards in Australia. It is only through want of knowledge of the habits of the insect and of the necessary preventive treatment that it has been allowed to get such a hold that no other course than trenching out remained.

Present State of the Wine Industry.

Having shown that New South Wales possesses extraordinary advantages in both soil and climate, the question arises, Why is not the wine industry in a more prosperous state?

The answer is that our wine-growers have heretofore taken no steps to counteract the effect of variation of season, and to produce from year to year a wine that does not vary with soil, climate, and season—one that will always have the same strength, character, and quality.

In New South Wales there may be at the present time some one hundred brands of wine in the market, and with few exceptions they all vary from year to year to such an extent that the ordinary customer fails to identify the wine, and thinks he has been imposed upon. Now, this is hard upon the wine-grower who has done his best, and has produced a good, honest article, but unfortunately irregular in character.

For a parallel to the present state of the wine trade, let us look to the butter industry a few years ago compared with its present prosperous condition, and we shall find that the remedy for the wine trade lies in the same direction.

Practical Suggestions in Remedy.

The first step in reform will be the establishment of a "winery" in each of our most important districts, either by co-operation or by capital—preferably the latter, as it is desirable to have both the vintages and export business under the same control.

The small grower who cannot sell his wine with any degree of regularity will find it far more to his advantage to sell grapes to the winery for cash on delivery. He can then put his whole capital into a certain venture.

There is too great a difference between wine farming and wine making for both to be successfully carried out by one and the same individual. In a winery where machinery is used, and everything done on a large scale, a better article can be produced at less cost than by the small grower.

A winery need not necessarily be very expensive at the outset, if designed with a view to extension. The first requisite is an abundant water supply. Choice of site should be given where a sloping bank exists, rising, say 30 feet in 100 above the drainage outlet; such a rise from cellar floor to level of crushing mill will admit of performing all the heaviest work by gravitation. If the natural slope cannot be found, the height must be got by staging, although at an additional cost. In this case the grapes would have to be hoisted to the level of the sorting tables. The machinery employed in pumping water, must, and wine, crushing, and separating, also the wine-presses should be of the best quality, and designed for saving labour. Care and forethought must be exercised in this, or economical working will not result.

The fermenting house or cellar, if the slope of the ground admits, should be placed at such a height that vats or presses may be filled from trollies bringing the mark from the crusher; the floor on which they stand should be sufficiently raised to enable the must to run by gravitation into the fermenting casks from which it would be pumped to the storage casks.

In some districts, where the vintage is early and the climate hot, refrigerating machinery may be necessary. This, however, would be of the simplest make, as it would be only necessary to reduce the temperature a few degrees; consequently neither first cost nor working expenses would be great.

The principal object in establishing local wineries is to focus, or bring together the whole product of the district into one wine—or in technical phrase, "the vintage of the year." Of vintages there may be several, red, white, or sweet, for instance, but the fewer classes of wine attempted the better.

In order that choice may be afforded in selecting wines suitable for the general blend, a winery would be required in the far south; another in the limestone district of the Macquarie, another at Tam-

worth, two on the Hunter, one of them on the lower river, and one above Singleton, all connected by railway with a central export depot located upon navigable water.

It will be necessary to exercise great care and judgment in selecting the due proportion from the district wineries, with a view to incorporation, and the production of a wine that will require little or no subsequent treatment to assimilate it to standard.

The system now proposed is not new; it has been in vogue for a hundred years in France and wineries are almost universal in California.

If New South Wales is ever to be a great wine exporting country, we must be in a position to supply from year to year a wine of even strength, character, and quality, and this can be done by no other means than by vatting the wines of different districts in those proportions which the peculiarity of the season may suggest.

It may be urged that blending destroys the individuality of wine. This is true. But where is the advantage of an individuality which varies with every season? Except with the wine-grower who has already an appreciative constituency of custom, local individuality must be sunk and a general one adopted.

It is not proposed to blend mature wines, especially those having unequal alcoholic strength. The objection to this is well known to every practical winegrower. The blending will be done in the Eastern wineries by adding stronger vintages of the previous year during fermentation, the result will be complete incorporation and an average standard strength, or so near an approach thereto that blending will not cause disturbance.

Three-fourths of the wine will be grown on Eastern waters, perhaps within 100 miles of the port of export, and only one-fourth will be subject to distant trainage.

Before entering largely into the wine export trade several subjects will require careful and deliberate consideration.

First, the classes of wine most likely to find favour, and, secondly, the standard alcoholic strength to be maintained in each.

In the opinion of the writer four classes will be enough, say full-bodied red and white, with an alcoholic standard of 25 per cent. proof spirit, a light red and a light white, strength 20 per cent. proof spirit; but it is probable that the industry would be started with one red wine of 21 per cent. proof spirit called Claret, with the name of the company as a prefix, and if ultimately it was deemed advisable to introduce a stronger, the strength of the claret could be reduced 1 per cent. without prejudice.

As to the manner of placing our wines on the English market, I cannot do better than quote from the report of the special commissioner, *Sydney Morning Herald*, of 31st December, 1895, as follows:—

"But since writing the lines mentioned I have had opportunities to observe that large quantities of good sound wines suitable for hotel and restaurant dining-rooms were badly required. But you might have good wines in London and not be able to sell them. You would require to push and advertise your wines, and gain the goodwill of hotel managers and the chief men of big companies before you could hope to sell the good wines profitably. The causes of the South Australian Wine Depôt not being a complete success are that in the first place the trade is in but few hands, and in the second, the depôt has not the millions of gallons of good wine.

When the day comes that the millions of acres in New South Wales which are suitable for wine production are respected by capitalists, there will be some prospect of Australian wine being well respected in England. My limited experience here leaves the impression that the present system of marketing Australian wines or of using the name Australian on wines sold is doing much injury to the future trade. I know a London wine house which is said to have 2,700 agents in Great Britain. It would be a difficult matter on the part of a single winegrower to influence these agents in favour of Australian wine, but a winegrowing company with a good capital could have its own depôts and its own agents.

I am strong in the opinion that a good reliable market for Australian wines can be obtained in Britain. I know that the light wines (they must be light and sound) can be readily sold in England, Scotland, and Ireland, and that the same countries will willingly pay fair remunerative prices for sound red wines. I would not be afraid to place some of my small savings in a strong Australian Vineyard Company. I have many times put the plan of such a company before readers in Australia. The plan has been discussed, but when the call for capital was made the sums offered were too small to start a venture of the kind. There is profit in wool-growing, and small sums set it going, because wool is easily marketed, and is an annual crop, but more than six years are required before the vineyard company can hope for a return."

The above is perhaps the most recent opinion to hand on the subject, and, moreover, from the pen of an able business man, and one who is disinterested; therefore, his opinion is worthy of the serious consideration of those interested in the progress of the wine industry of this colony.

Writers in California also deplore the state of the wine trade in Eastern markets and also in Great Britain; they complain that there is no encouragement offered to growers to plant vines of higher class which do not bear so freely—that low-priced wines only are in demand by dealers; they further regret the want of judgment on the part of consumers, who, if they understood the subject, would repudiate an inferior article.

It is not to be expected that wine-brokers and dealers will take much interest beyond the question of immediate profits, neither can the wine-growers wait till the popular taste so far educates itself that inferior wines will be shut out of the market.

In the meantime a favourable opportunity occurs for a strong company operating on the lines herein projected to step in and sell a good, sound, wholesome wine at present ruling rates.

If the dealers find it remunerative to pay fees and commissions, it will pay a company to do the same.

By working on a large scale, employing labour-saving machinery, having command of strong wines to bring up weak musts, and thereby keep up a uniform strength and character, New South Wales could compete with any other country. It would simply be a question of capital and time.

The returns published in the *Statistical Register* give an average of only 207 gallons per acre as the produce of New South Wales vineyards. But these figures do not represent the producing power of properly cultivated vineyards, and the crops of which had been preserved exclusively for vintage. For the purposes of this paper it will be necessary to add 70 per cent. to the averages of districts given in the *Statistical Register*, and with this addition a very good criterion can be formed of the yield to be expected from vineyards cultivated as they would be by a strong company.

In the Southern and Western districts, in the localities where watering is advised, fully cent. per cent. may be added in order to get an estimate of production under high cultivation.

Failing the necessary enterprise to take advantage of our natural resources, the question arises as to how far the Government could assist in developing a trade. The subject has been fully considered, and deemed to be one for private enterprise alone. This view of the case will most likely be taken by future administrations, and therefore the subject may be dismissed.

A proposal to establish an Œnological Laboratory met with more success, and had the financial condition of the Colony warranted the expenditure of some £5,000, it might have now been in operation. In order to derive full benefit therefrom an Œnological Laboratory must be situated centrally in a district where grapes come so quickly under the influence of fermentation that transport by rail would be impossible.

The object of such an institution is to test practically under scientific control the important questions of fermentation, blending, and maturing, and also to impart instruction to students in such subjects.

In order to do this, cellarage and casks for 5,000 gallons would be required, together with appliances for crushing, pressing, and reducing temperature.

The first expenditure would be the greatest, and with no less sum than £5,000, could the attempt be made on the smallest scale. However, after a few years, the sales of wine and brandy would pay working expenses. A really pure brandy would be a boon to the hospitals.

This paper runs into greater length than originally expected; but to set forth our resources in soil and climate, how a wine of even character and quality may be produced from year to year, and, finally, to combat existing trade restrictions, could not have been done in a few words.

Sugar Growing and its Manufacture.

By W. S. Campbell, Department of Agriculture.

The cultivation of the sugar-cane and the manufacture of sugar from it have within the last thirty years developed into a very important industry in that semi-tropical portion of New South Wales, which is the north-easternmost corner of the colony, and the most easterly portion of the Australian continent.

It does not seem to be generally known that the sugar-cane was one of the first of the exotic plants introduced into Australia in A.D. 1788. It was obtained by Governor Phillip, at the Cape, with other plants, on his voyage to form a settlement at Botany Bay. These exotics were planted somewhere near the site of our present Custom House in Sydney. Whether the sugar-cane made any progress there does not appear, for history has not supplied any further particulars respecting it.

About thirty-three years after the arrival of Governor Phillip, a penal settlement was established at Port Macquarie, at the mouth of the Hastings River. Three years afterwards "at a Government plantation established at Port Macquarie, some sugar was manufactured from cane grown on the spot. Six hundred acres were planted with the cane, and it was stated that the sugar and rum produced repaid the Government for the outlay incurred." This plantation, according to the *Sydney Herald*, 1832, was situated on Wilson's River, a northern tributary of the Hastings. It was formed by the late Mr. Thomas Scott, who introduced the sugar-cane from the tropics in 1822. Mr. Thos. W. Scott, of Port Clare, Brisbane Water, son of the late Mr. Scott, informed me that from the first crop of cane which his father succeeded in producing, he made 70 tons of sugar, which was sent to the Commissariat Stores in Sydney. Shortly afterwards the penal settlement was abandoned, and nothing further was carried out to develop the sugar industry. Mr. Thos. Scott, who was the pioneer of this industry in Australia, was born in the year 1776, and died so recently as 1881, having attained the great age of 105 years. When a young man he managed his father's sugar plantation in the West Indies, where he acquired his experience. For many years, indeed up to the time of his death, Mr. Scott strongly advocated the cultivation of the sugar-cane in New South Wales and Queensland, and it is probably due to his perseverance that the sugar industry finally became established and developed into its present importance in both colonies. For upwards of thirty years he was a constant contributor to the press —the *Sydney Morning Herald*, the *Empire*, and the *Queenslander*—on the subject. In 1838 he made a small sugar plantation at Port Clare, Brisbane Water, near Gosford, and manufactured small quantities of sugar there which he distributed about this colony and Queensland for public inspection. For his services in introducing the industry, he

was granted, shortly before his death, a small pension by Parliament. Mr. Scott was the first and only person for many years to send bananas to the Sydney market. These were produced at Brisbane Water.

About the year 1865 much public attention was directed to the possibility of cultivating sugar-cane profitably in this colony, and experiments on a considerable scale were carried out on the Clarence, the Hastings, and the Manning Rivers, and in 1867 fairly large areas were planted with this crop on these rivers, and arrangements were made for the erection of sugar mills on the Clarence and Macleay by the Colonial Sugar Refining Company, and on the Hastings by Mr. Morrison, in conjunction with the late Mr. Thomas Mort. In 1869 the last-mentioned mill was worked for a considerable time, and that year two of the Sugar Company's factories were completed; but it was not until the following year that any considerable quantity of cane was crushed at these mills. In 1870 the Company's two mills at Southgate and Chatsworth on the Clarence were worked through the whole of the season. During the same year the mill at Darkwater, on the Macleay River, was at work during the season. The returns to both producers and manufacturers were, however, very unsatisfactory on account of the extremely wet season and the want of knowledge of those concerned in the industry. The results, however, justified further experiments and expenditure, and from that time onward there was a steady increase in the area of cane planted on the Clarence; but the cold winter that followed 1870 showed that sugar-cane could not be profitably grown either on the Hastings or the Macleay, and in 1873 the Colonial Sugar Company removed their mill from the latter river to Harwood, on the Clarence, while the industry was abandoned on the Hastings. For some years the three mills erected by the Company were worked with success, and in consequence a number of farmers erected small mills for the manufacture of sugar from their own cane and that grown by their neighbours.

For many years the chief industry on the Clarence was the production of maize for the Sydney market. At one time this was a very profitable crop; but, by degrees, as the area under maize was increased in other places, the industry apparently became less profitable. The farmers, therefore, gladly welcomed a new crop which seemed likely to become a reliable one; and for many years, and until comparatively recently, the growing of cane has proved a good investment of labour, and should continue to do so as long as the present prices paid by mill proprietors continue.

In 1879, the Colonial Sugar Company's large mill at Southgate, on the Clarence, was worked for the last time, and four years later the machinery at Harwood and Chatsworth was amalgamated in one large factory at the former place. This Company has at the present time only three large mills at work in the Colony, instead of five, as before; but the capacity of these three mills is much in excess of the former.

The rich alluvial land on the banks of the Tweed River caused considerable attention to be directed to the locality as being a very suitable one for cane-growing.

The Tweed is the most northern river in New South Wales, and an exceedingly beautiful one, being adorned in many places with rich tropical vegetation, and backed up by an elevated and rugged range of

mountains, which forms the boundary between this colony and Queensland, known as the Macpherson Range. In 1877 the Colonial Sugar Company decided to erect a mill here, and in 1880 it was started, and has since been continuously at work. A few other mills small and large had also started, but about three or four only are still at work.

About this time the rich country on the Richmond River, which is south of the Tweed and north of the Clarence, attracted great attention, and a vast number of selections were taken up, both along the banks of the river and its tributaries, and on the beautiful, undulating, volcanic country lying between the Richmond and Tweed Rivers, generally known as the "Big Scrub." The rush for land in this district was extraordinary, and large areas were taken up by selectors who could not hope to make use of them, except for speculative purposes; many of these selections afterwards changed hands for large sums of money. Areas were cleared, cane planted, and numbers of small, and in some cases large mills were erected, and the manufacture of sugar attempted by persons who were entirely ignorant of the process. Some of these mills did fairly well for a time, and the owners were able to employ a good deal of labour; but, owing to the fall in sugar, and ignorance of the proper processes of manufacturing it, only a few now remain.

The country about here is extremely fertile and well watered by almost everflowing creeks of excellent water. In its natural state it is clothed with magnificent vegetation quite tropical in appearance. Owing to the peculiar nature of the red volcanic soil common to the "Big Scrub" the heavy tropical rains which frequently occur do not impede to any great extent farming operations, for ploughing and cultivation can be carried on almost immediately after heavy rains. This is not the case on the alluvial banks of the rivers and creeks where the bulk of the sugar-cane is produced, and it is oftentimes extremely difficult to carry on necessary work. Notwithstanding the advantages the farmers enjoy in this red-soil country, the cultivation of the sugar-cane is in too many instances but indifferently attended to, for only too frequently weeds may be seen overtopping the sugar-cane even after it has attained its maximum height.

The sugar-cane produced on the beautiful undulating country within a few miles radius of the village of Rous is purchased under agreement by the Rous Sugar Company's mill, which is situate at the village. This mill, which is an extensive one, has been working for many years through many difficulties and changes. The price paid for cane here is about 7s. to 8s. per ton. This company grows a large quantity of cane for its own use.

A considerable area of land which was at one time cultivated for sugar-cane in this "Big Scrub" country is now used for grazing purposes, for which it is well adapted; and dairying has taken the place of sugar-growing to a considerable extent. The dairying seems likely to become of great importance to the whole district, for it is doubtful whether a better country could be found for the production of high-quality butter and cheese. Sugar-cane succeeds well here, and frosts sufficiently severe to cause injury to the cane do not seem to occur.

A State experimental farm has lately been established in connection with the Department of Agriculture on a portion of the "Big Scrub," and experiments are being carried out with as many varieties of sugar-canes as it is possible to obtain from various parts of the world, and

numbers of sets have been distributed to cane-growers in the district. Altogether, about sixty varieties are at present being tested. Notwithstanding the fact that during the past winter the severest frosts known in the district occurred, the canes were but little affected, the majority not in the slightest degree.

Some very important and useful experiments are being carried out by the Colonial Sugar Refining Company on their farm at Keith Hall on the southern bank of the Richmond River, which must prove of considerable value to all those farmers who are intelligent enough to take lessons from them.

In 1881 a large sugar mill was erected on the south bank of the Richmond River at the Broadwater by the Colonial Sugar Company, and owing to the liberal terms offered by that company many farmers were induced to plant cane under contract to supply the mill, consequently, and notwithstanding the failure of numbers of small mills, the greatest development of cane cultivation in the colony has taken place on and about this river—to such an extent indeed that the original factory has been trebled in size, and is now one of the largest and most complete mills in the world, capable of producing 10,000 to 12,000 tons of sugar in a season of about five months.

TABLE showing figures of sugar industry during last nineteen years.

Year ending 31 March.	Area.			Production of Cane.	
	Production.	Non-production.	Total.	Total.	Average per Acre.
	Acres.	Acres.	Acres.	Tons.	Tons.
1864	.....	.....	2	.....	.....
1865	.....	.....	22	.....	.....
1866	.....	.....	141	.....	.....
1867	.....	.....	116	.....	.....
1868	.....	.....	647	.....	.....
1869	.....	.....	2,584	.....	.....
1870	.....	.....	3,917	.....	.....
1871	1,475	2,607	4,082	.....	.....
1872	1,995	2,399	4,394	.....	.....
1873	3,470	2,001	5,471	.....	.....
1874	3,565	3,105	6,670	.....	.....
1875	4,087	4,453	8,540	.....	.....
1876	3,654	2,800	6,454	.....	.....
1877	3,524	3,231	6,755	99,430	28·2
1878	3,331	3,735	7,066	99,978	30·1
1879	2,949	4,489	7,438	104,192	35·3
1880	3,675	4,102	7,777	126,119	34·5
1881	4,465	6,506	10,971	121,616	27·2
1882	4,983	7,184	12,167	128,752	25·8
1883	6,362	7,176	13,538	169,192	26·6
1884	7,583	7,401	14,984	204,547	26·9
1885	6,997	10,520	17,517	105,323	15·1
1886	9,583	6,835	16,418	239,347	25·0
1887	5,915	9,202	15,117	167,959	28·4
1888	8,380	6,907	15,287	273,928	32·7
1889	4,997	10,284	15,281	110,218	22·1
1890	7,348	11,382	18,730	168,862	23·0
1891	8,344	12,102	20,446	277,252	33·2
1892	8,623	13,639	22,262	185,258	21·5
1893	11,560	15,191	26,751	264,832	22·9
1894	11,755	16,357	28,112	252,606	21·5
1895	14,204	18,705	32,909	264,254	18·6

As will be seen from the preceding table, published by Mr. Coghlan, the industry has been a progressive one until 1892, except during the years 1887–8–9, which Mr. Coghlan attributes to the facts that "the low price of the staple and the disturbed state of the markets of the world a few years ago forced the sugar manufacturers to correspondingly reduce the price offered for the cane, and so caused for a time the abandonment of this cultivation by the small farmers who found in the growth of maize less variable results for their labour."

The following information from the same authority will give a good idea of the extent of the industry:—

The County of Rous (that is, the country chiefly drained by the Tweed, Brunswick, and Richmond Rivers) is now the principal centre of sugar-cane cultivation, there being 948 holdings within its boundaries in 1894-5, or a total of 18,774 acres, devoted to its production, an area comprising nearly three-fifths of the total acreage in the Colony under sugar crops. The yield obtained from 7,855 acres of productive cane amounted to 168,162 tons, thus showing an average of 21·4 tons per acre. In the County of Clarence there were in 1894-5 631 holdings on which cane was grown, the aggregate area being 9,573 acres. In this, as in other sugar-growing countries, the majority of the farmers cultivate sugar-cane in addition to other crops, and only a few estates are entirely devoted to its production. Some farmers have areas of from 25 to 100 acres in extent under cane; but this number is limited. The yield in the County of Clarence was 60,426 tons, or an average of 15·2 tons per acre, cut on an area of 3,970 acres. In the county of Richmond the holdings under sugar-cane numbered 221, and aggregated 4,232 acres, of which 2,297 acres were cut, giving a total yield of 34,572 tons of the staple, or an average of 15·1 tons to the acre.

The amount of sugar-cane grown in other parts of the Colony was insignificant.

The estates on which sugar-cane is grown number 1837, and the whole crop during the last season amounted to 264,254 tons of cane, obtained from 14,203 acres, showing the average production of 18·6 tons per acre, which is 5·9 tons below the average of the former ten years.

The total consumption of sugar in New South Wales during the year 1894 amounted to 56,639 tons, of which 25,292 tons were the product of the local plantations, the area cut for the year's yield being 14,204 acres. The quantity treated by the New South Wales refiners, including imports, during the twelve months was 37,810 tons. The yield of sugar per ton of cane varies, of course, according to the viscidity of the juice; but in ordinary seasons it may be set down at somewhat over 9 per cent. of the quantity treated.

Until 1892 the yield of cane may be said to have averaged well, the farmers receiving satisfactory returns, and the manufacturers being content with the yield of sugar they obtained; but in 1893 the continuous cropping of the land with one kind of crop, and without manuring, combined with adverse weather, caused an outbreak of disease known as "gumming," which has wrought great havoc on the Clarence and Richmond more particularly; though it is considered and hoped that a change in the seasons from wet to dry, combined with better cultivation, may arrest the progress of the disease. During the last winter unprecedented frosts affected the sugar-cane to a considerable extent on the rivers and low-lying land; but that on the high lands seems to have escaped damage.

Notwithstanding the outbreak of the gumming disease, the farmers on the Richmond and Tweed have been anxious to increase the area they have under cane, and have done so to a certain extent, but would have planted much more largely were it not for the disinclination of

the Sugar Company to invest a greater proportion of their capital in the manufacture of sugar in New South Wales, and the unwillingness of other capitalists to take any part in the business. The extension referred to has taken place mainly on the rich volcanic table-lands between the Richmond and Tweed Rivers on that part of the "Big Scrub," nearest the Tweed River and close to the Lismore-Tweed railway line, between Byron Bay and the Tweed River, the greater portion of suitable river frontages on the Clarence, Richmond and Tweed, being already planted with cane.

The amount of capital expended on plant for the manufacture of sugar in New South Wales from the inception of the industry must have been very large; it is impossible to give the total, but the sum at present invested in the business by the Colonial Sugar Company and others is said to be about £750,000 in buildings and plant alone, while the outlay by the farmers in clearing, preparing, and planting their land has probably averaged between £10 and £15 per acre under crop.

The system of planting the sugar-cane is as follows:—The cane is planted in the spring—August to October included—and the first crop is cut in the following summer, or if then not sufficiently ripe for manufacture, it is allowed to stand over until the end of the winter or early spring of the following year. From the stools then left two crops of ratoons are usually taken, when they are ploughed out and the land replanted.

The price paid by the Colonial Sugar Refining Company to the growers was at first 10s. and is now 12s. per ton, the Company bearing the whole expense of cutting and removing the crop from the field, this amounting to about 5s. a ton. Other mill-owners pay considerably less, even as low as from 7s. to 8s. per ton.

It is a remarkable fact that New South Wales is the only country in the world, with the exception of the southern portion of Spain, where sugar-cane is cultivated and sugar manufactured entirely by white labour. It is impossible to predict whether cane-growing and sugar-making will be profitable in the future in view of the gradual removal over two years of the present sugar duties of £5 per ton which has been decided upon by the Legislature, and the competition of cheap coloured labour, but it certainly is not likely to be so profitable as at present.

In a circular issued by the Colonial Sugar Refining Company to the cane-growers last year, the General Manager remarks:—"It only remains for me to add in regard to the impossibility of bringing the cost of the New South Wales sugar close to that of sugar made in the tropics with coloured labour, that through the 'gumming' of the cane the Harwood sugar last year cost at the mill nearly £6 per ton more than the average of that made at our Queensland and Fiji factories, and was, as before stated, of a lower value by 15s. per ton; and further, that £5 a ton represents the subsidy which must be given to enable the makers of cane sugar outside the tropics with white labour to compete with men in the same trade in the tropics who have much sweeter cane, and grow and handle this at a much lower cost, a certain proportion of the sum being needed to cover the inevitable loss in the colony from floods and frosts." In the same

circular Mr. Knox informed the cane-growers under contract to the company that "the removal of each £1 of the present duty of £5 a ton must cause a reduction in the price we pay for your cane of 2s. a ton."

Should the cane-growing industry continue after the duty has been removed, it can only be by superior cultivation, a greater yield per acre, and an improvement in the quality of the cane. In the October *Bulletin* of the Botanical Department, Jamaica, appears the following important paragraph :—"The improvement in yield and quality of sugar from canes may be looked for in two directions—selection of the best canes on an estate for planting, as determined by chemical analysis or otherwise, or by growing some of the new seedling canes of proved high sucrose content."

In the *Bulletin* for January, 1894, a list of seedlings were given which had been received from Mr. Jenman, Superintendent of the Botanic Gardens at Demerara, and are now growing at Hope. Specimens were sent to Dr. Stubbs, Director of the Louisiana Sugar Experiment Station, and the following communication has been received :—

I send you herewith the analysis of the canes which survived with us. From them you will find that No. 96, the richest cane, is far ahead of anything that we have had during the past year. We have here seventy odd varieties, besides our home cane, and this is fully 25 to 33 per cent. better than the best of these. I am this year propagating it quite largely, and will try to have enough to have a thorough test in the sugar-house next year. . . . I am greatly encouraged by the results of this cane, and hope that in this way I may be able to obtain what I have failed in every direction, that is, getting a cane with a high sucrose content.

The extraordinary improvement in the sugar-beet of late years, and the wonderful advance of the sugar industry in Europe is causing those dependent on cane-growing to set about improving the sugar-cane if possible. "The crop of beet-sugar in Europe in the season of 1877–8 was 1,420,827 tons. The crop of the season 1894–5 reaches 4,800,000 tons, an increase in seventeen years of 350 per cent."

Considerable attention has been directed lately to the possibility of manufacturing sugar profitably from beet-root, as it has been found from carefully conducted experiments that in many localities the sugar-beet thrives admirably, and yields a very high percentage of sugar.

Some years ago, experiments were made at Bathurst in beet cultivation and sugar manufacture, but they failed. Sugar was made, and beet grew well enough, but the cost of manufacture was altogether too great. It is said that the variety of beet grown at this time contained a very low percentage of sugar.

The matter of sugar-beet cultivation, and sugar manufacture, has been taken in hand very warmly by Mr. Chas. A. Lee, M.P., of Tenterfield. He has induced many of the farmers to try experiments, and the results of yield per acre of the beet-root, and percentage of sugar, are considered extremely satisfactory. These experiments were conducted under the supervision of Mr. C. Van de Velde, the seed having been obtained from Europe by the Department of Agriculture. Mr. Van de Velde says that

The prospects of the introduction of the beet-sugar industry in the tablelands of this colony are extremely brilliant. He can safely state that no country where this great agricultural industry is carried out has soil and climate equal to those of New South

Wales. It is true that labour is dearer in this part of the world than in Europe, but ample compensation will be found in the cheapness of the land, the better and larger crops, the larger extent of the season for sowing and harvesting, the better market for the manufactured products, &c. The difficulty of the introduction of this industry in those colonies is the backward state of farming and agriculture brought about by the too flourishing conditions of the past. The sugar-beet industry means intense cultivation and high farming with productions of manure with the by-products of the farm to keep up the fertility of the land. The permanency of the industry can only be assured on these conditions. It will raise the present methods of agriculture and farming from their present level to the highest state of modern perfection, and it shows its importance from a national point of view.

The farmers about Tenterfield are taking a keen interest in the cultivation of the sugar beet. There is under crop this season upwards of 40 acres on small portions. This area would have been largely increased had not an unprecedented drought during the winter months prevented the soil being ploughed sufficiently deep. Mr. Lee expects that next season from 80 to 100 acres will be sown with sugar beet, if seed can be procured, in areas to be limited to one acre each. He says that the farmers appreciate the value of the roots as winter fodder for stock—cows in particular—and many of them will in the future grow sugar-beet in preference to turnips, mangels, or other root crops.

As an encouragement to experimenters in the growing of sugar beet the Minister for Agriculture has granted a sum of £50 to be divided into twenty prizes varying from £1 to £8 for the most satisfactory results this season.

It seems not at all improbable, judging from the results obtained by the farmers who were entirely new to the method of cultivation necessary for the production of good quality beet, that the heavy yield and high percentage of sugar likely to be obtained in New South Wales, as cultivation improves, may result in a profitable new industry.

The absolute necessity for extreme care and attention to the cultivation of sugar beet, must of itself be productive of much good to our farmers, who will thereby learn that similar care to other crops will, most likely, prove highly profitable.

I should not like to close this article without a very earnest reference to what is in reality the turning point of productive industry in Australia, and that is the establishment of a name for our produce which we offer for sale in distant markets. The leading idea should be that the very name, Australia, should convey the impression that the article is excellent of its kind and worthy of the name, Australia.

Horticulture.

By W. S. Campbell, Department of Agriculture.

Perhaps no portion of the world, of the same area, is better favoured, than New South Wales, with its varied climates and soils, for the production of fruits, vegetables, and flowers. It is really surprising how great a variety can be grown to perfection and at a minimum expenditure of labour. Exotics from cold, temperate, and even tropical countries thrive equally well within the limits of this comparatively small area; and still more remarkable is the fact that so many of these plants from different climates will grow side by side in many favoured localities. With all these advantages it seems strange that but little attention is devoted to the raising of vegetables for home use, or to the cultivation of flowering and ornamental plants for the adornment of the homes of the settlers in the country. Occasionally one may meet with a well-cared-for beautiful garden, like an oasis in the wilderness, but, as a rule, few attempts are made even to grow the commonest vegetables for the family's requirements, and dependence for supplies is placed on Chinese gardeners, whose gardens are generally to be found dotted about the country, especially in the most populated districts. The raising of vegetables, the selling of fruit, and the hawking of goods seem now to be almost entirely in the hands of the Chinaman, the Italian, or Syrian, and the Indian; at the same time that a vast proportion of our white population consists of unemployed men tramping through the country in search of work, and dependent on the hospitality of the settlers.

Considering the little difficulty there is, in most seasons, in producing a sufficiency of fruits and vegetables for a family's requirements in most parts of the Colony, it seems almost incredible that our settlers or farmers do not grow everything they need. This may be due in many instances to apathy, and in others to a want of knowledge; but, whatever the cause, it is very much to be regretted. Instances are known where vegetables are brought hundreds of miles to localities where the same kinds of vegetables can be grown to perfection with but little trouble. In some places Chinamen travel 40 to 50 miles carting vegetables to settlers who have soil sufficiently rich to grow all they need if they took the trouble to devote but a few minutes a day to the work.

All this will probably be altered as knowledge spreads. When the principles and practice of horticulture can be taught in our Public Schools it will be a boon to the Colony, for it is to the coming generation we must look for improvement. Here and there in the country instances may be seen of admirable work effected by the examples and kindly encouragement of masters at Public Schools when

HOT-HOUSE AND GREEN-HOUSE FLOWERS, GROWN IN NEW SOUTH WALES.

Arranged by Miss Goodenough, Florist, King-street, Sydney.

they happen to be enthusiasts in the subject. Far away in the country the writer met one day near a Public School a number of boys and girls—quite a string of them—toiling along under heavy loads. On inquiry it turned out that these loads consisted of bags of vegetables, bottles of honey, &c., &c., the produce of the children's own industry from little plots of ground adjoining the Public School. The land was inferior in quality, being stony and difficult to work, but by the judicious encouragement of the master these children—boys and girls—had become so interested in their gardening that they had been able to raise considerable quantities of produce after school-hours. Not one of those boys and girls will ever forget the admirable lessons thus learnt, which were entirely apart from the ordinary school curriculum. It cannot be expected that every teacher could succeed so well, for probably but few have any practical knowledge of the subject; but it would be well that all those who are being trained for the work of teaching should have every opportunity afforded them of acquiring some insight into the various branches of horticulture.

It is somewhat difficult to trace the progress of horticulture in New South Wales, as but little information on the subject is given in the early history of the Colony. The first plants introduced were doubtless those obtained at Rio de Janeiro and the Cape by Governor Phillip in 1787, when in command of the "First Fleet." Collins, in his History, says:

As it was earnestly wished to introduce the fruits of the Cape into the new settlement, Captain Phillip was ably assisted in his endeavours to procure the rarest and best of every species, both in plant and seed, by Mr. Mason, the King's botanist, as well as by Colonel Gordon, at that time the Commander-in-Chief of the troops at the Cape; a gentleman whose thirst for knowledge amply qualified him to be of service to the colonists, not only in procuring a great variety of the best seeds and plants, but in pointing out the culture, the soil, and the proper time of introducing them into the ground. The following plants and seeds were procured at the Cape and at Rio de Janeiro. At Rio de Janeiro: Coffee—both seed and plant; cocoa, in the nut (probably coconut); cotton-seed; banana-plant; oranges, various sorts, both seed and plant; lemon-seed and plant; guava-seed; tamarind; prickly-pear; plant with cochineal on it; Eugenia, or pomme-rose, a plant bearing a fruit like an apple, and having the flavour and odour of a rose; ipecacuanha, three sorts; jalap. At the Cape of Good Hope: The fig-tree, bamboo, Spanish-reed, sugar-cane, vines of various sorts, quince, apple, pear, strawberry, oak, myrtle.

In 1791 a supply of "200 fruit-trees and a quantity of garden seed" were brought by H.M.S. Gorgon from the Cape. It is mentioned in Phillip's "Voyage to Botany Bay," Chapter XIII, that in 1788

All the plants and fruit-trees brought from Brazil and the Cape which were not damaged in the passage thrive exceedingly, and vegetables have now become plentiful, both the European sorts and such as are peculiar to this country. In the Governor's garden are excellent cauliflowers and melons, very fine of their kinds. The orange-trees flourish, and the fig-trees and vines still more rapidly. In a climate so favourable, the cultivation of the vine may be carried to any degree of perfection; and should not other articles of commerce divert the attention of the settlers from this point, the wines of New South Wales may, perhaps, hereafter be sought with avidity, and become an indispensable part of European tables.

In 1792, Collins says:

The Colony had now been established within a few weeks of five years, and a review of what had been done in cultivation under His Excelleney's direction in that time cannot

more properly be introduced than at the close of his government. An accurate survey of the whole ground in cultivation, both on account of the Crown and in the possession of individuals, had been taken by the Surveyor-General and transmitted to England by that ship; and from the return which he then made the following particulars were extracted:—Ground in cultivation, 16 October, 1792—in wheat, 208½ acres; in barley, 24¼ acres; in maize, 1,186½ acres; garden ground, 121½ acres; ground cleared of timber, 162½ acres; total number of acres, 1,703¼.

Such was the initiation of Horticulture into Australia, a small beginning, but gradually to develop into an important industry. It was doubtless exceedingly difficult and expensive in the early days of the Colony to introduce plants from distant countries by means of the slow sailing ships, which took months on the voyage from England. So different to the present time, when the latest horticultural novelties can be obtained here almost as soon as they are in the market in England, and oftentimes very much cheaper.

Amongst the earliest of private individuals to develop horticulture was Mr. John Macarthur, of Camden Park. The late Sir Wm. Macarthur and the present Mrs. Macarthur Onslow, have continued this work in a praiseworthy degree.

The Australian Agricultural Company appears to have introduced many different kinds of plants to its large estate, north of Port Stephens, and the remains of old gardens may still be seen about the pretty little village of Stroud, which was once the head-quarters of the Company. This village was once greatly famed for its gardens.

Much good work in developing a taste for horticulture has been effected through the medium of the Botanic Gardens, Sydney. When these gardens were first started, in 1816, the work seems to have been confined pretty well to the cultivating of fruits and economic plants, and until the present Director, Mr. Chas. Moore, F.L.S., was appointed in 1847. These gardens have been gradually so greatly improved under his direction that they are now renowned throughout the world for their beauty and usefulness.

Here we now have a magnificent collection of plants, and representatives from nearly every country in the world, growing side by side in great perfection. As might be expected, a vast amount of horticultural or botanical knowledge can be acquired here by anyone interested, and days may be spent with profit. Some years ago the annual exhibitions of the Horticultural Society used to be held on the lawn in the Lower Garden, and very attractive and interesting they were.

This Society seems to have had its origin about 1848, in the Australasian Botanic and Horticultural Society. It then became the Australian Horticultural and Agricultural Society, and afterwards developed into the Horticultural Society of New South Wales. Much good has been effected by this Society in improving horticulture and developing a taste for the beautiful and useful in flowers, fruits, plants, and vegetables.

A few years ago many of our leading citizens were deeply interested in gardening, and encouraged a love for the art by their example. Amongst them were the late Messrs. T. S. Mort, H. Prince, H. Moore, H. H. Bradley, Dr. Bennett, C. Stephen, J. Young, and the then well-known nurserymen the late Messrs. T. W. Shepherd, R. Henderson, — Guilfoyle, J. Graham, and J. Baptist.

Of recent years gardening has become exceedingly popular about Sydney and some of the country towns; and gardeners, professional and amateur, exhibit remarkable skill in the art. There are several Horticultural Societies in the city and suburbs; and others in the country, which are chiefly connected with Agricultural Societies. At some of their Exhibitions may be seen wonderfully good specimens of flowers and ornamental plants, difficult to excel, perhaps, anywhere. The rose seems to hold its own as a favourite, although the chrysanthemum has many admirers. The rose, in this Colony, succeeds to perfection, and is one of the easiest and most satisfactory of plants to grow, for it will withstand a severe drought and much ill-treatment. When properly attended to, manured, pruned, and cultivated, it repays tenfold this attention, and many varieties will blossom, almost continuously, throughout the year. The tea-scented, and those termed hybrid tea-scented, are by far the most floriferous, and consequently have become the favourites. The varieties termed hybrid perpetuals are not grown now nearly so much as used to be the case a few years ago, and this is to be regretted, for there are many exquisite kinds amongst them. The best season for hybrid perpetuals is about the month of October, and if the spring should be showery and moist, without hot winds, the flowers come to great perfection.

The chrysanthemum seems to be perfectly at home in almost all parts of New South Wales; and, strange to say, and quite contrary to the general impression, it succeeds wonderfully well in the dry atmosphere of the inland parts of the Colony, provided it can be supplied with water. There is generally great competition amongst chrysanthemum-growers at the Horticultural Shows, and some remarkable flowers are frequently exhibited. Nearly all good novelties raised in Europe or America seem to find their way here almost as soon as their qualities are known. Some few good varieties have been raised here; but it seems rather surprising that the work of hybridising and raising new kinds is not taken more in hand by amateurs. The same may be said with respect to other plants, for few really good varieties are raised here, although garden-plants seed with great freedom and are so easily hybridised.

The Camellia thrives exceedingly well, and is a useful ornamental plant even when not in full bloom. After it becomes fairly well established it needs but little attention, and will in time attain a considerable size. Unfortunately, many of the plants grown are poor varieties which bear indifferent, semi-double, ugly blooms, when their places could just as well be occupied by others bearing beautiful flowers.

A flower which has come greatly into favour amongst floriculturists is the Bouvardia, which belongs to the Order *Rubiaceæ*. There are many varieties now in cultivation, and they all succeed remarkably well in most parts of the Colony. It would be difficult to find more beautiful, graceful, or useful plants. They blossom continuously for many months during the year, and the more the flowers are removed the better the plants seem to blossom. The first varieties introduced into the Colony were *B. triphylla* and *B. Jacquinii*, but of late years great improvements have been effected, and all the beautiful varieties have been introduced.

Carnations, pinks, picotees, and all members of the Dianthus family thrive to great perfection, and are very useful and ornamental flowers for the garden. The variety of carnation most preferred is that known as the "Tree, or Perpetual-flowering," which blooms for the greater part of the year. Considerable interest has been taken in the carnation lately, and flowers of great excellence, and in great quantity, are grown by florists for decorative purposes. Plants need attention and watering during very dry weather, or they may die off suddenly. Some fine varieties of the tree Carnation have been produced in the Colony.

Bulbs and tuberous-rooted plants succeed admirably in various parts of the Colony, and many of them need little or no care after they are once planted. They may be left in the ground year after year with impunity, unless it is thought necessary to thin them out. Great quantities of Daffodils, Liliums, Jonquils, Hyacinths, Snowflakes, and Snowdrops are grown by the nurserymen and florists for sale during the season. Some of them succeed best in elevated coolest parts of the Colony. Hippeastrums succeed admirably, and without any care. Some fine hybrids have been raised in the Colony from time to time by amateurs and others.

Pelargoniums were at one time great favourites, but although still grown largely, interest in them seems to have fallen off considerably; the reason probably being that they can be grown so easily—almost like weeds, if permitted. The same thing may be said with respect to many other kinds of plants which are glass-house treasures in some countries. Indeed, some plants which have been introduced for ornamental purposes thrive so well that they have become great pests, as, for instance, a Lantana from China; and the prickly-pear, *Opuntia vulgaris*, which has spread to such an extent in some parts of the Colony that vast tracts of country have been ruined by it for pastoral purposes. The sweetbriar, also a garden favourite in some countries, has spread here almost beyond control; and the common blackberry has become a great pest in some places, and most difficult to eradicate. Numbers and numbers of species of beautiful trees, shrubs, and flowering plants thrive in this Colony in great perfection. Magnolias of various kinds, Azaleas, Rhododendrons, Cactuses, Abutillons, Palms, Yuccas, Bamboos, Berberis, Cratægus, Daphne, Jacaranda, Deutzia, Dracænas, Gardenia, Hibiscus, Hydrangea, Lasiandra, Spirea, Annuals of almost every kind, Perennials, and beautiful creepers of wonderful variety are quite at home in the various climates. It is not possible here to mention the names of more than a very few of the exotics which have become quite acclimatised.

Our native flora abounds with many species of beautiful flowering plants and Palms, Ferns, and Macrozamias well adapted for cultivation in our gardens, and some of them are used with great effect, although others are somewhat difficult to grow under cultivation, strange as this may appear to the uninitiated.

In the rich semi-tropical districts in the north-east of the Colony, and in patches extending considerably to the south of Sydney, near the coast, the indigenous vegetation is extremely beautiful, especially that in the north. Here and there in this rich country may be seen vast groups of graceful Palms, the Bangalow, *Pytchosperma Cunninghamii*; the beautiful little Walking-stick Palm, or Midgimbill, *Areca* or

Bacularia monostachya, and the Cabbage-tree Palm, *Livistona Australis*. In the dense "brushes" grow magnificent specimens of the "Silky Oak," *Grevillia robusta*, a most useful tree for ornamental purposes in large gardens and for street-planting. Strange to say, this tree thrives well, and flowers and seeds abundantly when planted in our dry western districts, which have quite a different climate to that of the moist, humid climate in which it is indigenous. In these "brushes" also grow the beautiful *Hymenosporum jasminoides*, frequently cultivated in our gardens; the Flame-tree, *Brachychiton acerifolium*, which is one of the most gorgeous trees it is possible to imagine when bearing its masses of scarlet bell-shaped flowers before the leaves appear. This would be an acquisition to any garden in the world where it would thrive; the Richmond River pine, very ornamental when young; the Moreton Bay chestnut, *Castanospermum Australe*, one of the most beautiful and ornamental of trees; the Queensland nut, *Macadamia ternifolia*, which bears sweetly-scented flowers and afterwards excellent nuts. This tree is very ornamental, and worth growing. Handsome creepers and climbing plants abound here also—Passifloras, Hoyas, Jasmines, and the beautiful *Tecoma jasminoides*, bearing large, bell-shaped, pinkish flowers, which is frequently cultivated in our gardens. In swampy places and along the edges of creeks the handsome white-flowered *Crinum pedunculatum* abounds, and all through the brushes are millions of the large ornamental-leaved *Colocasia macrorrhiza*.

Perhaps the most beautiful flowering plant in the north is the water lily (*Nymphæa gigantea*), some flowers of which were lately sent to Her Majesty the Queen, in ice, by a Sydney florist. This grows in creeks and lagoons about the Richmond and Clarence Rivers, and beautiful indeed it is to see in its natural state floating in great masses on the still water. The fig-trees, *Ficus macrophylla*, *F. rubigenosum*, F. *aspera*, and *F. vesca* are deserving of mention, for they are used extensively, especially the first mentioned, for ornamental and shade purposes. *Ficus vesca* is exceedingly handsome, but not so well known as the others. Some of these figs grow to extraordinary perfection in the north, but it would need pages to describe them and their remarkable peculiarities. Along the coast, in poor sandy country, some of our prettiest flowers grow to great perfection. The Christmas Bells (*Blandfordia*), the Christmas Bush (*Cerotapetalum gammiferum*), the Waratah (*Telopea speciosissima*), all easy of garden cultivation; the Flannel Flower (*Actinotus helianthi*), made popular by Lady Carrington; the Epacrids, Correas, Boronias, Gigantic Lily (*Doryanthes excelsa*), and numbers and numbers of other pretty flowers. Some of the native orchids are grown in our gardens, chiefly the handsome, *Dendrobrium speciosum*, which thrives well about Sydney. *D. Kingianum* is exceedingly pretty; and there are several other species worth the growing, but not often collected. One of our most beautiful orchids is *Sarcochilus Fitzgeraldi*, which, however, is rather rare. Of ferns sometimes collected there are Adiantums of several species, several Alsophelas, Cyatheas, Todeas, Gleichenias, Tricomanes, Dicksonias, *Lygodium scandens*, Aspleniums, Polypodiums, Lomarias, and numbers of other ferns, including the remarkable Stag and Elk Horn Ferns, *Platycerium alcicorne* and *grande*.

Several varieties of Acacias are in cultivation, for their beauty is becoming well recognised. One of the most beautiful is the Cootamundra Wattle (*Acacia Baileyana*). The dry western portion of the Colony is remarkably rich in leguminous plants, including many species of Acacia, which are exceedingly beautiful when in full bloom—perfect masses of gold. No doubt in time they will be treasured in our gardens. In the dry west too we have the handsome Eremophilas and Sturt's Desert Pea (*Clianthus Dampierii*), besides numbers of pretty things hardly known at present beyond their immediate neighbourhood.

The magnificent palms indigenous to Lord Howe Island are well known and valued throughout the gardening world. These are the Howeas, best known as *Kentia Belmoreana*, *K. Canterburyana*, *K. Fosteriana*.

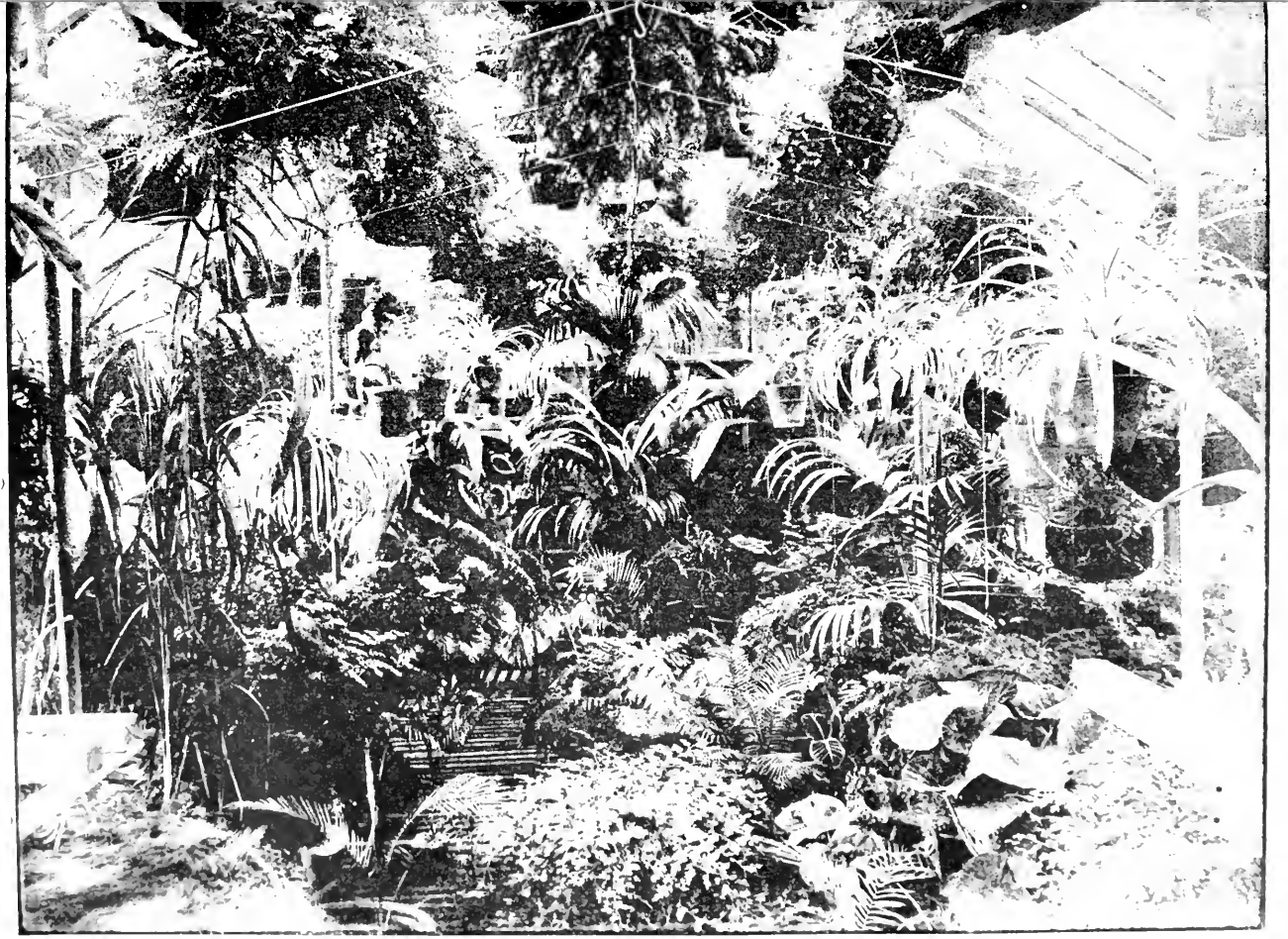
A considerable trade is carried on by the nurserymen and florists in these palms, chiefly in *K. Belmoreana*. They succeed admirably in gardens about Sydney, and when planted with tree-ferns grow freely and quickly, and are wonderfully effective. They are useful for glass-house, bush-house, and indoor decoration, being able to withstand ill-treatment and neglect better than any other palms.

The bush-house is one of the most useful of structures in connection with the garden in all the warm parts of New South Wales. In it a multitude of plants can be grown which would be liable to perish in the hot sun. It can be, and is, constructed of all sorts of material, sometimes tea-tree brush, laths, bamboo-blinds, and indeed anything that will break the rays of the sun without altogether obstructing them. In many gardens about the metropolis and large towns there are glass buildings where tender exotics of warmer climates than New South Wales are well grown, perhaps as well grown by some of the gardeners and amateurs as in any part of the world. Everything indicates that the taste for floriculture is improving rapidly, and will continue to improve, and this is due in a great measure to the fact that we have many excellent gardeners, professional and amateur.

Unfortunately, the "vegetable" branch of horticulture is greatly neglected; and it is a disgrace to the Colony that we should be obliged to import many of the vegetables we use from our neighbouring Colonies, chiefly from Victoria, where vegetable-growing is in the hands of Europeans. In New South Wales we have equal facilities for the production of every vegetable we need of the best quality, but we seem to lack the enterprise, or spirit, or go, of our exemplary neighbours.

As previously stated, our vegetables are chiefly produced by Chinese gardeners. Consequently they are of but poor quality, insipid and watery, owing to the peculiar method of over-watering and over-manuring adopted. Although these vegetables are of such poor quality, they are absolute blessings in many parts of the Colony where Europeans either will not or cannot grow those they need. Vegetables of excellent quality can be produced, even in dry districts, with but little irrigation if they be properly managed, but unless a Chinaman has a super-abundance of water he is lost.

The vegetable chiefly grown and used in New South Wales is the cabbage, generally of the largest and coarsest kind, for bulk seems to



AN AMATEUR'S GREEN-HOUSE NEAR SYDNEY.

be the object chiefly in view. Quality seems to be generally ignored, although cabbages of superb quality are frequently to be met with in private gardens, or even in small market-gardens worked by Europeans; the difference in quality is extraordinary, proving beyond all question that the best cabbages can be grown, not in one or two localities, but throughout the Colony, as the writer has had many opportunities of proving.

The potato is a vegetable largely used, and can be grown of the best quality and in almost any quantity; but not nearly enough for our own consumption is produced. Coghlan says:—

> The amount of potatoes imported for local consumption during 1894 was 31,013 tons, while the quantity available from the fields of the Colony, after allowing for seed, was 78,237 tons. The net imports amounted, therefore, to 28 per cent. of the total consumption, as compared with 42 per cent. in 1893, and 52 per cent. in 1892.

As with fruits and flowers, the variety of vegetables that can be produced throughout the year in New South Wales is surprising. In some of the warmest localities near the coast, in the north-eastern-most portion of the Colony, tender vegetables like the French bean and tomato can be grown all the year round. The latter may be seen growing wild in some places, the seed having probably been spread about by birds. Here the sweet potato, the Papaw apple, and varieties of yams are grown in conjunction with such vegetables as cauliflowers, cabbages, onions, and potatoes.

Probably every vegetable worth growing for domestic purposes can be produced in various parts of New South Wales of the very best quality. Splendid asparagus and celery can be grown, but it is difficult to obtain them of good quality or at a reasonable price. Rhubarb, too, can be grown equally well, but is neglected, and quantities are imported, and, of course, being stale when used, cannot be equal to that freshly gathered. The most surprising thing is that we import and use considerable quantities of tinned vegetables, such as tomatoes, asparagus, peas, and others, when it really should be the other way about, and our exports should be large.

Melons, cucumbers, squashes, pumpkins, and marrows grow to great perfection, but very often they are grown together, and become crossed and recrossed to such an extent that good varieties deteriorate and become greatly spoiled; but good seeds true to name can always be obtained from seedsmen in the city and their agents in the country, and at very reasonable prices.

Not much attention has been given to seed-raising, although it should be a profitable industry. At one time in our short history, when cultivation was confined to the County of Cumberland, it was considered that seed deteriorated greatly, and no doubt this was the case with some kinds of vegetables, but it has since been proved that seed equal to any imported, and indeed in many instances better, can be raised in our cool climates. This is a branch of horticulture which might be made profitable by anyone skilled in such work, if sufficient care be given to it.

From the foregoing remarks it will be apparent that our horticultural potentialities are practically unlimited, and it only needs the necessary knowledge, skill, and perseverance for our settlers to develop them for their own profit, pleasure, and health.

Silk Culture.

By W. S. Campbell, Department of Agriculture.

It is becoming very apparent to those who have given the matter serious consideration that the settlers in the country districts of this Colony will find it necessary, in the near future, to give more attention to those branches of Agriculture which are generally known as "minor branches" than has been the custom up to the present time.

There are complaints on all sides that such crops as maize, wheat, sugar-cane, hay, &c., &c., yield very little profit; and numerous inquiries are made from time to time to the Department of Agriculture for advice as to other crops likely to be suitable to our various climates which may prove more profitable and more sure than those which the farmers have been accustomed to produce.

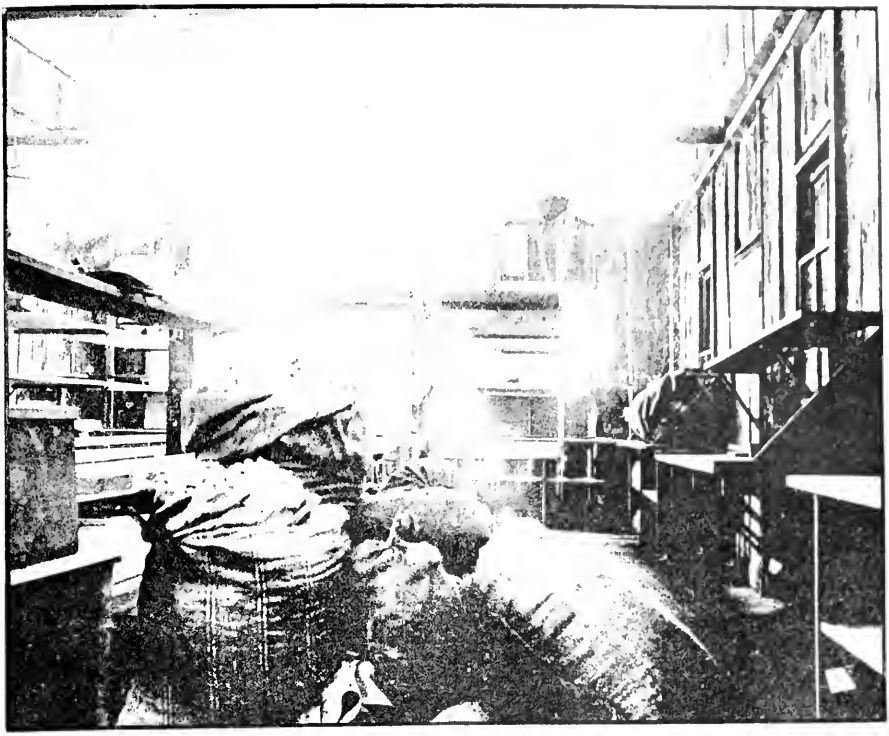
In course of time necessity will compel our settlers to practise better systems of cultivating their lands; to produce more food for their own use; to improve their productions for foreign markets; and to concentrate as much of their produce as possible into as little bulk as can be effected without deterioration.

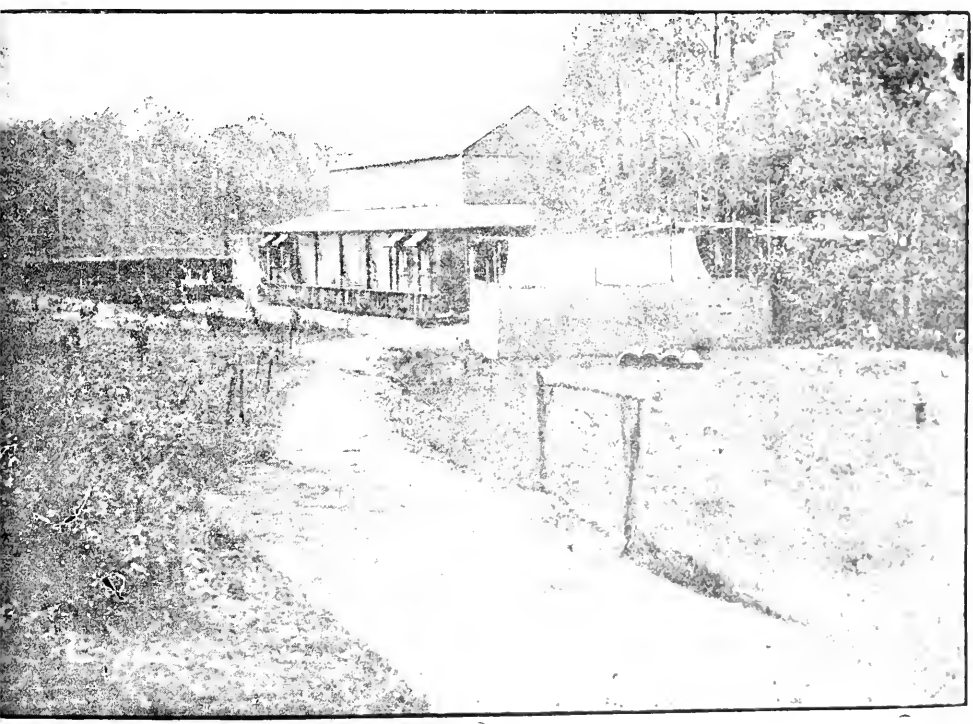
There seems to be no reason why very many settlers cannot follow the admirable examples of some of the European nations, where each family produces on its own small farm most, if not all, the food required, and even the greater part of the raw material for clothing. In countries with climates far more severe and trying than ours, the requirements of the families are produced on remarkably small areas. An area of 10 acres would be considered a large farm, and on this a family will live contentedly, and nothing would induce the members to leave their little plot. This is the case in many districts in France, which is probably in consequence the most wealthy country in the world, and where about 50 per cent. of the population is engaged in farming operations. On their little areas of perhaps 1 or 2 acres, a few olives, some vines, figs, mulberries, maize, wheat, vegetables, &c., are grown, and fowls, goats, and a few other kinds of stock are kept, and every inch of land is made use of. In this Colony of New South Wales many settlers with, hundreds of acres each, can hardly make a bare existence.

In Germany, "In 1882, at the time of the last occupation census, the total number of farms (including arable land, pasture, meadow, cultivated pastures, orchards, and vineyards), each cultivated by one household, was as follows:—

Under 1 hectare (2·471) acres)	2,323,316
Between 1 and 10 hectares (2·471 to 24·71 acres)...	2,274,096
,, 10 and 100 hectares (24·71 to 247·1 acres)	653,941
Above 100 hectares (247·1 acres)	24,991
Total	5,276,344

These farms supported 18,840,818 persons, of whom 8,120,518 were actually engaged in agriculture."





SILK-CULTURE.

Amongst the many industries highly suited to the climate of New South Wales, but hitherto neglected, is that of the rearing of silkworms, for it has been well proved that their food—the mulberry—succeeds well, and that the mulberry silkworm (*bombyx mori*) is perfectly at home, and produces silk of the best quality, showing that the mulberry grown here yields not only good food, but that it also secretes the peculiar resinous substance which is so necessary for the production of silk of the best marketable quality.

It seems somewhat remarkable that, notwithstanding the facts, which are beyond all question, that the mulberry thrives here in the greatest perfection, that silkworms are remarkably healthy and vigorous, and that the necessary skill in rearing them to the best advantage is forthcoming, the colonists have not, until recently, given consideration to silk culture. This may be accounted for, to some extent, to the fact that the rearing of silkworms has generally been made a sort of plaything of by children, and it has become the custom to consider it merely as a kind of toy, and unworthy the serious attention of adults. However, it is somewhat singular (and perhaps a sort of consolation to those who desire to see the industry prosper) that the introduction of silk culture has met with serious difficulties in all those countries where it has subsequently become so profitable. It will therefore be interesting to give some instances.

It seems to be beyond all doubt that the industry had its origin in China. Duhalde, in his work, "Description de la Chine," says: "Up to the time of this Queen (Si-ling-Chi), when the country was only lately cleared and brought into cultivation, the people employed the skins of animals as clothes. But these skins were no longer sufficient for the multitude of the inhabitants. Necessity made them industrious. They applied themselves to the manufacture of cloth wherewith to cover themselves. But it was to the Princess that they owed the useful invention of silk stuffs. Afterwards the Empress named by Chinese authors, according to the order of their dynasties, found an agreeable occupation in superintending the hatching, rearing, and feeding of silkworms, in making silk, and in working it up when made."

Figuier mentions that "M. Stanislaus Julien tells us of many regulations made by the Emperor of China to *render obligatory* the care and attention requisite to rearing silk.

"Tchin-in, being governor of the district of Kien-si, ordered that every man should plant 50 feet of land with mulberry trees. The Emperor, under the dynasty of Witei, gave to each man 20 acres of land on condition that he planted 50 feet with mulberry trees. Hien-tsang (who ascended the throne in 806), ordered that the inhabitants of the country should plant 2 feet in every acre with mulberry trees. The first Emperor of the dynasty of Song (who began to reign about the year 960) published a decree forbidding his subjects to cut down the mulberry trees.

"By all these means, according to the testimony of M. Stanislaus Julien, the business of the fabrication of silk became general in China. This great empire soon furnished its neighbours with this precious textile material, and created for its own profit a very important branch of commerce."

The history of the spread of the industry in other countries from China is extremely interesting, but limited space forbids further particulars being given, beyond those which appertain chiefly to their compulsory nature.

The greater part of the silk produced in Europe is raised in Italy and France, but great difficulties were experienced in establishing silk culture in those countries, and there, as in other places, it has been effected by the efforts by far-sighted, and even sometimes despotic, individuals. "The culture of the mulberry and rearing of silkworms," says Cochran, "is said by some authors to have been begun in France during the 13th century, in an amateur way, in Languedoc, Province and the Comtat d'Avignon, but the experiment does not appear to have made much progress," however, later on, "it was enthusiastically encouraged by King Henry quatre," during whose reign the industry may really be said to have begun. "This king," says Figuier, "saw with grief considerable sums of money leaving France each year for the purchase of raw silk or silk stuffs. Two men marvellously furthered his project of encouraging the silk trade"—these were Barthelemy Laffemas and Olivier de Serres, who used great efforts to establish sericulture—"but, notwithstanding this great impulse, sericulture dwindled away on the death of the king. It received a fresh impulse under Colbert," to be brought to a standstill by the revocation of the edict of Nantes. After the first French Revolution the industry revived, and Cochran says, "One of the very few good things Napoleon Bonaparte did for France was to foster sericulture, so that under his encouragement the crop once more began to increase and progress, and after the European peace of 1815, rapid progress up to the end of 1853 was attained," when the disastrous silkworm diseases almost annihilated the industry in Europe.

In Italy there seem to have been considerable difficulties in the way of establishing the industry. Figuier mentions that in Tuscany, "in 1440, each Tuscan peasant *was forced* to plant at least five mulberry trees on the land he cultivated."

His Excellency, our late lamented Governor, Sir Robert Duff, who, with the members of his family, took considerable interest in sericulture, caused a translation to be made and published on the "History and present state of Sericulture and Silk-spinning in Hungary, 1891." The writer of the article says, "Silk culture was begun in Hungary towards the end of the 17th century; the industry was most successful until the end of the last century, when it was almost entirely abolished by various unfavourable circumstances. In 1811 a Commission was instituted, under the protection of Joseph (the late Archduke of the Palatinate), for the promotion of silk culture, and through his zeal the industry gradually revived, so that in 1826 the amount of cocoons gathered rose to 152,000 kilogrammes (1 kilo. = 2·2055 lb.) The present Archduke Joseph, following the example of his father, is one of the most ardent supporters of this grand industry. Between 1835 and 1845 the amount of cocoons produced reached the maximum of 250,000 kilos., and this amount was maintained until the political crisis of 1848–9. At that period the industry began to decline, and during 1850 and the few following

years the remains of it were so completely crushed by the 'Pebrine,' a silkworm disease which raged all over Europe at the time, that by 1860 silk culture seemed to have disappeared entirely from Hungary.

"About 1870 the Hungarian Government once more directed its attention to this branch of commerce, and instituted a Board for the official inspection of silk culture at Szagzard.

"In 1880 Baron Gabriel Kémény, the Minister of Agriculture, reorganised the Board of Inspection, granting it a more independent sphere of action, and urging and encouraging the occupation in the country.

"The arduous task of its development was assured by M. Paul de Bezeredy, who threw all his energies into the work, and strove perseveringly to attain his object not only from an agricultural point of view, but especially in a philanthropic sense, and he sacrificed a large part of his own private fortune for the success of the enterprise. Thanks to the zeal of this able man, and also to the valuable aid of M. W. de Ritter, of Gorice, whose enlightenment and technical knowledge were important acquisitions, the success surpassed all their highest hopes. The following figures are sufficient to show the enormous strides with which the industry advanced:—In 1880 there were 71 communities, producing 10,000 kilos of cocoons; in 1891 there were 2,268 communities, producing 1,110,000 kilos of cocoons.

"M. de Bezeredy did not attain these marvellous results without constant hard work and perseverance and overcoming many obstacles. The ignorance and carelessness of the people was a continual obstruction, and in combating this he was assisted by the Royal Government, who invested the president of the Board with the power of requiring from the local authorities the use of the public forces to check disorders in any part of the kingdom and to punish the culprits who resisted the picking of the mulberry leaves and even damaged or destroyed the trees."

From the examples given in the above brief extracts it might reasonably be supposed that there would be many difficulties to overcome in establishing sericulture in New South Wales, or in any of the colonies, and such, in part, has been the case.

In the earliest days of the Colony, when it was found that the mulberry succeeded admirably, some thoughts were given to the establishment of the industry. In 1825 the Australian Agricultural Company expected good results from silk culture, but no steps seem to have been taken to further it at that time.

In 1842 Mr. Surgeon R. T. Jameson, in his work "Recent Travels in New South Wales," remarked "of these prospective resources the culture of silk is especially deserving of attention. The mulberry tree grows to great perfection, and the silkworms already introduced have shown by their instructive industry that a great trade in raw silk might be carried on from the shores of Australia as easily as those of China and Italy."

A gentleman named Buezeville, about the year 1848, made an attempt to establish silk culture on a farm at Eastwood, near Ryde, but this collapsed through want of means and profitable varieties of silkworms. Flanagan, in his "History of New South Wales," says

"the experiment which had been made to grow silk on an extensive scale in the Colony proved a failure, chiefly in consequence of the want of the proper species of mulberry."

Various attempts were made from time to time to promote the industry, but they seem to have failed chiefly either from a want of proper knowledge of the subject or from inadequate supplies of food for the silkworms.

At the time the terrible silkworm diseases were so prevalent in Europe, and which threatened to completely ruin the industry there, the price of healthy silkworms' eggs or graine rose enormously, and nearly every part of the world was searched by agents from France and Italy. This gave a stimulus to sericulture in this Colony, where healthy eggs could be raised without difficulty. The silk manufacturers in England became alarmed at the probability of importations of raw silk becoming short, and "the Silk Supply Association was formed in London to take measures for the arrest of the evil, and promote silk farming in every English country devoted to the growth of the mulberry. * * * The effect of these diseases was gradually to curtail the annual crop of silk available for international commence, until a point was reached when the silk industry of the world was threatened with extinction." Happily, Pasteur took in hand the investigation of the silkworm diseases, with such splendid results that the expected calamity was averted.

At this critical time "we had in this Colony pure-bred races of the old original stock of silkworms, perfectly free from diseases of any kind, owing to the careful efforts of Mr. Charles Brady, who had succeeded in eliminating all traces of disease." Dr. George Bennett, M.D., Hon. Secretary to the Acclimatisation Society of New South Wales, writing to Her Majesty's Minister at Florence, 18th May, 1870, said, "It is well for me to explain that the subject (the rearing of silk and silkworm graine in the Colony) is not quite a new one to us, and under the immediate observations of this society some remarkable experiments have been carried on here continuously for several years last past. Diseased and weak worms have been introduced by Mr. Charles Brady from Europe and from elsewhere, others sound but more or less inferior in quality. Some of this diseased and feeble stock, after treatment by him for several generations in this climate, have, under the influence of fresh food grown in the new soils of the Colony, gradually improved in constitution, and some breeds even appear to afford reasonable hope of becoming perfectly sound and absolutely restored to the original vigour of the parent stock before the disease appeared." Dr. Wallace, of England, in an article on Sericulture in "Cassell's Technical Educator," remarks, "I have myself received from Mr. Brady eggs of a celebrated European race (Milanese), now very subject, in Europe, to disease, which have been pronounced after microscopic examination by skilled experts to be perfectly free from all signs of disease."

After Pasteur's investigations and discoveries, the silkworm diseases were sufficiently stamped out to permit of the silk industry being re-established, and the price of healthy eggs fell from £3 3s. per ounce, which had been received by Mr. Brady for his graine, to a price which

was not nearly so remunerative, and the hopes of those colonists who were making preparations to embark in the industry of rearing graine for export were damped considerably in consequence.

Amongst the various colonists besides Mr. Brady who made considerable efforts to establish the industry about this time were the late Thos. S. Mort, Mr. George Thorne, Dr. G. Bennett, Mr. Jas. Manning, Revd. Father Pacilio, Mrs. Bladen Neill, Messrs. Affleck and Howard, Mr. R. D. Adams, Mr. F. Wentworth, Mr. S. D. Gordon, Mr. J. Fry, and Mr. J. T. Hobbes. From that time until the present, Messrs. Brady, Fry, and R. D. Adams have continued their efforts, and at last there seem to be good prospects of sericulture being properly established on a system which obtains in no other part of the world, discovered and worked out successfully by Mr. Brady. Attention was directed to this system by the late Dr. Bennett. Writing to the Colonial Secretary, 7th June, 1870, he said: "Secondly, the well-known operations of Mr. Brady in the Colony have already caused considerable attention to be directed to Australia, and the very remarkable system originated by that gentleman, and carried on from time to time during several years under the observation of this society (Acclimatisation), of producing a succession of daily broods and crops of silk during a great part of our long season, is highly encouraging." This very important fact, so honourable and, if rightly understood, so calculated to do good to the Colony, was thus commented on by Mr. Dickens, President of the Silk Supply Association of London, at a public meeting held at Coventry:—"The fact of producing silk day by day was most wonderful, and was what was not done in any other part of the world." And Mr. Chadwick, M.P., at the same meeting, took occasion to say, in reference to this Australian plan, that "the daily production of silk which would be as important a fact as ever occurred in the silk trade." The late Mrs. Bladen Neill, who lectured before the Society of Arts in London, 1876, remarked: "No account of silk culture in Australia would be complete without a tribute of praise to the unwearied and scientific labours of Mr. Chas. Brady, of Antony, Tweed River, who has devoted his life to the study and improvement of silk culture. We owe to him the means of producing successive and daily hatchings at pleasure, as well as the introduction into Australia of the best races of silkworms known. These will doubtless produce in time. He probably knows more about silkworms than any man living."

It has been necessary to give the above particulars to enable the reader to form a clear idea of the operations to further the establishment of silk culture, which are now being carried on by the Government.

Before entering into particulars respecting these operations, mention should be made of the sericultural work carried on by a small settlement of Italians at New Italy, a comparatively poor tract of country, situated between the Richmond and Clarence Rivers.

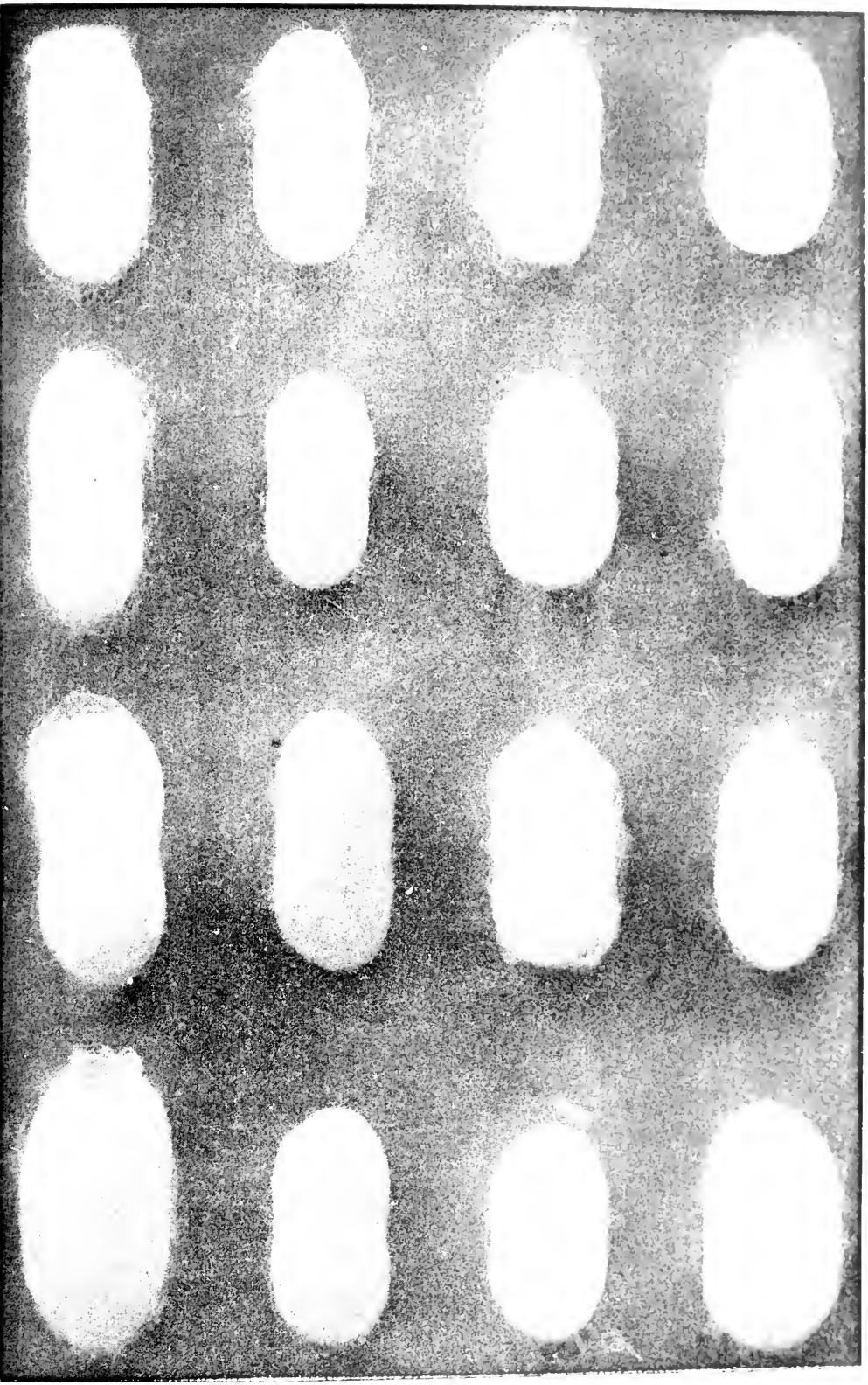
These Italian settlers are a remnant of the ill-fated expedition to New Ireland organized by the Marquis de Ray. They were practically destitute when they settled at New Italy, but, by indomitable perseverance and thrifty habits, succeeded in clearing small areas of heavily-timbered land, and building comfortable homes. Within the last few years they have planted mulberries, reared silkworms, and

produced excellent reeled silk; and when it becomes possible to establish a market for dried cocoons in Europe and Asia, the Italians will doubtless enter as largely into the business as their means will permit. These worthy people had been accustomed to silk culture in Italy, and were more than surprised at the ease with which the silk-worm can be reared here compared with the difficulties at home. A lady, resident in Sydney, who takes a great interest in the establishment of sericulture in this Colony, recently obtained some reeled silk from New Italy and forwarded it to the well-known silk manufacturer, Prat Salle, Villeurbonne Rhone, near Lyons. In order that the best opinion respecting this silk might be given, the services of an expert were obtained. The report sent was to this effect:—"This silk loses a little less than our own silk in its manufacture, not quite such a good quality as the best French silk, but it is a little less nervous, and it would be intermediate between the silk of the Cevennes and the silk of Japan. What you sent me was too little to judge what we could give per kilo. For the silk reeled which you sent me the price, net, would perhaps be 38 francs per kilo. I hope your efforts will be successful in the splendid enterprise of the production of silk. The silk carried well and was clean and regular."

One of the settlers at New Italy succeeded, after wonderful perseverance, in erecting a small silk hand-loom with its various appliances, and has manufactured small pieces of silk fabric from the cocoons raised at the settlement, which is the first, as far as is known, that has been manufactured in Australia.

Some two years ago an association was formed in Sydney under the energetic management of Mrs. Sanger Evans, termed the Women's Silk Growing Association, having for its objects the growing of the mulberry, the production of silk, and the raising of fruits and vegetables, to be managed and worked as far as possible by women. Some land was purchased at Wyee, near the railway line from Sydney to Newcastle, and about 1,000 mulberries were planted recently. Sufficient time has not yet elapsed to determine the success or otherwise of this philanthropic association.

In consequence of an exhaustive report on Sericulture in New South Wales, published by direction of the Minister for Mines and Agriculture, a considerable impetus was given to the industry, not only in this Colony, but in the adjoining colonies as well, and much attention is at the present time being devoted to the subject. Thousands of mulberry plants have been raised at the State Nursery, Gosford, and distributed to applicants free of charge by the Government, who also secured the services of Mr. Charles Brady. An agreement was made with that gentleman by which he engaged to instruct certain persons in his system of successional rearings. Under this system it is possible to rear successive crops of the annual silk-worm throughout the year, if desired, or as long as food may be available. In some portions of this Colony some varieties of mulberry bear leaf throughout the year, and in other parts leaf may be relied upon for nine or ten months of the year. The benefits likely to be gained from carrying out Mr. Brady's system must be obvious when it is known that in the chief silk-producing countries in the world only one crop of the annual silkworm is reared during the year. It



SILK-CULTURE—COCOONS.

Natural Size.

may be mentioned that other species of silkworms known as bivoltine or multivoltine hatch out twice or several times during the year, but they are liable to degenerate and their produce does not compare favourably with that of the annual silkworm.

Under the usual method of raising one crop only, it is clear that all the appliances for rearing that crop must be idle for the greater portion of the year, whereas, on the other hand, provided there be a sufficient supply of mulberry leaf, under the method of successive rearings, those appliances, the rearing shed, &c., can be kept constantly occupied and in use.

In January, 1894, operations were begun at an old mulberry plantation at Booral, near Stroud, about 25 miles north of Raymond Terrace. This plantation, of about 7 acres, was made by the Australian Agricultural Company for the purpose of inducing settlers to take up the industry, and silkworms were reared to some extent, but the project was abandoned after a short time, and the plantation became greatly neglected. The Government leased this property at a nominal rent, as many of the mulberries appeared to be sufficiently vigorous to justify a start being made there.

Thanks to the liberality of an Italian gentleman, Signor Martelli, who many years ago had made great efforts to establish sericulture in Victoria, but without success, a good start was made with the industry. He has lately resided at Fiji, and visiting Sydney on a journey to Italy, happened to read press comments on the report on sericulture before mentioned. His interest in the subject revived, and desiring to assist as much as possible in promoting it, procured in Italy, and brought out successfully, a fine supply of the best varieties of Italian silkworm eggs. These he presented to the Department of Agriculture, and Mr. Brady took in hand their rearing; and notwithstanding the poor shed accommodation at the Booral plantation, and the indifferent quality of the mulberry leaf, owing to the generally neglected condition of the trees, the results of the rearing were satisfactory; the silkworms acclimated, and a splendid stock of graine secured for future requirements.

It may be mentioned that the main object at Booral is an educational one, the intentions of the Government being to enable persons having a real desire to acquire a knowledge of the arts contributory to the rearing of silkworms to acquire the practical knowledge and experience up to the stages in which they have been developed in Australia.

One of the inhabitants at Booral, Mr. S. Carnell, a local landholder, on witnessing the various operations which were carried on in the old shed, placed his property at the disposal of the Government, and engaged to erect improvements required, and to lease the whole to the Government on very favourable terms. The demonstrations made in consequence have proved most attractive; many preconceived but erroneous ideas have been eradicated; more just appreciation has taken the place of prejudice and doubts, and the utility of such an establishment is already upheld. The rearing of successive crops is in full operation, and will continue as long as there is food available.

Intending pupils who wish to acquire a mastery of the art of raising silk for commercial purposes should make application to the Department of Agriculture.

In order to give an idea of the enormous value of the silk industry to France and Italy, the following tables from Mulhall, "Dictionary of Statistics," edition, 1892, are given.

The balance-sheet (France) of the silk industry since 1830 was approximately as follows:—

Period.	Raw Silk.	Manufactures.	Net Result.
	£	£	£
1831-1840 ...	48,000,000	80,000,000	32,000,000
1841-1850 ...	86,000,000	140,000,000	54,000,000
1851-1860 ...	120,000,000	200,000,000	80,000,000
1861-1870 ..	166,000,000	298,000,000	132,000,000
1871-1880 ...	125,000,000	288,000,000	163,000,000
1881-1887 ...	72,000,000	206,000,000	134,000,000
57 years.	£617,000,000	£1,212,000,000	£595,000,000

In 1820 the number of mulberry trees was 9,632,000; in 1835 the number of mulberry trees was 14,880,000; in 1884 the number of mulberry trees was 6,100,000.

PRODUCTION in Italy—Cocoons.

Year.	Quantity.	Value per lb.	Total.
In 1886 ...	91,074,127 lb.	$15\frac{1}{4}$ pence ...	£5,795,125
1887 ...	94,656,722 ,,	$15\frac{1}{12}$,, ...	6,184 956
1888 ...	75,531,040 ,,	$13\frac{12}{16}$,, ...	5,560,624
1889 ...	40,774,410 ,,	$17\frac{5}{16}$,, ...	5,393,140
1890 ...	89,703,702 ,,	$18\frac{3}{8}$,, ...	6,898,500

SANSOON TOBACCO (CIGARETTE),

Growing at Department of Agriculture, Sydney.

Tobacco Culture.

By Samuel Lamb, Department of Agriculture.

The history of tobacco-growing in this Colony dates back to very early times. Mr. Rd. Hardy, now residing near Nabiac, on the Wollamba River, told me that he well remembered being employed in the tobacco-fields on the Hastings River more than sixty-five years ago; that large quantities of tobacco leaf were then grown and cured there, pressed in wool-presses into woolpacks, and shipped away by sea from Port Macquarie, he thought, to England or Scotland. How far Mr. Hardy's memory served him correctly I have no means of verifying, but it is common knowledge that tobacco was grown on most of the old sheep stations for the purpose of making sheep-dip, and tobacco plants are even now growing wild in the neighbourhood of many old sheep-runs. These plants are not of any Australian species or varieties, but evidently of American origin. Especially in the northern coastal districts, from the Hunter up to the Tweed, tobacco plants of American origin are to be found everywhere, occasionally, as at Tintinbar, Richmond River, in great profusion and growing luxuriantly, some plants attaining the height of 10 feet.

It is not easy to identify the variety from which these wild plants are derived; having been long uncultivated, they have reverted towards the original type of wild tobacco discovered by the Spaniards at Yucatan when they raided Mexico nearly four centuries ago, but the difference in soil and climate has somewhat modified their character.

There are four, possibly five, different tobaccos indigenous to Australia, not one of which has any commercial value. Nicotiana Suaveolens is a very pretty plant, having leaves of a deep green colour. The flower-stalk is about 2 feet high, and bears numerous almost pure white trumpet-shaped flowers, which, in the evenings and early mornings, give out a very delicate perfume, but close up in the heat and glare of midday. It is found in abundance under the shade of oak trees, on the steep banks of creeks, in the upland valleys of the table-land. It is very hardy; has long, tough, running roots; flowers in October, and produces a succession of blooms for several months; it is subject to the attacks of the same insects that injure tobacco in cultivation for commercial purposes. The finest specimen of this plant I have seen was growing in a lane off the main street at Gunnedah last year. In some parts of Queensland it attains a much larger growth, and invades the cultivation, from which it is difficult to eradicate it. It is worthy of a place in any flower-garden, and is grown in hothouses in England as an ornamental plant.

Many localities in New South Wales have at various times enjoyed a good reputation for the tobacco they have grown—the Hunter River and its tributaries, notably Jerry's Plains, Paterson, Alleyn Brook, the Williams, Glendon Brook, Bandon Grove, and the district around Dungog. At one time tobacco seemed to have established itself as a permanent industry at and around Tumut, which place has often been credited with having produced the best tobacco yet grown in the Colony. Very large plantings were also made in the Tarcutta district, lying west of Gundagai. The district around Bathurst also grew large crops of tobacco, while a great portion of Nemingha Flat, near Tamworth, was at one time under this crop.

The northern coastal district has always sent more or less tobacco to Sydney.

But of late years tobacco-growing has lost favour with Australian farmers, and has fallen into the hands of the Chinese, while the manufacture of tobacco, which was carried on in a number of small factories in country districts, has ceased almost entirely, and is now for the most part concentrated in Sydney.

The farmers and those who formerly manufactured tobacco on a small scale are of one mind in denouncing the Tobacco Acts of 1884 and 1885 as the cause of what they term the ruin of the industry. I have constantly endeavoured to combat this opinion, which is not founded on a true appreciation of the facts. I do not deny that the imposition of the excise duty, with its accompanying regulations and restrictions, has had some influence in producing the result; but I do say and maintain that there have been many other causes at work exerting much greater force. The small factories in country districts were bound to go down before the competition of the big firms in Sydney, which have a greater command of capital, cheaper and more constant supply of labour, and whose working expenses and cost of supervision are, in proportion to turnover, 50 per cent. less than those of the small manufacturer.

The same thing occurred in England at a time when the tobacco trade was most prosperous. During a period when the consumption of tobacco more than doubled, the number of manufacturers' licenses issued decreased by nearly 10 per cent. The small concerns were swamped by the competition of the big ones, and had to shut up.

Our farmers complain that they cannot now get a fair price for their leaf, and some of them lose their tempers when I tell them that this is the consequence of their own action and the effect of a law which has always been in operation, and can never be repealed or altered.

Paradoxical as it may at first sight appear, I have no hesitation in affirming that the exceeding profitableness of the crop has had more to do with what is called the "Ruin of the Industry" than all the other causes put together. It is the action of a natural law that, so long as a crop is unusually profitable, more people plant it every year. When tobacco is at 7d. or 8d. per lb. "the farmer plants who never did before, and he who always planted plants the more," and if the quantity required for consumption remains the same, or does not increase in proportion, the supply soon overtakes the demand, and prices have to come down.

What are the facts? The annual consumption of tobacco in New South Wales is about 3,000,000 lb., of which about one-third is imported in a manufactured state and about 600,000 lb. in the leaf. The remainder, say, 1,400,000 lb., is therefore of our own growth; that is to say, that about 45 per cent. of the tobacco which pays duty is colonially grown. This does not include the very considerable quantity which escapes payment of duty. In tobacconists' shops in Sydney and Newcastle, and in some other towns, tobacco-leaf is openly sold at from 8d. to 1s. per lb. Consumers purchase this free of duty, and make it up for their own use and that of their friends. The quantity thus disposed of must be very considerable. Every grower of tobacco-leaf makes up some for his own use and to give to his friends; this also pays no duty, and does not appear on the statistics. We may therefore fairly assume that the average annual consumption of tobacco of native growth in this Colony is about 2,000,000 lb., or 17,800 hundredweights. (I turn this into hundredweights because Mr. Coghlan's statistics are in hundredweights.) This quantity does not vary much from year to year, and is not increasing.

Now let us take the production from Mr. Coghlan's "Statistical Register":—

The crop of	1884	was	20,006 cwt.
„	1885	„	9,914 cwt.
„	1886	„	22,947 cwt.
„	1887	„	13,642 cwt.

$$66{,}509 \div 4 = 16{,}627\tfrac{1}{4}.$$

Add them together and divide by four to find the mean, which is 16,627 cwt., or about 1,200 cwt. less than the average consumption; stocks became exhausted, and the price rose to 8½d, and upwards, with the result that the production for the three succeeding years was—

1888—23,469 cwt.
1889—55,478 cwt.
1890—27,724 cwt.

$$106{,}671 \div 3 = 35{,}557 \text{ cwt.},$$

or almost exactly double the quantity required to supply the average consumption; consequently prices went down, needy growers were compelled to sell at any price they could get, and the planting was reduced to very small proportions, accordingly the production for the three following years was—

1891—14,021 cwt.
1892— 9,314 cwt.
1893— 8,344 cwt.

$$31{,}679 \div 3 = 10{,}559 \text{ cwt. average},$$

or about 7,241 cwt. per annum less than is required for the annual consumption. Stocks are now again becoming exhausted, and a time of higher prices may confidently be looked for.

So it is clear that the industry is not ruined, but is only suffering from over-production for a limited market, consequent on the exceeding profitableness of the crop.

That the crop is a very profitable one is clear. I have put the question to a great number of tobacco-growers as to what price would leave a profit, and in almost every instance have had for reply that if there was a sure sale at 4d. per lb. they would always put in an acre or two.

Many men, now in good circumstances, have told me that they made their first rise in tobacco-growing, but perhaps the most notable example of success in this industry is that of the late Mr. Holtz, of Glendon Brook, who purchased a freehold farm for £800, and received exactly £800 for the crop from 16 acres of tobacco grown on it the first year. A few years later he planted 18½ acres, and sold the crop for £1,340.

It would be easy to multiply instances of large profits, but enough has been said to show that in a fairly good season tobacco-growing is so profitable that whenever the price reaches 6d. per lb. more is produced than can be sold; a glut ensues as a matter of course, and prices go down until planting ceases and the glut is worked off again.

Is there any remedy? Yes, I answer, more than one. The first and most obvious one is to so far improve the quality of our product that it will be saleable in the open markets of Europe, so that when a crop exceeds the requirements of our colonial consumption the surplus can be exported at a profit. This is a remedy that will act in two ways, because if our tobacco can be so far improved as to be saleable outside the Colony, it will be good enough to take the place of the 1,700,000 lb. which we now import, and when that is the case the growers will be able to demand a much higher price than heretofore. If we can raise tobacco that will sell for 8d. per lb. in London, Bremen, or Antwerp, it ought to be worth 1s. 8d. per lb. here, because of the Customs duty of 1s. per lb., which has to be paid on imported leaf tobacco coming into the Colony. As things are the tobacco-grower does not get the benefit of the protection afforded by this duty, but only gets from 3d. to 4d. per lb. for leaf which costs him nearly as much to grow. If there is any benefit at all it goes to the manufacturers and dealers.

Another question arises as to whether the desired improvement in quality is possible, whether we have soil and climate which will produce tobacco fit for European markets.

The great variety of soils and climates in New South Wales renders it a reasonable expectation that some localities may be found in which very choice tobacco can be grown, and my experience here has justified the expectation, affording sufficient proof that there are localities in this Colony capable of producing high-class tobacco of each of the three principal grades, namely, for cigar-making, for cigarette-making, and for manufacturing into plug for pipe-smoking.

I think that I have shown that until we can produce tobacco fit for export we shall not be able to avoid the great fluctuations in prices which have been the chief bar to the establishment of tobacco-growing in New South Wales as a permanent source of wealth and prosperity. The question naturally presents itself as to whether there are markets abroad which would form an outlet for our surplus tobacco, and I think that this question can be answered in the affirmative very shortly and very conclusively. England is a great buyer of tobacco; she requires a supply of about 2,000 cwt. daily, and wants it good; she grows none herself, and has to depend on outside sources for her

supplies. There is, perhaps, no other place in the world where common tobacco can be bought so cheaply. I have seen large parcels sold in London at prices varying from ¾d. to 2d. per lb.; such tobacco she does not consume very largely, it is mostly exported. On the other hand, there is no place, except perhaps Moscow or St. Petersburg, where such high prices are paid for exceptionally fine, or what are sometimes called fancy, tobaccos. I have seen as high as 1s. 3d. per lb. paid for fine Borneo cigar wrappers, and a small lot of 600 lb. of fine cigarette leaf was sold for 12s. per lb. exclusive of the duty, which is 3s. 2d. per lb. The buyer in both cases was well satisfied with his bargain, and made substantial profits, as well as increased his reputation by the purchases. Indeed, there never has been a time when really fine tobaccos were not readily saleable in London.

Besides London, Dublin, and Glasgow, there are very large markets in Bremen, Antwerp, Hamburg, and Amsterdam, whose requirements far exceed those of the English trade, and then the Government factories of France, Austria, Hungary, Italy, and some minor European States, are large importers of tobacco leaf.

It is first to England, and then to Europe generally, that we should look for markets for our tobacco, and there is no valid reason why Australian tobacco should not be as welcome in the Old World as Australian wool has become.

Then, again, we have Federation slowly but surely advancing, and, if New South Wales is true to herself and uses her opportunities wisely, she ought to supply tobacco, cigars, and cigarettes to the Federated Australian Colonies.

But, before this vision can become a fact, there is much to be done.

Naturally enough, every tobacco-grower would like to grow good leaf, but very few Australian tobacco-growers have ever had a correct idea of what constitutes good tobacco. The common notion is that the biggest is the best, and I have found it difficult to combat this idea.

Until a true ideal is instilled into the farmer's mind he will continue to work up to the false one, and go on producing big, heavy leaf, which is now almost entirely out of fashion.

There are five points in judging tobacco: the first, *flavour*; second, *colour*; third, *texture*; fourth, *burning*; fifth, *size of leaf*. The only one our tobacco-growers regard is the last, and least important.

Another cause for our want of success in tobacco-growing is the continual use of colonially-grown seed. In other crops the farmers change their seed frequently, because it is apt to run out; but in tobacco they go on growing plants from their own seed year after year on the same soil. The tobacco consequently acquires a character of its own, and its peculiarities become exaggerated.

Again, in the eagerness for a heavy crop, tobacco has almost always been planted in the richest river flats. Now, I have constantly pointed out that the best tobacco cannot be grown on these rich flats, which can only produce big, fat leaf of low commercial value, and I have constantly urged tobacco-growers to try the second bottoms on the upper reaches of the rivers and creeks. I was speaking on this point at West Maitland three years ago, and Mr. Buxton, the manager of the tobacco factory there, who has had fifty years of tobacco experience

in the Colony, said that he had always found the tobacco from the upland valleys much finer, both in flavour and colour, than that grown on the lower flats.

The Victorian Government sent Mr. Sinclair to America last year to inquire and report on the cultivation of sugar-beet and tobacco. In his report, page 37, he says:—"It is not on these rich bottoms that the best tobacco in Kentucky is grown, as might be expected. Here the farmer has his corn patch. For the tobacco crop the upland slope, if not too steep and not liable to be washed or scoured, to the loss of soil or plants, and the elevated flat portion of the rising ground is cleared of timber for tobacco-growing. In this upland, undulating timber country the finest tobacco is produced."

The example of Java is also very much to the point. There are two classes of Java leaf sold in Europe. One brings 6d. to 8d. per lb., and the other from 2s. to 3s. per lb. The former is grown in alternation with rice on the flats, the other in the upland valleys.

If we will persist in growing from the same seed year after year on these rich flats, there is no help for it, the leaf will get bigger, stronger, and coarser every year, until at last it becomes unsaleable.

At an early stage of my Australian experience, I used to insist that tobacco should not follow tobacco year after year on the same soil. I still hold to that opinion as a general rule; but I am bound to admit that there are exceptions in which better tobacco has been grown in the third and fourth years than in the first and second on the same land, but they are exceptions. The growers had waged successful war with the weeds, grubs, and caterpillars that infested the land when newly cleared, so that, as the land became cleaned and sweetened by constant tillage and care, it yielded better crops of better tobacco year after year. But, as a rule, it is far better to alternate the tobacco crop with a grain or fodder crop.

There is another matter which has worked against the tobacco industry—it is the want of an efficient organisation for the disposal of the crop when harvested and matured. Two brothers cultivated tobacco on the halves on a certain piece of ground. When the crop was fit for market it was evenly divided into two portions, one brother sent his share down to Sydney, and it was sold at 5d. per lb. The other sent his to the same firm a fortnight later with a letter, pointing out its excellent quality, and it was sold at 6½d.

The practice of sending small lots of tobacco to be sold at auction at the produce sales amongst pumpkins, maize, potatoes, hay, chaff, and onions, is altogether bad. It is not worth a manufacturer's while to keep a man to go round every day to look for and buy these little parcels, so the middleman or jobber comes in and makes a big profit for any small lots of good tobacco that come up for sale. We want some system by which we can ensure a fair price being obtained for every parcel of well-grown, well-cured, and well-assorted leaf sent to Sydney, so that careful growers might be encouraged to even greater care; but while it is a mere chance what price he gets, no man cares to bestow much labour in putting up his crop for market.

Another difficulty which we have to contend with is the uncertainty of the seasons. There have been times when it has been possible to

cure tobacco in the open air, without a shed of any sort, simply scaffolding it on poles in the field, and chancing the weather; but, of course, this is very risky.

A grower at the foot of the Toowoomba Range, Queensland, told me that he had harvested a crop by simply cutting it down and letting it lie on the ground till dry, turning it every two or three hours. When sufficiently dry, he carted it to the shed and stacked it; there it cured itself in a little over a fortnight. He said that the crop cost him £16 per ton and sold for £37. I only accept this with a grain of salt – it is *possible*, perhaps, but the chances are a thousand to one against.

The uncertainty of the seasons in New South Wales renders the proper curing of tobacco a matter of much difficulty. I have examined many hundreds of samples of tobacco grown in this Colony, and in the great majority of them I have found mildew on the stems or on the tips and margins of the leaves. In many of the samples the mildew was plainly apparent, in others only to be discovered by the aid of a magnifying glass or being subjected to moisture for a few hours. When mildew once becomes established it can never be entirely destroyed. Even after the most skilful treatment at very high temperatures it will reassert itself when it is placed in a moist atmosphere. The effect of this fungus is to destroy the natural aroma of the tobacco. In a favourable curing season it does not make its appearance, but if a few damp days intervene while the leaf is in a partially dried state it is very apt to be developed, sometimes very rapidly. If a week or two of such rains as we frequently experience should occur, nothing but fire can save the tobacco. It was because Mr. Holtz, of Glendon Brook, knew this, and provided against the contingency, that he could always sell his tobacco at the top price of the market. He built very ample sheds and provided abundance of suitable wood for fuel, and on the occurrence of rain lit a number of fires in each shed, and kept them constantly going as long as the damp weather continued.

The curing of tobacco by the natural air process occupies from five to nine weeks in ordinary seasons; but there is a process of drying by artifically heated air, by which it can be accomplished within a week. This process was employed, though with very imperfect and makeshift appliances, by Mr. Hungerford and Messrs. Rose, of Baerami, under my directions, with very fair results, last year, and is to be thoroughly tested this season at the experiment stations at Moombi and Nemingha. If it proves a success (as I have every reason to believe it will), mildew can be banished from New South Wales tobacco-sheds. One very important question to be proved is whether tobacco cured by this process will retain the texture that is wanted in cigar wrappers, and if not, whether any modification of the process will be possible to secure that texture.

The Department of Agriculture is making great efforts to assist the development of an export trade in tobacco. Not only is the new system of fire-curing to be thoroughly tested, but seed has been obtained of many choice varieties of tobacco, which are being acclimatised at the experiment farms which are being established in various parts of the Colony. Some of these new tobaccos promise very well, in spite of the dry season. It is very desirable that no tobacco-leaf shall be sent from this Colony to foreign markets, except the very best we can

produce. We cannot hope, or even wish, to compete in the supply of low-grade tobaccos against the cheap labour of other tobacco-producing countries, and, as we can grow high-class leaf, it would not be wisdom to grow the inferior grades.

I have already spoken of the want of an organisation for placing the crops of small growers on the Sydney market, so as to secure to the grower the fair market value of his leaf. In the development of an export trade the want of some system will be even more sharply felt, especially in its earlier stages. The capitalist who goes in for tobacco-growing on a large scale by hired labour may well be left to take care of his own interests; but in this Colony, at least for some years to come, tobacco will chiefly be grown in plots of ½ acre to 3 acres by farmers having families of boys, and to enable such to ship their crops, some organisation will be required, and this, I think, should be undertaken by the State. It is palpable that isolated shipments of a few bales of tobacco, sent by individual growers, would be at a great disadvantage on arriving at a new market, where it would be quite unknown. Small lots of unknown tobacco would not be worth the notice of any of the larger firms, and would only be taken up by a few of the smallest class of manufacturers, and by them only at very cheap prices. It will, therefore, be necessary to collect these small crops into a large shipment (of some thousands of bales, if possible) so as to challenge the attention of the largest firms of manufacturers.

There will be difficulties in the way, of course. Any plan which proposes to establish a new source of wealth, and does not present difficulties, would scarcely be worth considering. It has been in overcoming difficulties that the best features in the Australian character have been manifested.

About five years ago, in a conversation I had with Sir Thomas McIlwraith as to the best means of developing the tobacco industry in Queensland, I urged strongly the advantages that would accrue to the Colony if the tobacco trade was made into a State monopoly, on lines somewhat similar to the French Régie system. I pointed out that the trade was then drifting into what was, or would shortly become, practically a private monolopy—hostile alike to the interests of tobacco-growers and to tobacco consumers. That the American Tobacco Trust was using great endeavours to secure a monopoly of the Australian tobacco trade, and was on the high road to success in regard to one portion of it—namely, the cigarette business, which was large, and rapidly increasing. I pointed out that a monopoly, owned and controlled in the United States of America, could not be to the advantage of Australians, but served only to enrich Americans at our expense. Sir Thomas promised to consider the matter, but said the time was scarcely opportune.

Since then the American Tobacco Trust has virtually established a monopoly in cigarettes in all the Australian colonies, and, I am informed, is working to secure the control of the tobacco trade also.

I think that a modification of the French Régie system would be of great service in New South Wales at the present time.

Very briefly, the French Régie system is as follows:—It is enacted that the growth, manufacture, and merchandise of tobacco or any of its products shall be carried on solely for the benefit of the State.

The Régie owns all the factories, machinery, utensils employed in the industry, and also all the stocks of tobacco, whether manufactured or in the leaf, or in process of manufacture.

The director of the Régie at a fixed date in each year estimates the quantity of home-grown leaf which will be required for the supply of the factories in the year following, and he fixes the price to be paid for it in three classes—first quality, second quality, and third quality. The director decides which of the provinces of the empire shall be permitted to grow tobacco, and what proportion of the total quantity required shall be grown in each of the selected provinces. This decision is published by proclamation and advertisement. Farmers who are desirous of growing tobacco for the Régie make application to the officer appointed in each district, and the quantity allotted to the district is divided equally amongst the applicants, who must be *bonâ fide* cultivators of the soil, and be provided with the proper appliances for cultivating and curing the quantity of tobacco allotted to them. The largest area allowed to any one applicant is a little over 3 acres. Licenses to grow tobacco are issued to the successful applicants, who enter into bond and give security that all the tobacco grown shall, when harvested and cured, be delivered into the depôts of the Régie, which are established in each of the tobacco-growing districts, and to utterly destroy by fire, in the presence of an appointed officer, all damaged and unripe tobacco, and to uproot and destroy all growing plants which remain after the harvesting.

When the crop is harvested, cured, and properly classed into 1st, 2nd, and 3rd, it is to be delivered at the depôt, where it is received and examined by the officer appointed to that duty, who gives the cultivator a docket, stating the weight and classification of the tobacco received by him. The cultivator takes the docket to the office or treasury of the depôt, and there and then receives prompt cash payment for his leaf.

Cultivators who desire to grow tobacco for export, apply in the same way, but receive a different form of license, and enter into a different bond.

Under such a system there is no possibility of a glut in the market; no more leaf is permitted to be grown than is required. The price is fixed before the license is issued, so that the grower knows what he is likely to receive. The only chance is that in a good season he gets a heavier crop containing a larger proportion of first quality, and in a bad season a smaller crop containing a larger proportion of second and third quality. The careful cultivator has the advantage that he has always a larger proportion of first quality in his crop than the careless grower has, and he always gets the full value of what he delivers. The State factories having no competition to face, have no interest in paying second price for first quality.

In its relation to the consumer the State factory having no private interests to serve will have no inducement to accept or manufacture inferior or damaged leaf, and will, therefore, always turn out sound, good tobacco. At the same time, as tobacco manufacturing is a very profitable business, States which have adopted the Régie system have found it to yield a large and increasing revenue.

I think that some modification of this system would be very helpful in establishing this important industry on a satisfactory footing.

Timbers of the Colony.

By J. H. Maiden, F.L.S., Superintendent of Technical Education, &c.

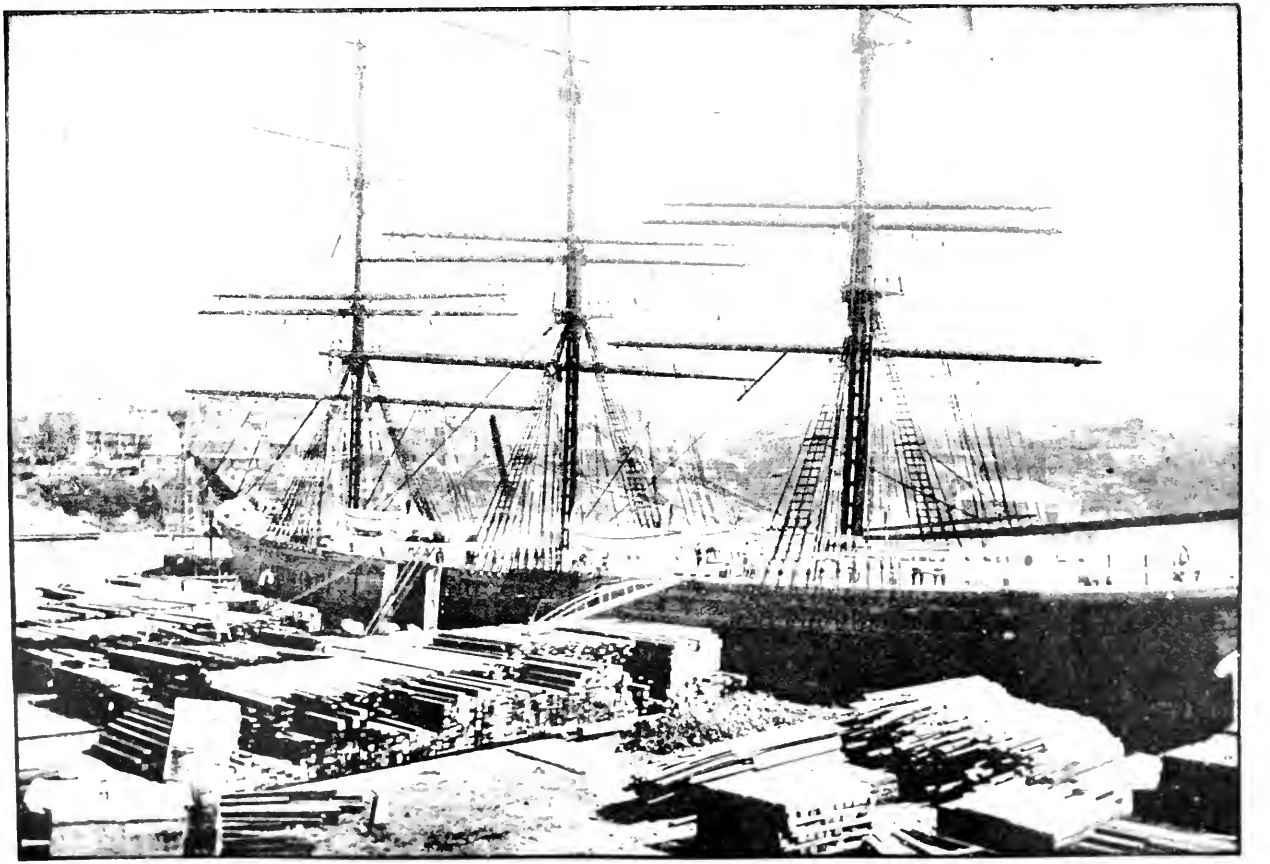
The Geographical Conditions of the Colony as regards the availableness of her Timber Supply.

Without entering into the much-debated question as to the extent of the relation of cause and effect between forests and rainfall, we may state that, roughly speaking, the rainfall of New South Wales gradually diminishes from the coast-line to her western boundary, while the altitude and denseness of the forest vegetation diminishes in a similar direction. The general forest conditions of the rich-soil gullies of the intervening mountains and elevated table-lands a good deal resemble those of the coast belt.

What is known as the Dividing Range forms a huge vertebral column, whose general direction is north and south, extending through nearly the whole length of the Colony. This range is roughly parallel to the coast, and at no great distance from it. As far as the commercial timbers of the Colony are concerned, it separates the territory into two divisions,—the first comprising the eastern slopes and the comparatively flat country thence to the sea, which yields the great bulk of our readily available forest wealth, while the country to the west produces timber available only for utilisation in the districts in which it is grown, partly because of its inferiority of size and value (with a few notable exceptions), and partly because of the cost of land-carriage to the coast. In considering the availableness of the western timbers, it must be borne in mind that none of our rivers, flowing east and west, are of any great length, because of the proximity to the sea of the Dividing Range already alluded to, and therefore the advantages of cheap water-carriage between the inland forest regions and the coast are not available.

Brush and open Forest.

The timber-trees of New South Wales are found, for the most part, in either what are called brushes or open forests. The brush perhaps corresponds to what in India would be called jungle, and consists of well-watered, rich-soil areas in the coast districts, which not only support rich arboreal vegetation, but also creepers and climbers of various kinds, and shrubby undergrowth. The tree-vegetation is of a



SHIP "HARVEST HOME," 1,944 TONS REGISTER, LOADING THE FIRST CARGO OF NEW SOUTH WALES TIMBERS FOR LONDON, SEPTEMBER, 1895.

most varied character, but rarely includes Eucalypts. In open forests, on the other hand, Eucalypts form the prevailing vegetation in the coast districts, and frequently attain a great size. As compared with brush forests the soil is less rich and moist. Of the open forest timbers (including she-oaks, cypress pine, &c.), we may say that we possess a fair knowledge; it is mainly in regard to the brush-timbers that our knowledge is defective. This results from a variety of causes. In brushes the variety of trees is very great, and they are less gregarious than those of the open forest. There is a good deal of uniformity in the barks of the trees,—a nearly smooth bark being of very common occurrence, while the trees are so close together, that their leafy tops intertwine, and it is impossible, in many cases, to get a fair idea of the shape and general appearance of a particular tree. Only those who have visited our dense northern brush forests can form an idea of the difficulty of distinguishing more than a few kinds of trees. The massive trees, wonderfully vertical, remind one of cathedral columns; craning the neck for an upward view in the dim forest light is inconvenient and even painful, and results in only general impressions, while if a gun be fired with the view of bringing down a twig for purposes of identification, the probability is that it cannot be stated, with certainty, from what particular tree the specimen has fallen. If one cuts through a tree, it very often happens that other trees prevent its falling down, and thus its leafy top is not available for examination.

Botanical Classification of Trees.

The principal forest vegetation of the Colony consists of trees belonging to the genus Eucalyptus. Those which have smooth (or comparatively smooth) trunks are known as gums, and this term is qualified by adjectives such as white, blue, and red. A white gum has a white trunk. A blue gum has a trunk or leaves (or both) with a bluish cast. A red gum has the *timber* red, and so on. Others have rough bark, thus those with a rugged, hard bark (accompanied by a timber of great hardness and durability) are known as ironbarks; those with a thick, fibrous bark (accompanied by a timber which is very fissile) are known as stringybarks. The common names for the various kinds of Eucalypts are very numerous, and they vary so much in different localities, and also for the same tree, that an accurate knowledge of them can only be acquired by much travel and study.

The natural allies of Eucalyptus are the other genera belonging to the Myrtaceæ, of which the principal are *Angophora* (apple-trees), *Syncarpia* (turpentine), *Tristania* (brush-box and water gum), *Melaleuca* (tea-trees), and *Eugenia* (myrtles).

The next genus to Eucalyptus in point of number of arboreal species is *Acacia*, which includes many trees generally known simply as wattles, or qualified by the prefix black, green, silver, golden, broad-leaved, weeping, &c. Other *Acacias* are known as hickory, blackwood, myall, boree, mulga, brigalow, dead finish, sally, gidgee, yarran, ironwood, and a host of other names. The *Acacias* rarely form forest trees of the largest size.

Amongst other natural orders yielding timber-trees are Pittosporeæ, Tiliaceæ (yielding blueberry ash, maiden's blush, &c.), Rutaceæ (yielding many of the soapwoods [*Evodia*], also *Geigera, Pentaceras,* &c.), Meliaceæ (yielding cedar, rosewood, &c.), Sapindaceæ (yielding *Cupanias, Nepheliums,* native tamarind, &c.), Leguminosæ (including *Acacia* and black bean), Saxifrageæ (including a number of plain, easy working, durable timbers, such as coachwood, marara, &c., belonging to the genera *Ceratopetalum, Weinmannia, Ackama, Eucryphia, &c.),* the Verbenaceæ (including the white beech, the mangrove, *Vitex, &c.*), the Proteaceæ (including a number of fissile timbers bearing a strong family likeness, such as silky oak, honeysuckle, &c.), the Monimaceæ or Sassafras family, the Euphorbiaceæ, (including some hard, dense timbers known as scrub ironbark [*Bridelia*], pencil cedar, water gum, &c., belonging to the genus *Phyllanthus,* and not to be confused with other timbers bearing the same vernacular names), Casuarinæ (including she-oaks in variety), Cupuliferæ (including a true beech, *Fagus Moorei,* a durable timber which would be much sought after if it were found growing in less inaccessible situations), the Santalaceæ (including the native cherry), the Coniferæ (including the cypress pine, Moreton Bay pine, and she or brown pine), and others. The number of plants, indigenous to New South Wales, which attain tree size, amounts to several hundreds, but many of them are not of economic importance.

Statistical.

I attach some particulars of the exports from, and imports of timber into, the Colony for 1894 (for which I am indebted to Mr. Coghlan, Government Statistician). It will appear that the value of the exports is about one-ninth that of the latter. We are a great timber-using Colony (although much of it is used for rough purposes), but we can form no reliable estimate of the value of the timber thus used for home consumption.

Export of Timbers from New South Wales during 1894.

Description.	Quantity.	Value.
		£
Dressed Timber	72,301 sup. ft.	532
Rough ,, ...	6,308,210 ,, ,,	26,556
Houses	3 No.	372
Laths	800 ,,	1
Palings	1,100 ,,	7
Posts, rails, and spars... ...	2,671 ,,	4,093
Doors	45 ,,	40
Sashes	198 ,,	109
Shooks and staves	4,713 pkgs.	2,226
Shingles	63,000 No.	41
Spars	1 ,,	4
Wooden blocks	7,890 ,,	49
Total	.....	34,030

Imports of Timber into New South Wales during 1894.

Description.	Quantity.	Value.
		£
Dressed timber	6,992,320 sup. ft.	41,420
Rough ,, ...	49,453,151 ,,	243,370
Laths	3,505,600 No. ...	1,998
Palings	56,231 ,, ..	464
Doors	12,855 ,, ...	5,540
Sashes	615 ,, ...	430
Shooks and staves ...	61,332 pkgs. ...	9,298
Shingles	830,500 No. ..	408
Shutters	3 ,, ..	3
Total	.....	302,931

During 1894 we exported 46,000 spokes and 9,600 felloes to Victoria and 31,500 spokes to South Australia. The exports of these articles to New Zealand approximately equal those to Victoria. "Felloes and spokes" are enumerated in the Customs statistics under the heading of "Carriage-makers' materials." Hubs and naves are included in the same classification, but no figures are available as to the imports and exports of those articles.

Following are some statistics *re* our saw-mills, &c., for the years 1892 to 1894:—

	No. of sawmills.	Hands employed.	Quantity of timber sawn, &c. (in thousands of super. feet, 1 inch thick.)	Plant or machinery.	
				Power (Horse).	Value.
					£
1892	288	4573	229,696	5262	274,575
1893	283	3266	196,114	4452	330,170
1894	299	3257	173,088	5101	292,790

We now proceed to a more particular examination of the various kinds of our timbers.

Hardwoods.

After ironbark, a convenient practical classification of our hardwoods is into "Pale hardwoods," "Red hardwoods" (both these comprising the commercial or best hardwoods of the Colony), and the inferior or doubtful hardwoods.

Ironbark stands alone as the embodiment of the combination of a number of qualities valued in a timber, viz., hardness, strength, and durability. It may be called the king of New South Wales timbers. It is extensively used in bridge-construction, for railway sleepers, for posts, for shafts, framing, &c., by the waggon and carriage builder; for large beams in buildings, particularly in stores for heavy goods—in a word, wherever great strength is required. For such purposes as railway sleepers it will last an indefinite period, and in many cases has only to be taken up, not because it shows signs of decay from exposure on the permanent way, or disintegration because of the vibration to

which it has been subjected, but because holes have been made in the sleeper by the renewal of bolts and spikes. Sleepers which have borne the heaviest traffic of the main line near Sydney for twenty-five years are now as sound as the day they were laid. While by no means a scarce timber, it is in such active local demand (particularly for railway purposes), that it would appear not to be desirable to actively stimulate an export trade in it.

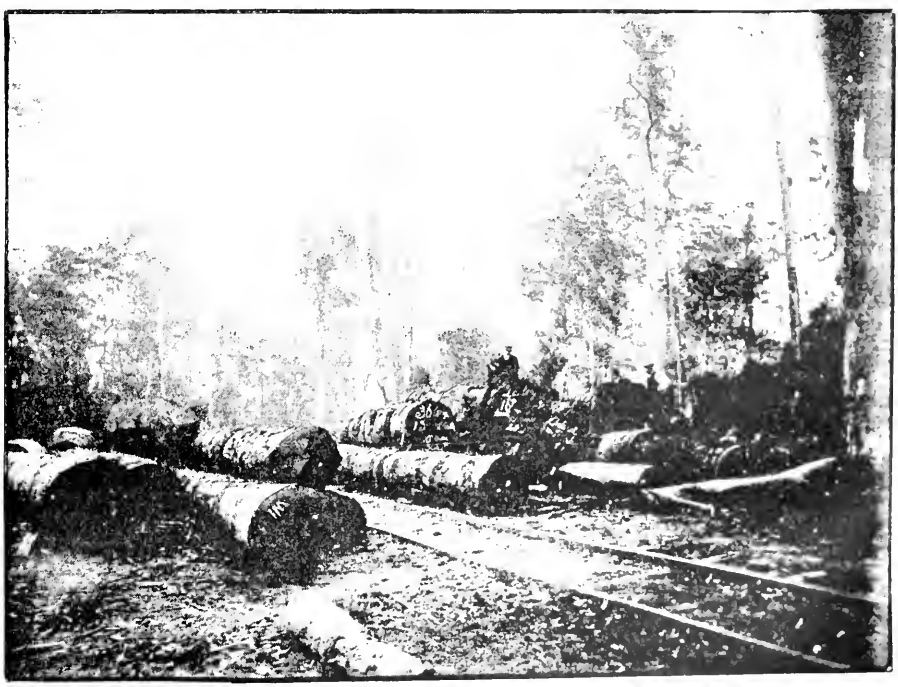
Pale Hardwoods.

Timbers of this character are to a certain extent under a cloud in Europe. The reason is that some of our inferior timbers—those which we in New South Wales would never use except for inferior or temporary purposes, and which are of a pale colour—have been exported under misleading names. The man who substitutes an inferior timber for a superior one specified, trusting to the ignorance of the purchaser or his inspector not to detect the substitution, is guilty of dishonesty, and I believe the ordinary machinery of the Courts is quite adequate to deal with conduct of this kind. But the best remedy lies in the spread of knowledge in regard to our timbers, and meantime, if a purchaser lacks the knowledge, he should employ a timber expert to inspect for him. A business man, as a rule, obtains expert opinion in regard to the quality of a line he is buying if necessary, and if this principle be applied to timbers, the death-stroke to substitution would be given. I would like to emphasise what I look upon as a great truth, that is, that one of the main reasons why colonial timbers are not more used is because users are nervous through ignorance. I have no intention of touching upon the fiscal question, but I will express the opinion that if it be desired to stimulate the use of our indigenous timbers, and conversely, to discourage the use of imported ones, the best plan will be the diffusion of knowledge concerning the trees in our forests. How many persons in this Colony, learned in Oregon, redwood, spruce, Baltic, and so on, could turn over a heap of sawn stuff from our mills, name the timbers, and then state the most approved uses for them? The present is not a suitable occasion for discussing the various ways by which a knowledge of our timbers may be diffused, but the question is connected with our national prosperity, and I should be lacking in my duty if I failed to emphasise the point on every occasion that presents itself.

One of our best pale hardwoods is the blackbutt (*E. pilularis*, Sm.), a thoroughly safe and well-tried timber, and one so valuable for wood-paving that if the municipal authorities of Europe and America knew its real worth, an active demand would spring up for it. We, in New South Wales, look upon this as a timber of the front rank for wood-paving, and we have not only had extensive experience of wood-paving, but also of the merits of our own timbers. Yet in Europe it is mistrusted because of its pale colour!

White mahogany (*E. acmenoides*, Schau.) is also a valuable timber, but comparatively few know of its merits, because it is often confused with other timbers, particularly stringybark, confusion which has resulted in the appraisement of the durability of stringybark at too high a figure.

FOREST OF YOUNG BLACK-BUTTS, MANNING RIVER, NEW SOUTH WALES.



TALLOW-WOOD LOGS, BROUGHT FROM FOREST TO WHARF ON WOODEN TRAIN-RAILS, MANNING RIVER, NEW SOUTH WALES.

The tallow-wood *(E. microcorys*, F.v.M.), which does not extend south of the Hawkesbury River, is a picturesque tree. The timber is so valuable (it is easily worked, is of good appearance, shrinks little, and is very durable), that the opinion is generally held by experts that, next to ironbark, it is our most valuable hardwood. When freshly sawn it is of a canary-yellow (rarely reddish) colour, but its most remarkable property is its greasy nature, which is turned to practical account in the laying of ball-room floors.

Spotted gum *(E. maculata*, Hook. f.), a tree with a smooth bark, with the outer layer peeling off in blotches, giving it a spotted appearance, is found both north and south of Sydney. It is a timber that has probably suffered both from unqualified praise, and from unreasoning prejudice. Its sap-wood is worthless, being more ready to decay than perhaps that of any other hardwood in New South Wales; its heartwood is perhaps below the average as regards brittleness. But, given mature spotted gum, with its sap and heart carefully removed, it is an admirable timber, in some respects unrivalled amongst colonial timbers. For toughness and elasticity it is simply unrivalled amongst our hardwoods, rendering it a formidable rival to American hickory for carriage-building. As regards its durability, we have indisputable evidence of its value in such trying situations as wood-pavements, tram-rails for logs from forest to mill, &c.

Grey box *(E. hemiphloia*, F.v.M.) is a tough, inlocked timber, really valuable for purposes where these properties are brought into play. For instance, it can be recommended with confidence to railway-carriage builders and others, who require a strong, durable timber for framing, &c. The pastoralist looks upon his tree with especial favour, as usually indicative of good grazing country.

Red Hardwoods.

Timbers of this class bear a good reputation for durability, consequently we sometimes hear a person say "send me only red hardwoods." The idea has arisen because some of our Red Hardwoods are amongst the most durable of our timbers, but it should not be forgotten that timbers at least as durable are to be found amongst our Pale Hardwoods. Consequently a purchaser who insists on a red timber, limits his choice, and shuts himself out from what experts consider to be the most durable of our timbers.

One of the best, and perhaps *the* best of our timbers belonging to the Red class, is the so-called red mahogany *(E. resinifera*, Sm.), a rough-barked, handsome tree mostly found in the northern forests. It resists destructive agencies of all kinds. It resembles the Western Australian jarrah a good deal, and, in my carefully-formed opinion, is quite as durable a timber. I have seen jarrah as well as red mahogany attacked by cobra, but the mature timber of both trees is excellent. Red mahogany has a rich, handsome colour, hence it is used for substantial furniture.

Grey gum (*E. propinqua*, Deane and Maiden) is a timber which resembles red ironbark a good deal, to which, however, it is inferior in strength. Its durability is, however, notorious, and for such purposes as posts, paving-blocks, &c., it can hardly be excelled. A drawback in

its liability to gum-veins, consequently large sizes are often defective. Gum-veins of moderate size do not affect the durability of a timber, and my advice to municipal authorities would be to encourage its use for paving-blocks, kerbing, &c. The authorities of some country and suburban municipalities, where suitable stone is not available, might be reminded that many of our hardwoods form cheap, durable, and neat kerbing. And in a township hardly anything is more important, both for æsthetic and sanitary reasons, than well-defined roads and paths. The grey gum is well known, amongst forest trees, by the dull grey appearance of its bark, with irregular white blotches.

The Murray red gum (*E. rostrata*, Schlecht.) is chiefly found on the flats, subject to inundation, adjacent to the rivers Murray, Edwards, and other rivers and creeks near the New South Wales-Victorian boundary. It is also found in the western districts, always either on the banks of a river, or on land subject to inundation. The great bulk of the Murray red gum forests are in New South Wales, and are largely worked for the purpose of supplying Victorian demand. In the southern colony it is used in enormous quantities for railway sleepers, wood blocks, and other situations, such as for posts, house blocks, &c., in which a very durable timber is necessary. A drawback to it is some tendency to shell off, which limits its uses for such purposes as flooring and decking.

Closely allied to the preceding is the Forest red gum (*E. tereticornis*, Sm.) which is found in open forests, and is not a riverside tree like the preceding. As might be expected from its wide geographical range, and the various soils in which it is found, it varies in quality, but in most parts of the Colony the mature timber is of a very durable character, and hence is used for posts in the ground, a severe test of the durability of any timber. It is a tree that is often gnarled, and shows unmistakable evidence on its trunk of the twisted, interlocked character of its timber. It is consequently difficult to season, but it is worth taking some pains over.

Both the Murray and Forest red gums are smooth-barked trees, with the thin outer layer of bark falling off in small ribbons.

The Sydney blue gum (*E. saligna*, Sm.) is, for the most part, a smooth-barked tree, but the lower part of the trunk has rough, fibrous bark for a height which varies in different districts and situations. It is usually found on the well-drained sides of hills, but a variety (known as Flooded gum) usually frequents the banks of streams, or land subject to inundation. In exceptional cases the two timbers grow intermingled. The flooded gum yields a timber usually inferior in quality to blue gum, and it must not be confused with the Murray red gum, of which the name flooded gum is a synonym. The blue gum of Tasmania and Victoria (*E. globulus*) is a pale-coloured timber, quite different in appearance to the Sydney blue gum, which is a red timber usually paler in colour than red mahogany or red gum. It is straight in the grain, comparatively easy to work, and therefore, for a hardwood, a favourite with carpenters. It is the timber most largely used in this Colony for felloes of wheels.

The Woollybutt (*E. longifolia*, Link. et Otto.), so called because of the fibrous, woolly texture of its bark, is a tree that attains its best development in the southern coast districts. It is not one of our best

timbers, being deficient in strength and elasticity; but it is a very durable timber, and its defects are no drawback to its use for such purposes as wood-paving.

Most people in the coast and coast mountain districts know a tree with a scaly bark, which is often stained with a blood-like exudation. This is the Bloodwood (*E. corymbosa*, Sm.). It is usually faulty, owing to the presence of gum-veins, but it has two important properties to recommend it. One is that it is one of the most durable timbers in the Colony, the other is that when the cut-end of a log is exposed to the ardent rays of the sun it does not open out like most colonial timbers. For posts, piles, timbers for culverts, wharfs, &c., it can be safely recommended, its gum veins, unless very large, merely offending the eye, and in no way affecting its durability. I am of opinion that the presence of this gum (kino) is actually a preservative of the wood.

Supplementing the timbers enumerated in these two great classes, I may mention that we have four Stringybarks, which, however, are of unequal quality, viz.:—*E. obliqua*, *capitellata*, *macrorrhyncha*, and *eugenioides*. The Yellow Box (*E. melliodora*) of the southern and western districts is a tough and durable timber, but never available in large sizes. The Red Box (*E. polyanthema*), which strongly resembles ironbark in appearance, strength, and durability, is one of the most valuable timbers the Colony produces, but it principally occurs on the western side of the Dividing Range.

Inferior Hardwoods.

In this class we include those hardwoods which are of either doubtful quality, or are inferior to those already enumerated.

White gums of various kinds (*E. paucifiora*, *E. hæmastoma*, *E. viminalis*), messmate (*E. amygdalina*), peppermint (*E. amygdalina* and *E. piperita*), mountain ash (*E. sieberiana*), swamp mahogany (*E. robusta*), bastard mahogany (*E. botryoides*), mountain gum (*E. goniocalyx*), apple (*E. stuartiana*), swamp gum (*E. gunnii*). Some of these are timbers of fair value, *e.g.*, mountain ash, swamp and bastard mahogany, and mountain gum.

Closely allied to the Eucalypts are various hardwood trees known as apple (*Angophora*), myrtles (*Eugenia*), water gums (*Tristania laurina* and *Rhodamnia*), tea-trees (*Melaleuca*), turpentine (*Syncarpia*), and brush box (*Tristania*).

Botanically they all belong to the Natural Order Myrtaceæ, and are confined to the coast and coast mountain districts. As a rule, these timbers are of inferior quality because of their liability to shrink and twist in seasoning, and of some tendency to dry rot, but I am of opinion that they have been neglected because of the ready availability of Eucalyptus timbers of high class. Two timbers, however, stand out as possessing conspicuous merit, namely the turpentine (*Syncarpia laurifolia*, Ten.) and the brush box (*Tristania conferta*, R.Br.).

Amongst the more immediate allies of the turpentine and brush box may be mentioned the tea-trees (*Melaleuca*), whose names have become synonymous with durability. As posts in the ground, as palings, as flooring-boards, as corduroy roads (saplings being of course used for this purpose), as piles in rivers for, say, small boat jetties, tea-tree, and

particularly prickly-leaved tea-tree (*M. stypheliodes*, Sm.) is not excelled in durability by any other timber we have, but its excessive hardness, and its great tendency to shrink irregularly are against it. The water gum (*Tristania laurina*, R.Br.) makes perhaps the best mauls of any timber we have, while for axe and tool handles it is unapproached save by spotted gum. The rough-barked species of apple (*Angophora*) yield useful timber for the naves of wheels, for bullock-yokes and for fuel.

The turpentine (*Syncarpia laurifolia*, Ten.) prefers the shaded gullies of our coast and mountain districts. It is one of the most umbrageous and handsome trees we have, and deserves conservation, and extensive planting for ornamental purposes. Its name suggests inflammability, but it is really one of our timbers most difficult to ignite, hence it is used for joists and pillars in buildings. With the bark on it is one of the best timbers (perhaps *the* best timber), we have to withstand the attacks of Cobra in sea-water. Between the fibrous bark and the sap-wood is a layer of oleo-resin (known as "turpentine" in the vernacular), and the immunity of this timber to destruction by various pests is attributed to this substance. Cobra is very much more active in brackish than in pure sea-water, and turpentine is not absolutely resistant to Cobra in brackish water. Of my own knowledge I do not know any timber that is—jarrah certainly is not, and I would much like to pit a pile of British Guiana greenheart (*Nectandra*) against one each of prickly tea-tree, turpentine, jarrah, and New Zealand totara at, say Kempsey, in this Colony.

The brush box (*Tristania conferta*, R. Br.) is another umbrageous tree,—one of the best we have for street planting in the coast districts from the Illawarra northwards. It yields a very durable timber, which is universally used in the north coast forests for tram-rails for haulage of the logs to the mill. It is not cut by the iron-wheels, while it becomes polished by the traction. It is one of the most perfectly durable timbers we have for wood-blocks. Like most of the timbers of its class, it warps and twists if cut at the wrong season, but I have seen inch boards of it exposed to the atmosphere without warping, and, in view of its pre-eminent merit as a resistant to wear and to attacks by fungus and insect pests, I feel that it is desirable that more attention should be given to the proper season for felling it. I look upon it as one of our timbers whose merits will be recognised in the near future.

Wood-paving.

This subject being of such great practical importance at the present time, both as regards our local demand and the export trade, I may mention the following timbers as of well ascertained suitability for the purpose.

Pale Hardwoods.—Blackbutt, tallow-wood, whitemahog any, spotted gum.

Red Hardwoods.—Red mahogany, grey gum, Murray red gum, forest red gum, Sydney blue gum, woollybutt, bloodwood.

In addition to the above, turpentine and brush-box are worthy of extended trial, particularly the latter, which is especially wear-resisting. For further information the reader is referred to the remarks under each timber.

Cedar and Rosewood.

We now leave the hardwoods, which term in practice is restricted to Eucalyptus and its allies, and which does not usually include the brush hardwoods, some of which rank amongst the hardest timbers of the Colony.

One of the most valuable timbers of this or any other country is the red cedar (*Cedrela australis*, F.v.M.), which resembles the mahogany of commerce a good deal, with the advantage of possessing only half its weight. It is a superb timber, easy to work, handsome in appearance, and durable. It has for many years been the principal furniture wood of the Colony, and it has been so much appreciated that it is now getting scarce. It is one of our few deciduous trees, and is found in the rich brushes from the Illawarra northward, though in marketable quantities only on the northern rivers. Closely resembling cedar, and a fair substitute for it is the onion wood (*Owenia cepiodora*, F.v.M.) found on the northern rivers. Botanically very closely related to these are the rosewood (*Dysoxylon Fraserianum*, Benth.), and the red bean (*D. Muelleri*, Benth.) The rosewood has a dainty rose odour, as its name denotes, while the red bean may be described as a scentless rosewood. The rosewood is very abundant; the red bean less so. Both are admirable furniture woods, and may be recommended for many purposes where a timber a little harder than a soft wood is required. They have a handsome red colour, with often a pleasing figure. The rosewood is particularly valuable as a resistant to white ants, a circumstance that citizens contemplating the building of a house would do well to bear in mind.

Pines.

We boast of two kinds of pines which, though not true pines (*Pinus*) belong, like them, to the cone-bearers (Coniferæ). One is the Colonial or Moreton Bay pine, and is confined to our well-watered, rich-soiled northern forests. Its botanical name is *Araucaria Cunninghamii*, Ait. It is an inferior pine compared with many of those that are imported, for it lacks durability, and is often a bad colour; but, on the principle, I suppose, of "A prophet is not," &c., our colonial pine does not always receive fair treatment. It should ever be borne in mind that the pine from the mountain side is so superior to the pine from the low coast lands as to be practically a different timber; and secondly, *seasoned* colonial pine is comparatively light in weight, of good colour, and works well. I have never had a desire to encourage the use of colonial timbers merely on sentimental grounds, but I can state that hundreds of times I have shown planks of colonial pine to citizens who have expressed surprise at its good quality. It has the recommendation of being cheap, and certainly its uses could be advantageously extended—but let it be seasoned.

Our other pine includes a number of species belonging to the genus *Callitris (Frenela)*, closely related to the North African tree which produces the sandarach of commerce. We call these pines cypress pines, and different ones red or black pine, Murray or white pine, Richmond River cypress pine, Port Macquarie pine, &c. The chief recommendation of these cypress pines is their power of resistance to white ants—an important recommendation in many parts of Australia

Cypress pine has a pleasant odour—camphoraceous, or reminding one of sandalwood. Many of the plants have a most gorgeous figure, almost too gorgeous, in fact, while others are so neat that they would not offend the most refined taste. The chief drawbacks to this timber are its brittleness and its inflammability. It chiefly occurs in the western parts of the Colony.

Beech and Beech substitutes.

It is an easy transition to pass from pine to white beech, which, like most colonial timbers, resembles very slightly its prototype. Its botanical name is *Gmelina leichhardtii*, F.v.M., and it belongs to the Verbenaceæ. It never was one of our most abundant timbers, and now it is getting scarce in readily accessible localities. It is pale-coloured, white with a tinge of brown. Its chief recommendation is that it shrinks so very slightly, hence it is used for verandah-floors. It is valued for house-fittings generally, ships' blocks, wine-vats, &c.

We have a number of timbers which are best known as colonial beech substitutes, and some of them are in some respects superior to beech. It will be sufficient to mention (1) Flindosa or Cudgerie *(Flindersia australis*, R. Br.*)* a large tree found in the brush forests of the northern districts, extending nearly as far south as the Hawkesbury; (2) Various kinds of Blue-berry ash, or Pigeon-berry ash, and belonging to the genus *Elæocarpus*. Most of them are distinguished by their blue fruits. They are found in the coast districts, and give a white-coloured timber of good appearance, bright looking, tough, and easy to work. Every collection of timbers shows others, possessing much in common with these timbers,—white woods, rather harder than soft-woods, and very generally useful. To what extent they can be utilised, and in what abundance they are, can only be decided as the forest trees become more familiar to the timber-getter and saw-miller. These remarks apply also to an enormous number of usually unfigured brush timbers of whose merits, and of whose relative abundance we are at present but imperfectly informed. In our luxuriant brush forests there are, I am fully convinced, very many kinds of trees hiding, as it were, their merits, and promising to reveal their true value only to the diligent inquirer. As there is hidden mineral wealth, so there is hidden, unrevealed timber wealth. I have already entered a plea for the fuller study of our timbers.

Black Bean, Myall, &c.

What we might call our colonial walnut, the black bean, or Moreton Bay chestnut (*Castanospermum australe*, A. Cunn.), may come next. It was greatly admired by its discoverer for its handsome, glossy foliage, and its umbrageous, symmetrical character. It produces its seeds in large cylindrical pods, which seeds or "beans" resemble in size those of the horse-chestnut of Europe. These seeds are tempting to horses, and being eaten by them have caused their deaths in large numbers from a form of indigestion. Consequently station-owners on the northern rivers have waged war against it, to the regret of the timber merchant, for it has been shown to be an excellent substitute for American walnut. It is somewhat capricious in

seasoning, but it is a really valuable timber, always admired by visiting timber experts, particularly those interested in the furniture trade.

Our Acacia timber may conveniently be divided into two classes — those dark-coloured and heavy, of which the brigalow and myall are examples; and those which are paler-coloured and more fissile, of which the black and green wattle and hickory may be cited as instances. Speaking generally, the former are interior species, while the latter are most developed in the coast and coast mountain districts.

Timbers of the former class are intensely hard, heavy, dark-coloured, and smell more or less of violets. They are used chiefly for turnery work. The trees attain no great size (say, 30 or 40 feet), with a trunk diameter of 12 to 18 inches. Considerable railway freights add to their cost, but not to a prohibitive extent, as these timbers are usually used for small articles,—such as presentation mallets, and the better class of turned work generally. True myall (*Acacia pendula*), brigalow (*A. harpophylla*), yarran (*A. homalophylla*) are the principal timbers of the above class. There are others, and the quantity available will satisfy any demand ever likely to be made upon them.

She-oak, Silky-Oak, &c.

The genus *Casuarina*, so called because its leafless wiry branches were thought to resemble the plumes of a cassowary, is known as oak or she-oak throughout the continent. Various species yield timber pale or dark, and varying a good deal in the oak-like blotchy markings, but there is a strong family likeness throughout. Different she-oaks are known as forest oak, black oak, swamp oak, river oak, bull oak, belar, and other names. They grow in the arid plains of the interior, amongst the rocky crags of the mountains, on the table-lands, by the banks of rivers, and in salt-water swamps, no genus of Australian timber-trees being more accommodating as to soil and situation. The timbers of some yield excellent bullock-yokes, others shingles, while most of them are excellent for turnery purposes. A limited quantity is exported to Europe for the purpose of making veneers for the backs of brushes and such like uses; also for panels for furniture.

We have still another oak,—a so-called silky oak (*Grevillea robusta*, R. Br.), a pale-coloured, ornamental timber of a very fissile nature. This property has led to its extensive use for such prosaic purposes as casks for tallow, and kegs for butter. For staves for wine-casks it requires to be strictly cut on the quarter to avoid leakage. It is used to some extent as a furniture wood. It is a very handsome tree, with beautiful fern-like foliage, and rich masses of orange-coloured blossoms, which have caused it to be a favourite in gardens, parks, avenues, &c., in the warmer parts of the coast districts. The red silky oak or beefwood (*Stenocarpus salignus*, R. Br.) yields a timber of a similar character, but much darker in colour. It is found in the coast districts from the Illawarra northwards. Even a cursory account of our timbers must take cognizance of the needlewood (*Hakea leucoptera*, R. Br.) a tree of the dry western parts of the Colony, and whose root-stock makes (so expert smokers tell me), a pipe cooler to smoke than even the briar. The making of needlewood pipes, which

has been left in the hands of bushmen for half a century, has now developed into a regular Sydney manufacture, the recognition of the value of needlewood being looked upon as of some importance, especially in view of the failing supply of briar-root.

The two silky oaks and the needlewood all belong to the Proteaceæ; to these I will add the honeysuckle (*Banksia*). These trees are present in the coast districts in countless millions, and prefer poor, rocky, or sandy soil, some of them being found on the sea coast. As a rule they are gnarled and picturesque, and have flowers called honeysuckles or bottle-brushes. Their timber is of an inferior character as a rule, its chief specific use being for boat-knees.

Tulip-wood.

The tulip-wood (*Harpullia pendula*, Planch.) is one of the handsomest of Australian woods. It is tough, close-grained, and marked with different shades from black to yellow, and is therefore much esteemed for cabinetwork. With selected pieces the effect may be described as gorgeous; it is also very durable. It resembles olive-wood somewhat in general appearance. It is found in our northern brush forests, and is moderately plentiful.

Root-stock for Veneers.

I would like to draw attention to a fact often lost sight of—namely, that the gnarled roots of trees often produce timber of great beauty. In fact, in clearing, the most beautiful timber is often left in the ground. The number of trees whose root-stocks produce ornamental timbers suitable for veneers, &c., is very large, and includes, amongst others many specimens of the ever-present Eucalypt. It is only in special instances that it will pay to utilise these root-stocks, but I would advise attention to the matter, as I am convinced that a market may be fostered for veneering woods.

Concluding Remarks.

In this little essay on New South Wales timbers it is obviously impossible to describe with any detail, or even enumerate, many of the miscellaneous timbers of our forests, and I have had to content myself with referring to the principal of them. I shall be satisfied if I have given some idea of the variety and value of the timber wealth to be found in our State forests, and I trust that the hands of the Forest Department may be strengthened in its efforts to conserve this valuable national heritage—the property of the whole of the Colony. By reasonable conservation we may have an abundant timber supply for our own use, while discharging the trust we hold for posterity in regard to our timber wealth. Meantime, I plead for a wider interest to be taken in our trees and our timbers, and that in place of the apathy which exists in the minds of so many worthy citizens in regard to them, it may be realised that study of them is not only full of interest, but, as a mental discipline alone, worthy of attention by the best intellects of the Colony.

Some Minor Vegetable Products.

By J. H. Maiden, F.L.S., Superintendent of Technical Education, &c.

Introductory.

The commercial depression of the last few years, which has caused so much distress in this Colony, as well as in other parts of the world, may prove to be, in some measure, a blessing in disguise. A hopeful sign has been the increased attention which dwellers in country districts have been giving to the products of the bush, and it is now more than ever realised that some of our less abundant vegetable products are worthy of collection, preparation, or cultivation for commercial purposes. In more prosperous times far less attention was paid to such, but I trust that the exploitation of these substances will henceforth form regular industries in the Colony, and be the means of rendering the existence of many a struggling selector, or other industrious citizen, more tolerable.

The principal difficulty is, of course, the finding of markets for our products, but the Government is giving all the aid possible in this direction, while many shrewd commercial men are taking the matter in hand. The products of new countries are always difficult to dispose of in the markets of the world, as manufacturers will only buy them when they are satisfied that they can receive adequate and continuous supplies; otherwise the routine of their operations is interfered with.

Merchants wishing to do business in the products of the bush, should bear in mind the circumstances of our country residents. The Colony itself is only a century old; the western interior has only been settled for about half that period. Our products of commercial value have in many cases found their way into the world's markets comparatively recently. The dwellers in the country districts have not, like Europeans and Asiatics, been in the habit of collecting these products for many generations, and thus information as to the best season for collection, the best method of collection, and also high technical skill, the result of long experience, perhaps handed down from father to son for many years, is in Australia frequently wanting. Many of our products are not collected unless they are asked for; the merchant if he chooses to make it known that he will buy a certain article at a certain price, will, as a rule, find business result, but if he expects that he may obtain some of our bush products in the same way that he would obtain tea, sugar, and such well recognised articles of commerce, he will be mistaken.

In some respects the merchant must look upon rural Australia as he would upon the lesser known parts of Africa; he will find that he has not only to buy, but also to take steps to show our country people how to collect and prepare an article for him to buy.

Take, for instance, the indigenous gum arabic of the western country. It remains on the trees until washed off by the rain, and the vast majority of our people have no idea that it is of any commercial value. If they did they could collect it at odd times, or the children of a family could collect it more systematically, and it could accumulate until sufficient had been obtained to trade to the local storekeeper, through whose intermediary it would find its way to the wholesale house in Sydney in the ordinary course of business. People in England and other parts of Europe have no idea of the bartering and miscellaneous trading relations which, from the very nature of things, take place between the country storekeeper and his isolated customers. The storekeeper is usually an educated or, at all events, a shrewd business man, with an intimate knowledge of his district, and, having obtained information (through advertisement or otherwise), that a certain product is in demand, we may readily imagine him saying to one of his selector-customers: "You see this article, Mr. X.; I have seen plenty of it on the trees at Dingdong Creek; I will give you so much a pound for all you can bring me." Business is often done in this way; the product is often not in the market until the demand for it has been communicated to the country districts.

I propose to deal with a few of our vegetable products which may be obtained in quantity,—some of them in the greatest abundance, and trust that some of the suggestions I make, and the advice I give, may either enable my readers to make money, or prevent them wasting it.

Eucalyptus Oil.

A good many people have the idea that Eucalyptus Oil is an article of approximately uniform composition, like water, but such an idea is a very erroneous one.

A Eucalyptus oil varies in composition primarily on account of the species of Eucalyptus (gum, tallow-wood, ironbark, peppermint, &c.), whose leaves have been distilled. To a less degree it depends upon the season of the year (whether young or mature foliage has been distilled), the locality whence the trees were obtained, and other circumstances.

The two principal constituents of Eucalyptus oils are cineol (eucalyptol), a colourless and transparent liquid, of specific gravity ·93, and boiling point 176°–177°C., and phellandrene, likewise a colourless and transparent liquid, boiling at 170°, a hydrocarbon, while cineol is an oxygenated product. Some oils contain both these substances in varying proportions; others contain one or other body almost or entirely to the exclusion of the other.

At the present time European buyers mainly buy oils containing cineol, rejecting those which contain a large percentage of phellandrene. We are in the position that some of our Eucalypts which yield oils most abundantly yield phellandrene oils; at the same time we do not possess information with any degree of fullness concerning the oils produced by 10 per cent. of our Eucalypts. New South Wales has the greatest number of species of Eucalypts of any colony of Australia (Queensland coming second, and Western Australia third in this respect), and it seems highly improbable to suppose that

we have not a number of species yielding cineol oils. As regards this question, we (as well as our sister colonies) lack two things, first, a botanical survey of the territory, from which would be at once seen the distribution of our various Eucalypts; and second, an exhaustive series of experiments to indicate the average composition of the oils produced by the various species of Eucalyptus. Until these two things are done, the Eucalyptus oil industry will never make the progress and assume the dimensions that I believe it is capable of doing in this Colony. Meantime the experiments are largely left to private enterprise, with the result that some firms turn out very creditable oils. The following species promise good results, and should receive careful, practical tests on a commercial scale:—Narrow-leaved iron-bark *(Eucalyptus crebra)*, grey box *(E. hemiphloia)*, tallowwood *(E. microcorys)*, Argyle apple *(E. pulverulenta)*, Murray red gum *(E. rostrata)*, and the various mallees near Balranald and in different parts of the Colony. Space forbids the matter being dealt with at greater length here, and I will only add that I will with pleasure give intending Eucalyptus oil distillers any further information or advice in my power.

Wattle-barks and Extracts.

That our tan-barks are both abundant and excellent is now recognised by everyone who has given attention to Australian vegetable products. They are the product of ornamental, usually yellow-flowering trees, botanically known as *Acacias*, or in Australia popularly as wattles. Hence wattle-bark, but in England the trade-name is usually Mimosa bark, our Acacias having been called Mimosas at the beginning of the century and later. Our richest wattle-barks contain from 25 to 40 per cent. of tannin. Most of the bark which comes into the Sydney market is the product of one or other of the forms of *Acacia decurrens*, popularly known as black or green wattle. We have other kinds of wattle yielding bark containing a fair percentage of tannin, which will best be utilised when extract-works are more abundant than they are at present.

We want a little more enterprise in this matter of extract-making. Extracts for tanning are thoroughly well known in the trade, are made in enormous quantities in America and Europe, and in small quantities in, at least, three Australian colonies. The advantages of an extract are mainly two,—uniformity of product and saving of carriage. What is the sense of conveying, perhaps thousands of miles, large and varying percentages of unnecessary ligneous matter? The potentialities of wattle-bark extracts are enormous, and what are the difficulties? Surely to the practical man, determined to surmount them, by no means insuperable. The raw-material (including small and refuse pieces of bark, twigs, &c., which are wasted at the present time), can be digested in wooden vats, the heat of the sun being permitted to assist in the evaporation in some places and some seasons. The wood of the stripped trees, and the exhausted "trash" are available for fuel, while the evaporation can be pushed as far as expedient in vacuum pans which, owing to the vicissitudes of the sugar-industry, can now be obtained at a low rate. The key to the difficulty of getting rid of the superfluous gum in extracts lies, in my opinion, in

the judicious use of alcohol, which can be recondensed and largely saved. Arrangements might be made, if necessary, for constituting each extract works a bond, and using duty-free spirit.

I feel so strongly on the subject of tanning extracts that, if I were not precluded from entering into business, the making of extracts on a large scale is one of the first things I should turn my attention to. I say this in perfect sincerity.

Wattle and other Gums.

Wattle-gum is the produce of various species of wattle (*Acacia*), a genus which is very largely developed in this continent, comprising over 320 species, besides a large number of well-marked varieties. Gum has, however, only been recorded from comparatively few species, as by far the great majority have no local names, and where it has been collected at all it has been simply known as "Wattle-gum." Best selected turkey gum arabic is the ideal gum of the group to which wattle gum belongs, and if judging were to be by points, it would take the highest place as regards absence of colour, freedom from accidental impurities, ready solubility, and adhesiveness of mucilage. Our wattle-gums as a rule fall far behind this high standard, although specimens of yarran, myall, and prickly wattle (*Acacia sentis*) gum compare with it very favourably. As far as my observations go, those samples obtained from the interior (comparable in its aridity to the Soudan and other gum-producing countries), are completely soluble in water, and make good mucilages, while those obtained east of the Dividing Range, *i.e.*, in well-watered districts, in which vegetation is comparatively luxuriant, are more or less insoluble, portions at least merely swelling up in water like cherry gum.

Australian wattle-gum (chiefly, however, from the other colonies), frequently finds its way into the London market, and may often be seen noted in the drug sales. Following are a few extracts from recent London market reports (auction sales), none of them, however, referring to the best wattle-gum :—

"Of 71 bags Australian only 7 bags sold at 32s. 6d. per cwt. for fine frosted palish." (April, 1895).

"Of Australian gums a considerable quantity (239 packages), including some nice lots, was offered, but only 8 packages ordinary to common glassy red sold at 21s. 6d to 23s. per cwt." (June, 1895.)

"The market was rather quiet for most varieties, several lots being held above current value. The only kind which sold with really good competition at full price was Australian gum, which appears to be wanted for Russia. The following is the result of the auctions :— 'Australian, of 295 packages, 180 sold at 31s. to 33s. for bold, partly woody mixed red ; 27s. 6d. for frosted reddish ; 26s. 6d. to 27s. for ordinary quality red ; and 20s. for siftings.'" (October, 1895.)

"Good, bright glassy to fine bold frosted Australian sold at 27s. to 33s. per cwt." (November, 1895.)

I would, therefore, earnestly recommend dwellers in the drier parts of the country, where there are wattles, to look after the gum, and carefully collect it. I would also include such trees as the leopard tree (*Flindersia maculosa*), which yields a gum arabic of excellent quality.

If a man were to set out with the deliberate intention of collecting wattle-gum, what with its capricious exudation, and the uncertainty of an odd shower washing it from the trees, he might find his undertaking unprofitable; but in this, as in the collection of other of our minor bush products, children and others should be apprised of the value of these gums, and whenever an opportunity presents itself of collecting them it should not be lost. If a permanent resident of a district be on the lookout for such a product, depend upon it, not much will be lost in the course of a year. If kept dry and clean it does not deteriorate on keeping, and it can be accumulated until a convenient opportunity of disposing of it presents itself. In spite of the various gum substitutes, there will always be a demand for wattle-gum, particularly for the finer sorts.

Grass-tree Gum.

This "gum," or, to speak more correctly, "resin," is obtained in large quantities from the stems and around the roots of the so-called "grass-trees," whose botanical name is *Xanthorrhœa*. We have several species, which vary a good deal in height; they are usually indicative of poor soil. One species yields a yellow gum,—the others a gum of a red colour. It is the yellow kind that is the more highly prized. The demand for it fluctuates. The monthly circular of one of our best Sydney firms quotes the value this month (December, 1895) at from £11 to £20 per ton.

This article has been used in the making of an inferior French polish, as an ingredient in waxes, fumigating pastilles, &c., and its use as an explosive has been patented. I do not doubt that additional uses will be found for grass-tree gum, and that the demand for it will be more steady than it has been of late years.

In gum-collecting the articles required are an axe, a flail, a coarse sieve, and a sheet. The stems of the grass-trees are chopped down, broken up into convenient pieces, and allowed to fall into the sheet. A stout stick or flail completes the work of disintegration. The substance is then passed through the sieve, the ligneous portions of the grass-tree for the most part failing to pass through its meshes. A gentle breeze is considered sufficient to winnow what has passed through the sieve, and render it ready for the market, though it often comes to Sydney without having been subjected to any winnowing process. Comparatively large pieces of grass-tree gum are also often found near the roots of grass-trees, or where grass-trees once stood, having been melted and caused to flow into the ground by the bush fires.

Grass-trees are very abundant in Australia, and a considerable quantity of the "gum" would be available with any reasonable inducement, sufficient for the men to earn a few shillings a day collecting it.

Australian Sandarach.

The clear resin of our cypress pines (*Callitris* or *Frenela*) is a perfect substitute for the sandarach of commerce, used in varnish-making and for other purposes. What the actual demand for this resin

is is not thoroughly ascertained, and inquiries are being made at the present time concerning it. Meantime, residents in the pine districts are recommended to collect the better qualities whenever they can conveniently do so.

Astringent Gums or Kinos.

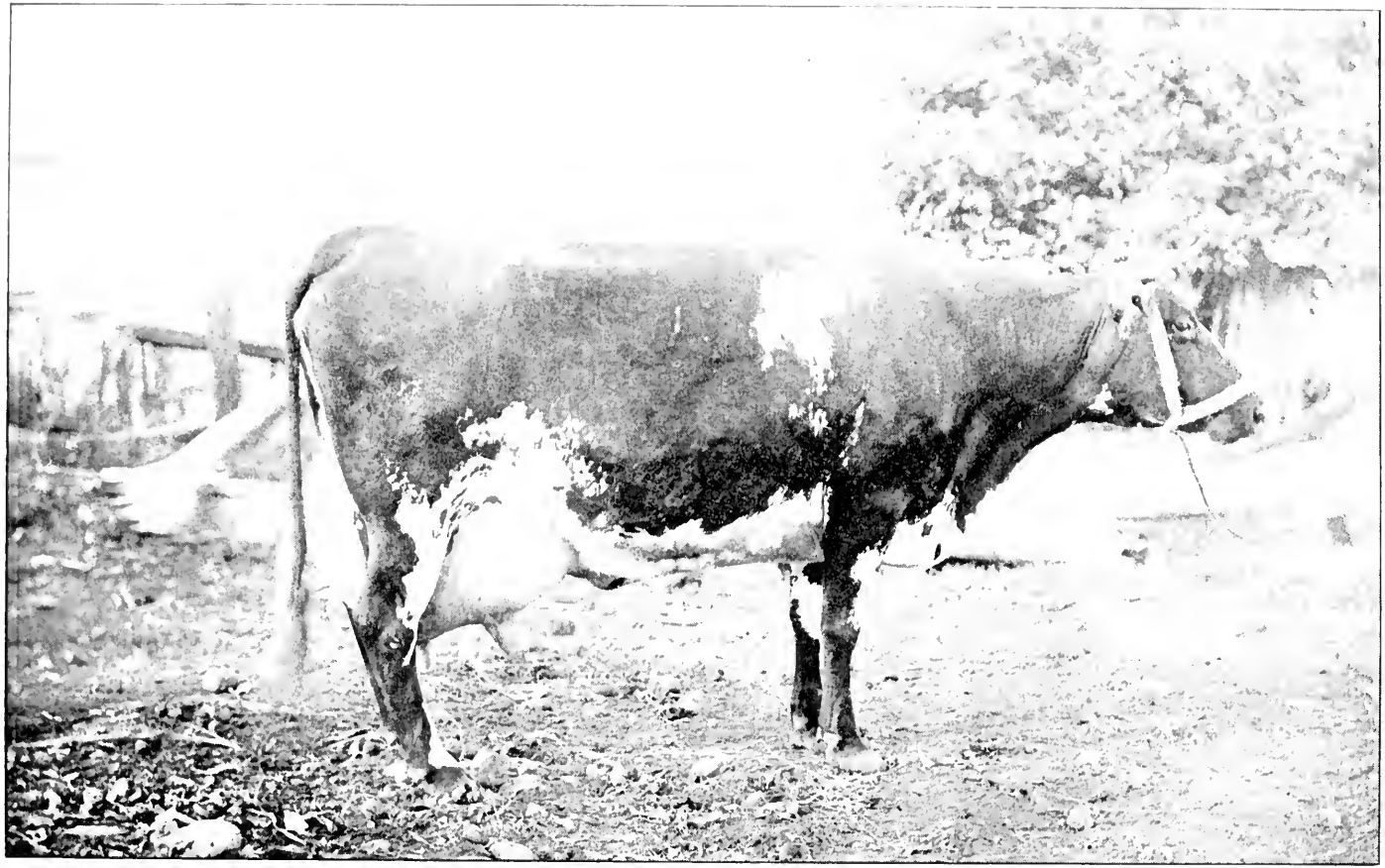
These are natural astringent extracts which some of our gum-trees in certain seasons and certain districts exude very freely. They vary somewhat in composition, and therefore it is necessary that the products of different kinds of trees should be kept separate, to be afterwards classified by experts. I believe that if tanners could obtain these gums (Kinos) in quantity at a cheap rate they would replace some of the extracts at present in use. Although the demand for the officinal kino as an astringent medicine is far less than what it used to be, I am of opinion that some of our kinos can replace the kino of the Pharmacopœia, and the introduction of kinos of known composition, and comparatively low in price, might result in an increased demand for astringent medicines of this class. The only kino in regular Australian demand at present is that of the Murray red gum (*Eucalyptus rostrata*), and we have several species of Eucalyptus yielding exudations of similar composition, but our local market might be readily over supplied.

Miscellaneous.

Some Australian vegetable products are in demand for research work, or for the medicinal principles they contain, in this and other countries. The leaves of the corkwood (*Duboisia myoporoides*) and the bark of the bitter-tree (*Alstonia constricta*), may be quoted as examples. Seeds and fruits of Australian plants, or the plants themselves, noted either for the beauty or peculiarity of their flowers, leaves, &c., and pressed specimens of our rarer plants are often merchantable commodities. From time to time I have known quite a number of men who have supplemented their incomes by miscellaneous collecting of this kind, which, of course, can only be undertaken by those who have studied the plants of their district. By correspondence, advertisement, and various means, the collector discovers the demand for the articles he is able to supply. So much depends on the individual collector that it is quite impossible to speak even approximately as to the remuneration to be expected from this source.

Grading.

In conclusion, a few words on grading may not be out of place. This is an important matter, but one too often lost sight of. In a mixed parcel of any product, the value tends to that of the most inferior portion of it. The sorting of a product and division into various qualities always pays, as the buyer can readily see what is offered to him. In wattle-gum, for instance, separate the large, pale-coloured pieces from the dark-coloured ones, and these again from the fragments and those admixed with accidental impurities. The extra labour involved is more than repaid by the extra price a well-graded product realises.



"HONEYCOMB," THE CHAMPION DAIRY COW OF THE WORLD.

Bred by Jno. Lindsay, Esq., J.P., Kemble Park, Unanderra, New South Wales.

The Dairying Industry.

By A. A. Dunnicliff, Department of Agriculture.

In dealing with the dairying industry of New South Wales, from our earliest times to the present day, it is my intention to confine my remarks strictly to the methods practised in this colony, avoiding comparisons with systems in vogue elsewhere, and endeavour to give such a *resumé* of its conditions and opportunities as may be helpful in a general way to those who may feel disposed to adopt this industry as their occupation in New South Wales. Beyond this, I would say to those who require more detailed or specific information on any of the points here lightly touched upon, that by referring to the Department of Agriculture their requirements may be promptly met.

In a British community milk, butter, and cheese are indispensable articles of diet, and from the early times of the colony to the present the production of these necessaries has been an honourable and fairly profitable occupation; sometimes very much so.

Our first record of note concerning the industry is that of the late W. C. Wentworth, who, in writing about Sydney in 1820, said the market was very well supplied with grain, vegetables, poultry, butter, eggs, and fruit. In Lang's "New South Wales" (1834) we learn that large quantities of dairy produce were sent regularly to Sydney from the rich districts of the Hunter River, Camden, and Bathurst. He also states that large quantities of both butter and cheese were manufactured on farms throughout the colony, and prices then were not very different from those of to-day, being for fresh butter 1s. per lb.; cheese, 4d. to 6d. per lb.; bacon, 5d. per lb., &c.

As early as 1832 we find New South Wales doing an export trade in butter and cheese to the extent of £5,279, nearly the whole of which went to the other British colonies. During the same year her imports of these products were only £872.

Bathurst was then noted for the superior quality of its cheese, which was largely sought for by the Sydney provision merchants. The industry appears to have been initiated by Mr. Geo. Ranken, of that district, who brought his practical knowledge from Ayrshire, Scotland. The first estate said to have been devoted specially to the manufacture of butter was Glenlee, on the banks of the Cowpasture River, owned by Wm. Howe, about this same time. The products of this estate were recognised throughout the colony as being very superior, and for fully thirty years maintained their reputation. The dairy stock consisted of a fine herd of Ayrshire cattle. During the next twenty years the industry had located itself in the rich districts of Illawarra, from Bulli to Shoalhaven, then called the Garden of Australia, and extended to Ulladulla, Moruya, and Bega in the far

south. In fact it had possession of the whole South Coast. Distinct dairy herds were formed by such shrewd progressive gentlemen as Alex. Berry, of Shoalhaven (who was exporting butter in quantity to California in 1849); Henry Osborne, of Marshall Mount, A. McGill, De Mestre, and others; and thousands of acres of the richest lands were specially devoted to dairying, The discovery of gold, and the consequent large influx of population, enabled farmers of all classes to obtain remunerative returns for their labours, and the writer has very frequently, during the fifties, both bought and sold fresh butter at 2s. 6d. to 3s. 6d. per lb. wholesale. Sometimes extravagant rents were paid for lands in favoured localities, even as high as 50s., 55s., and 60s. per acre were not unknown. Consequently the increased dairy production was such that, notwithstanding the rapidy increasing population, the supply during the summer months exceeded the local demand, and prices receded to perhaps 6d. per lb. The surplus was then exported to the other colonies, chiefly Victoria, and was 79,990 lb. in 1855, valued at £6,636. There does not appear to be any authentic records showing the actual quantities of the dairy products of the colony at this time, but from data which may be taken as reliable, I estimate the output of butter for 1855 at 1,300 tons, the greater part of which was from Illawarra, or the strip of coast country between Bulli and Shoalhaven.

One matter which tended greatly to the extension of the industry was the system of "clearing leases," which found much favour in Illawarra at this time. By it, any respectable family with an aptitude for, or knowledge of, dairying, could obtain virgin lands on lease from landed proprietors to convert into dairy farms. The intending settler or lessor, who was generally a new arrival in the country, took a lease for seven or ten years of, say, 20 or 50 or perhaps 100 acres of rich, well-timbered bush or forest land, undertaking to clear and grass the same, to erect such fences, yards, buildings, &c., as he might need to work the place. He would usually have the place rent free for the first half or more of the term, and pay to the lessee probably 10s. per acre during the latter part. Conditions, of course, varied with individual cases, and at the expiration of that lease the lessor generally stayed on the land as tenant at £1 or more per acre per annum. Under this system many hundreds of acres of heavy brush lands were brought into profitable work without the outlay of a single penny by their owners, and many poor but industrious families that went on those lands with almost nothing, soon found themselves in very independent positions. Upon the advent of "Free selection" under the Land Act of 1861, many of the best men of the coast districts, who held either clearing leases or rented farms, now felt the landowners' demands upon them to be too heavy, and determined to make a move to obtain lands for themselves. They spread out north, west, and south, taking with them their herds, and the industry which had proved so profitable to them. By these means some of them obtained what are now princely estates.

From this time until the advent of the factory system of dairying, a quarter of a century later, the industry struggled along with varying vicissitudes, through seasons of prosperity and of adversity, times of luxuriance and abundance, and spells of drought, when the pastures

were burnt up, and the cattle perished by thousands throughout the country. If remunerative prices were obtainable the local market was almost sure to be immediately glutted by imports from colonies which had previously been purchasers from us.

I should here mention that during this period the late Mr. Seccombe of Ulladulla carried on the manufacture of condensed milk, for about twenty years, or from 1858 until his death. The article always found a ready sale in Sydney, successfully competing with European makers. A company was also formed in Kiama, and a factory well equipped for the same purpose; but, as the quality of the output was variable, the establishment was subsequently closed.

The initiation of the system of separating cream from milk by machinery was due to the importation in 1883 of two Danish cream-separators by the Fresh Food and Ice Co., a most progressive company formed by the late T. S. Mort, for the purpose, primarily, of supplying pure new milk and other foods to the citizens of Sydney. This company, always on the alert to take advantage of any advance in science or practice applicable to their business, immediately recognised the immense advantage to be derived from the then newly invented machine. Two separators were obtained from Europe, as already said, and placed at their milk depôt at Mittagong, where the surplus milk, not required for sale in Sydney, was then separated; the cream being made into butter of extra quality, and the skimmed milk utilised for fattening pigs for hams and bacon.

Mr. Pateson, the company's manager, freely gave the dairymen every information and assistance; and laboured hard personally, by lectures and otherwise, to induce them to take up the new and better system of work. Shortly afterwards, when a co-operative company was formed at Kiama, and a butter factory erected (1884), he further encouraged them by taking the whole of their output at an advance of 3d. per lb. over the top market price in Sydney for best hand-made butter. The soundness and success of the system being thus demonstrated at the "Pioneer" factory, as well as at Mittagong, many of the best dairymen furnished themselves with separators, and the farmers in various dairying centres formed themselves into co-operative companies for the erection and mechanical equipment of butter factories, to which all the shareholders might take their milk.

The farmers very speedily recognised the great advantage of the factory system of manufacture; the great diminution of labour in the absence of milk setting, cream skimming, churning, with the endless washings and scourings of utensils, &c., &c. The females in particular were relieved from much work, whilst the men had some hours per day more, which could be devoted to the improvement of their lands, fences and buildings, or production of more fodder, and consequent handling of more cows. Besides these benefits there was the supreme one of more actual monetary returns from the same quantities of milk, as a larger quantity of butter of much superior quality was obtained therefrom. Factory butter or separator butter also realised a higher price than the best hand-made brands under the old system, and of course formed the standard of values.

By the end of 1885 there were about fifty separators running in the Colony. There were also other results from the introduction of the

factory system, which were very evident. Large numbers of farmers who were deeply involved with the banks and storekeepers, or were struggling with a hand-to-mouth existence, were soon enabled to reduce or clear their liabilities, and obtain for themselves and families very comfortable positions; whilst the general condition of all engaged in the industry was materially improved. Again this system also allowed other districts which had hitherto been purchasers of quantities of butter in Sydney to join in and secure for themselves the benefits of the industry.

Farmers who had long endeavoured to grow grain and hay at unremunerative prices, and whose crops were mortgaged as soon as they appeared above ground, who dreaded more than the drawing of a tooth to meet the storekeeper or banker if they went into the local town, by converting their arable fields into pastures and consuming their crops as fodder to milking cows on the farm, producing all the milk they could for their local butter factory, soon found they could take their families into town in well-appointed buggies, and the aforesaid formerly-dreaded individuals would be pleased to raise their hats and smilingly greet them. Formerly the farmer saw or handled but little money, and then only once a year, when the crops of grain, hay, or wool were sold; but now he had the cash for his milk every month, and larger returns than he had received before. Besides the prosperity of the farmer, the community was benefited in a multitude of ways, and whole districts were changed materially and socially. Without any extraneous aid this industry has developed solely by private energy and enterprise during the eleven years since the erection of the old "Pioneer" factory; and co-operative factories, also proprietary factories, both of companies and individual dairymen, have spread over the whole length and breadth of the coast districts and tablelands.

The present number of butter factories and creameries (January, 1896) is approximately 400, with many more in course of erection. Besides these, there are numerous other establishments not having steam power, and therefore not designated "factories," but having either horse or hand power cream-separators. The total number of separators at work in the colony now reaches about 1,500.

The factory system has proved equally successful when applied to the manufacture of cheese, and we have about 80 factories where cheese is made, either alone, or in conjunction with butter or bacon.

The official records of the year ending 31st March, 1895, give the colony's production of butter and cheese to have been

	Factory.	Dairy.	Total.
Butter	17,507,646 lb.	9,792,049 lb.	27,359,695 lb.
Cheese	1,656,703 ,,	3,164,709 ,,	4,820,412 ,,

and during the same period 4,590,606 lb. of butter were exported to the United Kingdom.

The number of persons employed, more or less, in this industry, in factories and farms, is, approximately, 26,800. The present number of milking cows may be set down at 450,000, and the total dairy stock of the colony is estimated to exceed 1,000,000.

Present and future Conditions of Work.

As I have previously intimated, the introduction of the factory system of dairying has caused a radical change in the methods of work on the farms. Formerly nearly all the internal labour of the dairy fell to the lot of the female members of the household. There was the setting of the milk in pans twice daily, the skimming of the cream, the churning, making and packing of butter, with the daily washing, scouring, and scalding of numbers of utensils; and sometimes the feeding of pigs and calves with skimmed milk, fetching the cows from pasture, and always a full share in the milking. These labours beyond their domestic duties were frequently anything but light, and a woman's life on a dairy farm was not as enviable as many thought it to be. Now she is not troubled beyond the care of her home, except to assist perhaps with the milking; for the milk as soon as it comes in from the cows is in the care of the man, who at once after aerating it puts it through the cream-separator, if he has one, or puts it into large cans, and takes it to the local factory, where a record is taken of the quantity and quality of his delivery. The cans are cleaned and scalded before leaving the factory. A partial load of skimmed milk is usually taken back for the farm animals. This cartage of milk to and from the factory may be done by a stout lad, who also feeds the animals. In an adjoining Colony I have seen young women take the milk to the factory; the young men there vieing with each other who should render her most help.

Some other advantages of the rearrangement of labour in the dairy farms I have already detailed; but beyond those there is one which stands out not less prominent. I allude to the healthful spirit of co-operation which has been developed, and its successful application to this industry, whereby many thousands of pounds have been put into the pockets of our producers instead of going into those of speculators or monopolists. And there is no doubt that by the system of co-operation in vogue amongst us, the dairy farmers of this colony have received higher prices for their products and better returns for their labours than those elsewhere.

Co-operative factories owned and controlled by the dairy farmers themselves have been, not merely in favour, but almost the only ones obtaining footing in New South Wales until just recently. In any locality where the farmers could supply the milk of say a minimum of 600 or 700 cows, they could combine into a company to erect and equip a butter factory, or even a less number for cheese. Each farmer would take up shares proportionate to the number of his milking cows. Sometimes it was necessary to accept extraneous help to get the thing started, but these investors' shares were not viewed with favour by the farmers, and were always paid off at the earliest opportunity. The farmers usually selected five of themselves for directors. These appointed the manager, engineer, and butter maker, or whatever labour was required in the factory, and supervised the whole business. The products were sold on behalf of the company, and the proceeds were divided proportionately amongst the milk suppliers, after deducting all expenses of manufacture, &c. These factories, with few exceptions, very successfully served the purposes for which they were

formed; their output found a ready sale with the retail trade, leaving generally, as surplus production, what were known as "dairy" or hand-made butters.

The demonstrated fallacy of hoping to establish a profitable and permanent export trade with anything but a really high class product, the keen competition among European and other countries for the British market, with the demand for a higher and more uniform standard of quality, and the rapid development of scientific knowledge and practice as applied to dairying, have shown the need for and caused the erection of a series of larger factories, equipped with the very best and latest improved machinery and appliances, with refrigeration for controlling temperatures during manufacture, or for cool, storage as required. These factories have each several outposts or creameries attached to them, and located in centres of farms beyond the reach of the central factory. These creameries gather each some hundreds, or even thousands, of gallons of milk daily, from which the cream is separated and conveyed to the factory. All of these creams are then there blended together, ripened, and churned daily; thus the whole output of the district is of one superior and uniform quality, produced at a minimum of cost, instead of, perhaps, a dozen different brands, colours, and qualities, as previously.

The former factories are now confining themselves to the simple work of creameries—gathering milks and separating cream therefrom.

There are large numbers of small creameries and private separators, the cream from which cannot be sent to a local factory.

Meeting this difficulty, we have a number of proprietary factories in Sydney, equipped in the latest and most approved style, to which these said creams may be sent. Prominent amongst them may be mentioned Messrs. Denham Bros., Messrs. Foley Bros., and the South Coast and West Camden Co-operative Company. They each have numerous constituents, who send their creams regularly, some indeed long distances, say 200 miles by rail and over 400 miles by steamer. These firms are noted butter makers, and do all the receiving, handling, chilling, churning, and making, and return the cream cans thoroughly cleaned for a very nominal charge, and the privilege of selling the butter when made. This arrangement appears to be found mutually advantageous. On very liberal and slightly differing lines is managed the butter factory of the J. Ireland Company of Newcastle. This unites in an admirable manner the best points of a proprietary concern, with the advantages to the producer of co-operative principles. Whilst they do everything on similar lines to the last-mentioned, they have also initiated a system of export, in which the interests of the firm and the farmers are combined, frequently resulting at the close of the season in a substantial dividend being added to the satisfactory payments already made to the latter. This firm also receives cream from long distances by rail and boat, as producers are eager to avail themselves of the benefits offered by this enterprising firm.

Yet another form of co-operation may be mentioned, one distinctly in advance of previous efforts, and one whereby the mutual interests of tenant and landlord, or producer and capitalist, are both blended and conserved.

The Berry Estate, one of the noblest properties in the country, consisting of between eighty and ninety thousand acres, was formed by the late Alexr. Berry in 1822, at the southern end of Illawarra, locating his homestead at the foot of Coolangatta Mount, near the mouth of the Shoalhaven River. The work has been largely pastoral, with a considerable portion devoted to agriculture and dairying. It has been a hive of progressive industry from the first, giving employment to all kinds of workmen; and the administration under Mr. Berry and his two succeeding brothers has always been kind and liberal, almost paternal. In 1839 the estate carried a resident population of 3,500 persons. Besides the multitude of men employed on the estate, there have always been numbers of tenants who were on the "halves" system, by which respectable families with nothing of their own, but their ability and willingness to work, were entrusted by the Messrs. Berry with good farms, stock, implements, &c., on an equal division of the yearly results; the worker and the capitalist thus taking equal shares in the success or failure in the joint enterprise. Many of these families have in time been enabled from their savings to take up good estates for themselves elsewhere. On the death of Mr. David Berry, a few years ago, the estate came into the hands of Dr. Jno. Hay, who has within the last three years spent £135,000 in improving the estate, and providing homes for 150 more families.

Of late much of the cultivated lands have been put into pasture for dairying, and all such farms are now held under a definite rent. The district has always been one highly esteemed by dairymen, and until this year has supported twelve independent dairy factories, either on or adjoining this estate, and working up yearly the cream of over 6,000,000 gallons of milk from 12,800 cows.

Recognising the necessity before pointed out for high class butter being made in larger quantities, and so obtaining more uniformity of quality, Dr. Hay erected at his own cost last winter one of the best and most complete butter factories in the country. One of the churns turns out over half a ton of butter at once; and the capacity of the present establishment is about 10 tons per day. Although, owing to the severe drought of the present season, the daily output is but little over 4 tons. The whole of the twelve butter factories just referred to were invited to come in and support this central factory, sending their creams to be manufactured into one uniform and standard article, instead of having twelve different brands of butter, of varying qualities. With one exception, they have all recognised the economic advantages of this system. The business is supposed to run almost entirely in the interests of the producers, and justly so; but the indirect benefit to the estate in the increased prosperity and contentment of the tenants, will no doubt prove an appreciable factor.

Another large dairying estate of perhaps 30,000 acres in the far south of the colony is worked on different lines again. Here the proprietor has erected a most complete and efficient establishment for all kinds of dairy-work, recognised as one of the best in the colony. Besides several large herds of milch cows worked by the employees of the estate, there are many others worked by dairy families on agreement, thus: The manager, on being satisfied of the respectability and

industry of any family which may be recommended to him, will admit them to a farm and homestead with every necessary convenience, &c., and a herd of cows, with any further and reasonable help to stimulate the production of milk. The area of land and the number of cows may be as large as the applicant is capable of managing; and in return the farmer agrees to deliver *the whole* of his milk at the factory or depôt near by at a proportionate and fixed price. Many families have thus raised themselves from nothing to comparative affluence on this estate.

The foregoing is one form of the proprietary factory in contradistinction to the usual co-operation. There are others where a factory, being placed in a farming district by an investing company, the milk is *bought* from the farmers supplying at a price fixed by the company and the profits arising from manufacture, advancing markets, or exportation, are retained by the company. The benefits of this system are not recognised by those producers who have enjoyed successful co-operation.

One of the greatest difficulties connected with the dairying industry is the question of milking; paid servants seldom have the same kindliness and care with the milch cows as the members of the family owning them. Many a man having to depend on paid help has had to abandon the occupation, and until the advent of an efficient milking machine, which is always coming but never here, the same difficulty will remain. It is the custom of some large dairymen to let out their milking to families by contract, payment being made at a stated sum per year, the owner seeing that the number of cows milking is kept up. Others again contract to pay so much per gallon for all milk obtained from the cattle, in which case it is usual for the family, during the milking, also to do certain work on the farm, for the purpose of increasing the milk production, such as cleaning and fencing in of pasture lands, the cultivation of fodder crops, soiling or hand-feeding of the milch cattle, &c., &c.

Cleared lands, let for the purposes of this industry in the older and more favoured portions of the Colony, may be estimated to realise an average of 30s. per acre as yearly rent; while some obtain much more, and others a trifle less. Their values are largely dependent on their access to a factory or creamery, proximity to a market, or social benefits. But further afield in all the settled districts there are thousands of acres equally suitable in themselves as regards soil and climate, and having other advantages, which may be rented at merely a proportion of the above, or obtained on reasonable and profitable terms. Then again our land laws now allow almost any man who desires it to obtain an area of good land on such nominal payments as have never been known in this liberal land before. Many of these areas are clothed with such rich and luxuriant pasture that nature offers a premium in immediate returns to those who will accept her gifts and use them. And how little our settlers do, either from ignorance or apathy, to preserve and improve their pastures, either natural or artificial; or still less supplement them, by growing fodder for winter use. This is particularly noticeable with those men who have taken refuge in dairying to escape from ill success in other branches of agriculture.

To provide an ample supply of rich succulent pasture or fodder is so necessary that it may be esteemed the basis of the industry. To this end the grazing lands should be fenced off into paddocks of convenient size, so that one enclosure after being eaten off, may be shut up and allowed to recover whilst others in turn are being eaten. Pastures, whether natural or artifical, will give much better returns by being thus systematically grazed than by indiscriminate use. Moreover, neither sheep nor horses should ever be allowed to graze with dairy cows; they may follow them, if necessary. If the pastures are bare after the cows have eaten them off, and it be not deemed advisable to renew them by breaking up, a top dressing of fine manure and a few pounds of grass seed and clovers, lightly harrowed in, will prove beneficial and remunerative. To such an extent do some of our most intelligent and industrious dairymen try to save their pastures, that they have green fodder crops growing and in cut for their milch cattle all the year round, except just in the great flush of grass in the spring; at any rate, for fully nine months in the year. By this means it is no uncommon thing for a farm to be carrying a milking cow to the acre, with the dry cows and young growing stock upon another "run." For this method of work a favourite fodder is green maize, which is sown *broadcast*, and at such a time in the spring as will allow of cutting and feeding to the cows to commence in the early summer when it should be cobbing. This plant sustains a good flow of milk, rich in butter fat, and successive crops should be sown to keep up the supply. During the summer may be sown "imphee" or "planters' friend," to be cut alternately with the maize crops, or after, as it will stand a little later towards the winter. It also yields well of good rich milk. For autumn or winter months wheat, barley, rye, or oats, each mixed with vetches, or alone as preferred, will be found very useful; and if supplemented with grass and clover, or oaten hay, sound ensilage, or other good foods, they will not only keep the cows in profit, but wonderfully lessen the tax on the pastures until the spring returns.

Another matter of vital importance to the dairyman is the quality of his dairy stock. I have already shown how early in the colony's history this principle was recognised, and the efforts made to establish herds of true dairy cattle. Illawarra has always been famous for its milking herds, and no doubt the best representatives of the colony are to be found there; but it has been acknowledged by the local agricultural societies that the majority of the dairymen's herds are not all that could be desired, and that the first half-century of their existence, with its many trying seasons of drought and vicissitudes of owners had not brought them to that high excellence which was anticipated years ago. In the hope of making the herds more profitable to the average dairymen, the agricultural societies of Kiama and Berry districts have their own Dairy Herd-books, the qualification for registration therein being based on *actual production*, the minimum for which is 3½ lb. butter, or 100 lb. milk in 48 hours. Hand-feeding or milk-feeding is not allowed. So successful have these efforts been that improvement is distinctly noticeable in the dairy stock competing at the local annual shows, whilst the test trials for registration show an advancing average.

Some of the Herd-book entries refer to animals worthy, in point of profit, to be inscribed on any Dairy Roll in the world; and the progeny of such stock are sought for by dairymen in all parts of the colonies. Space will not permit me to speak on the breeding of these cattle; but, in the "thirtys," Alex. Berry imported for this purpose several high-class bulls from England, both Durhams and Ayrshires, also Holsteins. At the same time Mr. Howe, of Glenlee, was dairying with a fine herd of Ayrshires, and many noted importations have been made covering the intervening years. The basis of the Illawarra breed is, undoubtedly, the milking strain of Shorthorns, crossed according to the exigencies or judgment of the dairymen, chiefly with the Ayrshire, sometimes Holsteins, and latterly with the Jerseys. Some of the best herds, however, claim to be still pure Shorthorns. There is no doubt that the higher type of the Illawarra cow of to-day is admirably adapted to local conditions, and a decidedly profitable cow for Australian dairymen.

We give a portrait of "Honeycomb," a typical beast of this breed, bred by the late John Lindsey, of Kembla Park. Her test record is 84½ lb. of milk per day, yielding 4 lb. 4 oz. of butter, or 29 lb. 12 oz. per week. With such a profitable strain of cattle we felt no surprise on receiving a letter this morning from a dairyman supplying a factory, which said: "My herd is worth from £18 to £12 each annually, according to the price of butter."

Want of space precludes me going into the matters of the rearing of calves, pigs, and poultry, which are inseparably attached to our dairy-farms. I may briefly say, however, that the skim-milk is generally utilised with other products in the rearing of pigs for bacon or the butcher; and it is considered by many farmers that on an average these pigs pay the annual rent. The poultry and eggs, similarly produced, are regarded by thrifty housewives as equal to providing for the sustenance or clothing of the family.

Possibilities and Means of Extension.

The great expansion which has taken place in the dairying industry of the Colony of late is strikingly illustrated by the fact that notwithstanding the severe drought which has existed here for months, whereby some thousands of cattle are reported to have died, and many factories, both large and small, have had to close for months for want of milk, the output for the whole Colony both of butter and cheese for 1895, as far as may be judged by returns up to the present, appears to have been as large, if not larger, than for 1894. Not only have the local demands been well supplied, but the imports of New South Wales butter in the United Kingdom between 1st January and 21st December, 1895, were 30 per cent. more than during the same period of 1894, and exceeded twice that of 1893. It is, therefore, just to suppose that had we been favoured with an average fine season all through, the output for the past year would have been surprisingly large. The dairy export trade of this Colony has grown hitherto but slowly, but from the large areas of lands and thousands of cattle that are now just entering the industry, there cannot be the slightest doubt but that in the immediate future it will be one of our most important sources of income, and may expand indefinitely and rapidly.

We hear the question frequently asked, "Is there not a probability of the thing being overdone in these colonies?" and grave doubts are expressed as to the wisdom of further extension, lest prices will become unremunerative. I see by the report of the Colonial Consignment and Distributing Company, Limited (London), dated 27th December, 1895, that the United Kingdom imported during 1895, 137,840 tons of butter, of which the Australian Colonies and New Zealand together sent 15,250 tons, or about 11 per cent. only; whilst of cheese the imports within the same period were 104,855 tons, of which Australia and New Zealand contributed 4,665 tons, or near 4½ per cent. only. We see no reason why we should not secure a much larger share of this trade; in fact, we intend to do so. Our present competitors, Denmark, Sweden, France, Holland, United States, Canada, Russia, Germany, and Belgium have advantages over us in much quicker transit, with very low freights, and cheap skilled and careful labour. But we have equally good or better opportunities on other lines. Whilst they have to house and feed their cattle on hay and other expensive foods for six months in the year, we have usually such genial climatic conditions that abundance of rich succulent fodders may be grown at all seasons, and throughout the year the cows are never taken off their pastures.

Besides those now in work, thousands of acres of rich lands are available, at very low rates, to be brought into the industry, and we can remuneratively produce at prices much lower if need be, than have been hitherto obtainable. The greatest factor, however, in our favour is that of our seasons being the opposite to theirs, the time of our greatest and easiest production, is the time of their scarcity, with increased costs and values. Still, it is not wise to be too optimistic, and whilst we are confident that a large and remunerative trade may be done by us, we must not overlook the indications of increased efforts on the part of the aforesaid countries to retain their markets; and also that we are likely to have a dangerous rival in Argentina with her great economic advantages, to be followed by Cape Colony with cheap lands, black labour, and only half our distance from market.

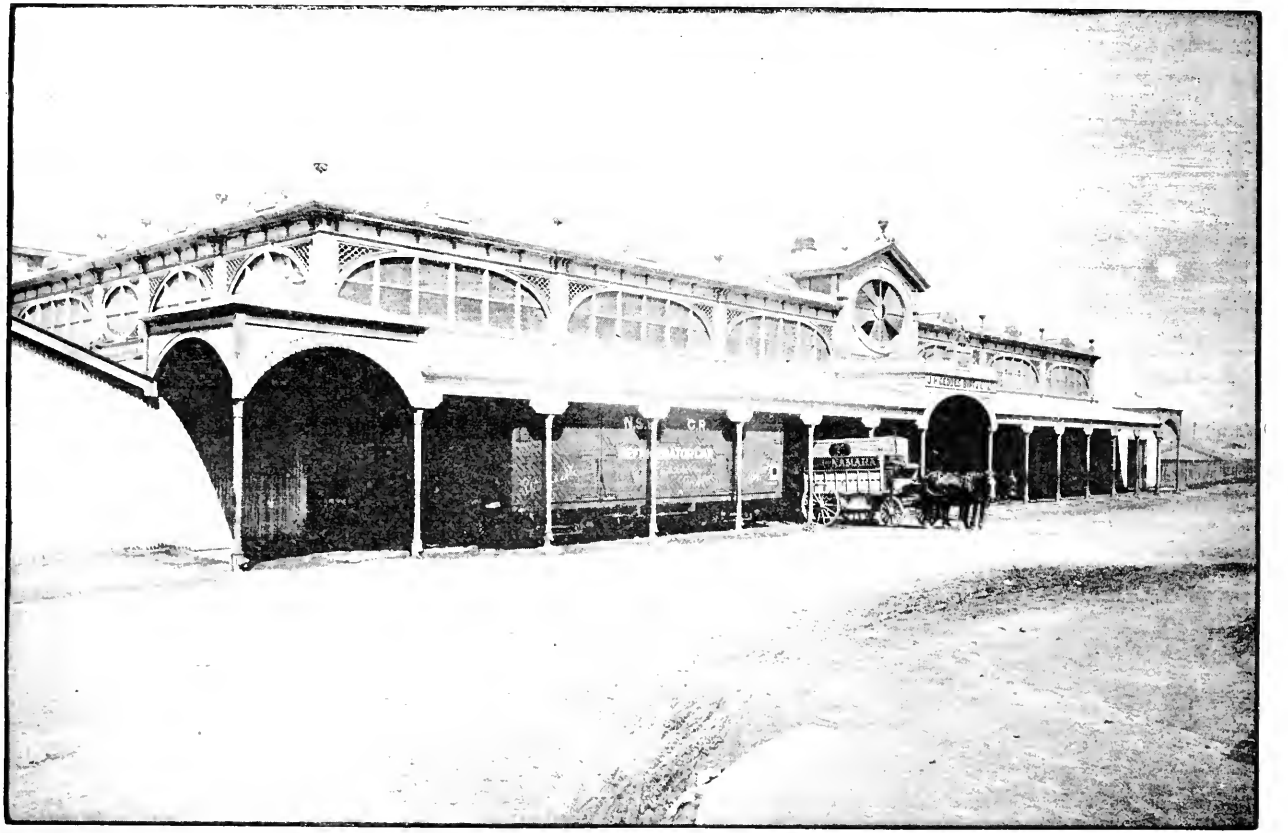
Keen competition and increased production mean receding prices, and, notwithstanding the favourable position in which our dairymen stand, by reason of their natural advantages, it is well to look and decide how lower prices may be met without reducing the net returns to the producer. Year by year we have improvements in the mechanical appliances of the industry, in its working methods, and the extension of co-operation on broader lines; but beyond these we require more scientific and technical knowledge amongst our butter and cheese makers and factory managers, and it is necessary that all such should undergo a special course of instruction to qualify them for such positions. The old days of "rule of thumb" work are over, and these men, like officers in a great army, must be scientifically trained if they would be of equal skill with their opponents. At the Hawkesbury Agricultural College such a course of dairy instruction is given, both scientific and practical, and it is gratifying to record that students, having passed through this course, are now holding responsible positions in connection with dairy manufactures. Respecting our dairy farmers, it should be said there are large numbers who thoroughly

understand their business—none better—whose methods of work are most economical and profitable; but, then again, we have large numbers in this colony, as elsewhere, who having but recently taken to the industry, have little real knowledge of anything connected with it, and who, consequently, are doing much unremunerative work. These men require to be visited by travelling instructors to fully advise them in pastures, fodders, improved and economic farm methods, with other allied subjects, for the purpose of cheapening the production of an ample and regular supply of clean rich milk.

The Government might take a more extended oversight of the industry than is given by the present Dairies Supervision Act, and take cognisance, not only of the farm and dairy buildings and cattle, but also of the suitability and condition of dairy machinery, and the qualifications of dairy managers. Also the compulsory registration of export brands, and the penalising of misrepresentation on the exterior of a package. There are some who advocate the official grading of butter before exportation, which I am assured by exporters and large salesmen in England to be of no value whatever at the port of arrival, as the article may not be landed in the same condition in which it was shipped, and when put on the market it is always sold on present merits.

The simple method of registering export brands would throw the responsibility of quality on the shipper, who would strive to maintain the reputation of his brand. A minor benefit I can see in grading is that a number of our present butter-makers, whose goods, through our faulty system of selling, obtain top price, would soon learn that their makes were not really of first quality, and would have to mend their ways or give place to better men.

The Government has expressed its intention of assisting the industry by means of increased facilities for transit to place of manufacture or port of shipment, providing cool storage if necessary, and in various other ways. For this purpose, it has already appointed a Board of Advice, which is intended to work in various ways in the interests of producers and exporters.



NEW SOUTH WALES GOVERNMENT MEAT-MARKET, DARLING HARBOUR, SYDNEY.

Lessees:—Geddes, Birt, & Co., Limited.

Meat Export Trade

By Cuthbert Fetherstonhaugh.

Improved methods of distribution have once and for all exploded the Malthusian theory, which for a term took such a hold of the public mind, and instead of the population of the world outpacing food production, we find every year food becoming cheaper and more easily procured. Without running the risk, therefore, of being considered altogether Utopian one may picture to oneself a time when, on account of increased facilities of distribution, there will be no starving men and women on the face of the earth.

Meat Export a New Departure.

The export of meat from New South Wales is almost a new departure, and was forced upon graziers in 1891, when, after three exceptional good seasons, they found all local avenues for the disposal of their surplus stock closed. It was plainly seen that in some shape or other, whether frozen, chilled, canned, or as tallow, surplus stock would have to be got rid of by exporting it out of the colony. There were nearly 62,000,000 sheep, and the country was at that time very much overstocked. The surplus consisted for the most part of animals not fit for export as dressed mutton, so that the "pots" were called into requisition, and the old wasteful, but prompt, method of boiling down for tallow was resorted to. Millions of sheep were thus disposed of, and together with numbers of good sheep, a great clearance was made of old and inferior stock, leaving more room also for sheep to be fattened.

On all sides we hear it said that the meat export trade of Australia is capable of almost unlimited expansion, and the writer has at all times freely expressed the opinion that an immense future lies before that trade. On no industry is Australia so dependent as the pastoral, and in its turn that industry is dependent on the successful disposal of its surplus stock. Until, therefore, a satisfactory minimum value has been established for that surplus, the great pastoral industry must continue in a depressed condition, and in sympathy the whole Colony must needs suffer.

The present depression, intensified, it is true, by the uncertain state of the labour market, which deters capital from being invested, is chiefly due to the enormous fall in the value of pastoral products. There is, however, now a decided advance in our staple commodity, wool, an advance which there is good reason to believe has come to stay. If, therefore, by judicious action, the disposal of surplus stock can be placed on better lines, we may reasonably look for a very marked revival in our greatest industry, and a consequent improvement all along the line.

Surplus Available for Export.

The number of lambs annually weaned from 56,000,000 sheep should be, as near as possible, 12,000,000. The annual decrease from mortality, &c., on 56,000,000 is estimated at about 3,000,000. We have, therefore, an annual surplus of some 9,000,000 sheep to dispose of, if the flocks of the Colony are to be kept at an even number. Of this 9,000,000, some 4,000,000 are consumed locally, including those sent to Tasmania and Victoria, leaving, say 5,000,000, for export as frozen and canned meat, extract, and tallow. To this we must add imports from Queensland, which will vary from half a million to a million, according to the seasons. If the seasons were regular, and there were no droughts, there would therefore be about 5,500,000 sheep for export; but during the last twenty-one years the losses from adverse seasons amount to over 33,000,000 head, or an average of over 1,500,000 sheep a year. We cannot, therefore, count on more than 3,000,000 to 4,000,000 sheep as being available for export. Some years there may be as many as 6,000,000, some years only 1,000,000. If sheep-breeders take up cross-breeding to any extent there will be a large available surplus, as numbers of cross-breds go away as lambs, while all mature from a year to eighteen months earlier than do merinos. If there are 4,000,000 sheep available for export, not more than half of that number can be expected to go away as frozen mutton, the balance will leave the country canned, or as extract and tallow. There ought not to be much difficulty in disposing of 2,000,000 frozen sheep annually from New South Wales, and this is as much as we can count on exporting in the present state of the development of the Colony.

Cattle.

The cattle and beef export trade of New South Wales is very small as compared with that of sheep. As a matter of fact we have no surplus of our own for export. Everything above our own wants comes from Queensland, and until the present year the export of frozen beef has been nominal. If beef recovers in value at home it is more than probable that there will be in future a considerable trade with England in frozen beef, as sheep have done so badly in some parts of the Colony of late years that a little encouragement would without doubt induce graziers to substitute cattle for sheep in those parts. The number of cattle in New South Wales on the 1st of January, 1895, was about 2,455,500. The yearly increase may be estimated at 400,000 and the net imports from Queensland 100,000, while the average loss from adverse seasons may be put at 80,000 a year. The relative position of the principal beef-exporting countries can be seen from the following table in which 700 lb. has been assumed as the average weight per beast :—

Frozen Beef Exports.

Year.	Queensland.	New South Wales and Victoria.	New Zealand.	Plate.	United States.	Other Countries.	Total.
1889 ...	3,500	.....	11,000	.....	.....	185,500	200,000
1891 ...	6,000	100	15,300	2,000	175,370	77,230	276,000
1893 ...	30,000	3,700	2,460	5,600	211,000	7,900	260,000
1894 ...	41,000	270	370	700	250,000	7,660	300,000
1895 ...	46,000	1,800	2,140	3,600	236,000	10,460	300,000

Frozen Meat.

The export of frozen meat was initiated as far back as 1880, but the demand for sheep to stock new country caused the trade to be neglected, and New Zealand growers took up the running with such good-will that from an experimental cargo in 1881, landed in splendid order after much difficulty, the trade has expanded into the enormous dimensions of over 2,409,000 sheep in 1895. In 1891 New South Wales sheep-owners were forced to take action, and some hundred tons of frozen meat were sent to London. The trade grew to 365,000 carcases in 1893 to 534,000 in 1894, but 1895 has seen a great development in the trade, and over a million carcases of frozen mutton have been exported. The shrinkage from drought and from the late very severe winter will, without doubt, largely curtail the export of meat from New South Wales for the next few years. Should any considerable shipments be made the local market must advance rapidly, with the result of at once curtailing any more shipments. Since 1883, which was shortly after the first large shipment of frozen meat from New Zealand, there has been a heavy fall in England in the value of all meat, but the fall in value of frozen meat has been very much more pronounced than that in home grown. In 1884 the value of prime home-grown mutton was 7¾d. a lb. In 1887 it fell to a little over 6d., recovered again in 1889 to 8¼d., and fell again to 7d., at about which average value it has stood for the last five years.

New Zealand mutton has fallen from an average of 6d. in 1884 to an average of 4⅛d. in 1893. The average for 1895 will be much lower. Australian mutton was worth 5½d. in 1884, and it also has steadily fallen in value till now the average price is under 3d. It will be seen, therefore, that while there was only 1d. a lb. decline in value of best English mutton from 1884 to 1893, New Zealand declined in the same time nearly 2d., and Australian, 2½d. a lb. We need not look behind the scenes for an occult reason for this difference in the relative decline. The cause is without doubt to be found primarily in the increased supplies of New Zealand and Australian meat; but the irregular and spasmodic manner in which frozen meat has been put on the market has also very much to do with it. In this connection it must be borne in mind that the period at which frozen meat was first introduced was one of exceptionally high prices, and meat had been quoted higher than for forty years previously. The apparently low prices that have ruled since may be only a return to previous normal conditions; but it must also be remembered that owing to a variety of causes the value for all products have been at a lower level than ordinary during the last few years.

Frozen meat has in no way affected the value of best home-grown mutton; the two commodities never come into competition. They run, in fact, on parallel lines. The price of either is not influenced by the relative value of the other, but by the supply on hand of each particular meat. For instance, in 1886 there was a substantial rise of nearly 1d. in English mutton because English sheep had decreased in that year by nearly half a million, yet at the same time there was a fall in frozen mutton in sympathy with the large increase in importations of 700,000 frozen sheep. Again, in 1888, there was a rise of

1¾d. in English mutton owing to a decrease in the number of sheep in the United Kingdom, but there was scarcely any advance at all in frozen mutton, as the importations of that article were large. In 1890 and 1891 there was a steady all-round fall, and no wonder, as in those two years there was an increase of over 2,500,000 sheep on the market, of which 1,500,000 were drawn from the United Kingdom. It will thus be seen that the sympathy so often expressed for the poor English sheep farmer has so far been thrown away, as frozen sheep importations have in no way affected the value of prime, home-grown mutton, though without doubt it does come into competition with inferior home grown. In considering the English market, it must further be noted that side by side with the large increase in frozen meat imports, during the eight years previous to 1894 there had been an enormous increase of United Kingdom sheep, in fact 5,000,000, giving an increase of some 300,000 additional sheep annually. That the United Kingdom has been able to absorb so great a number augurs well for the future of our trade. But it is well to mention here that while the total meat bill of the United Kingdom amounts to over £100,000,000 sterling a year, of which one-third consists of imported meat, Australia up to last year only contributed 2½ per cent. of the imported article.

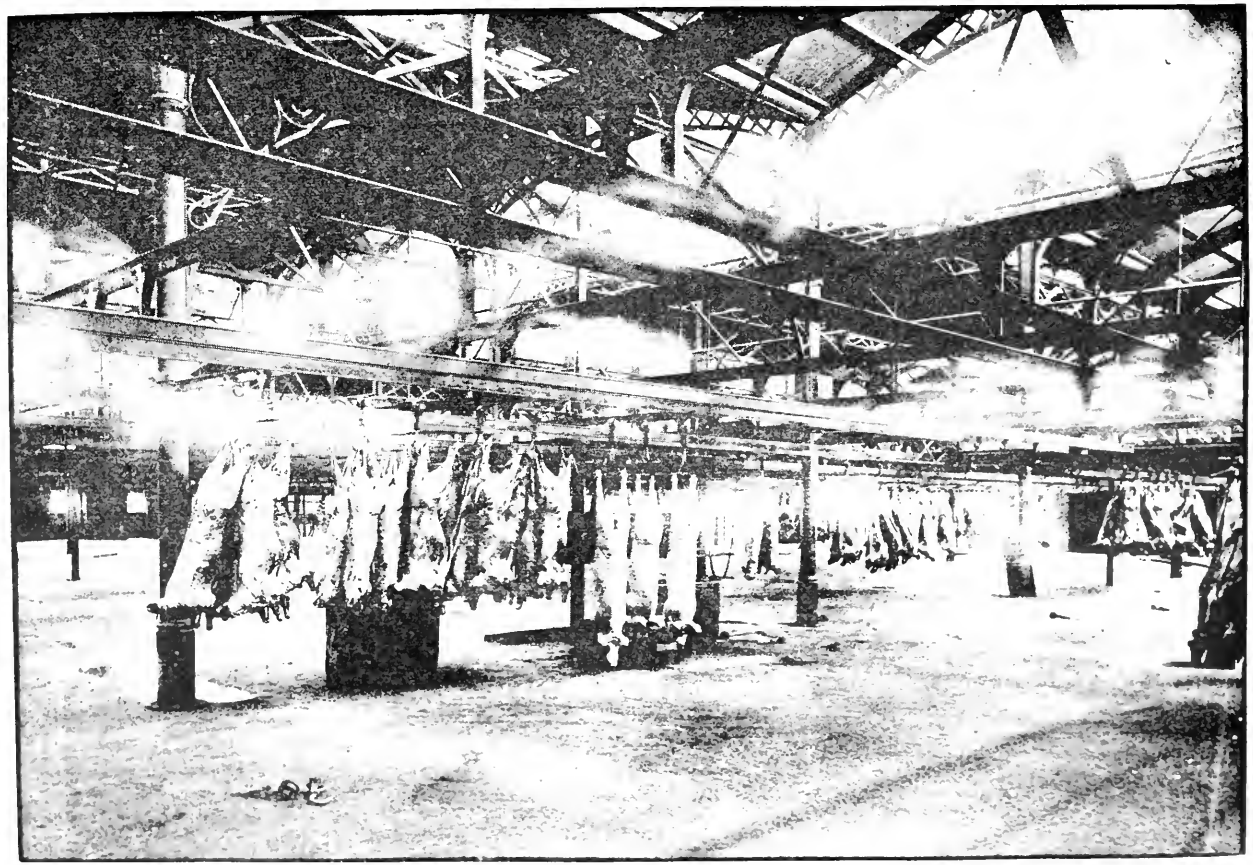
The share of British trade enjoyed by the principal exporting countries can best be seen in the following table:—

Imports of Frozen Sheep and Lambs into the United Kingdom.

Year.	Australia.	New Zealand.	Plate.	Queensland.	Total.
1884	111,700	412,300	108,000	.....	632,000
1886	67,000	656,000	331,000	30,000	1,084,000
1888	112,000	940,000	324,000	.....	2,376,000
1890	208,000	1,533,000	1,197,000	1,000	2,938,000
1892	505,000	1,540,000	1,111,000	17,000	3,173,000
1893	637,000	1,858,000	1,374,000	16,000	3,885,000
1894	940,000	1,958,000	1,415,000	11,000	4,534,000
1895	1,024,000	2,409,000	1,615,200	20,000	5,068,000

It will be seen that Australia has doubled its exports since 1892, *i.e.*, in four years, while New Zealand increased its output from 1,500,000 to nearly 2,500,000, the advance being principally in lambs. The Plate also increased its exports by about 500,000 sheep in the same period. The total addition in the four years was nearly 2,000,000 head, or over 55 per cent. advance.

In spite of the largeness of the above figures, only about 23 per cent. of the meat supply of Great Britain is drawn from abroad though the dependence on outside sources for food is each year becoming more evident. In this connection a comparison between the home and imported article, and the total meat consumption is of interest.



NEW SOUTH WALES GOVERNMENT MEAT-MARKET, DARLING HARBOUR, SYDNEY.

Interior View.

* ESTIMATED Supply and Consumption of Meat annually per head of the Population of the United Kingdom:—

Year.	Home Grown.	Imported.	Total.
	lb.	lb.	lb.
1884	63·5	14·2	77·7
1886	64·0	12·2	76·2
1888	60·6	13·8	74·4
1890	63·4	22·9	86·3
1892	66·5	21·4	87·9
1893	63·5	18·0	81·5
1894	60·3	23·2	83·5
1895	59·9	23·5	82·7

The tendency for the consumption of meat to increase is clearly visible in the above table. The check received in 1893 was due to the falling off in the supplies of chilled meat from the United States and the recovery is not yet complete. Doubtless, if the meat is available and British trade is fairly brisk, the rate of consumption of 1892 will soon be again reached, if not passed.

Canned Meat.

Until lately we have had only one meat-preserving factory in New South Wales putting out any quantity of meat—namely, the Sydney Meat Preserving Company. In 1887 that company exported some 4,000 tons of preserved meat, increasing the output to over 7,000 tons last year. This company has been a great relief to the graziers of New South Wales, who, recognising its value, subsidise it liberally. Several other canning factories have lately come into operation, notably those at Bourke and Aberdeen, while the Graziers' Meat Export Company propose to preserve meat on a large scale. The increase of meat-preserving will materially assist graziers, and it is estimated will add from 8d. to 1s. to the value of a sheep. The making of extract should always be combined with that of meat-preserving, and between the two it may reasonably be hoped that, useful as graziers have found it of late years, the wasteful system of boiling down sheep for tallow only will be at an end. A new method has been lately patented in New South Wales which it is considered will materially lessen the cost of production of extract. Unfortunately the value of this article is at present at a very low level, so that, unless more economical methods of extraction can be found, it will hardly pay to make it.

The increase of meat-canning operations will tend to regulate the frozen meat export, for canning adds from 10 per cent. to 15 per cent. to the net value of a sheep as compared with boiling only. Frozen meat at times rules so low in the Home market as to cause owners to send their sheep to the pots. It follows that, if, say, 12 per cent. more can be obtained by canning, owners will often boil and can in preference to trying the Home market, and this applies more especially to second-class sheep. The value of canning to graziers has been much overlooked. Old ewes and second-rate rather lean wethers, neither being sheep that pay to export in a frozen state, will yield

* From Weddell's Review for 1895.

from 12 to 18 lb. of raw, lean meat, which should return to the owner ¾d. a lb. As this meat would scarcely yield any tallow, if boiled, the return from canning is all gain to the grower, and the Colony generally gains in an increased export of produce. There is, without doubt, a great future before the preserved meat trade of Australia, as first-class meat for canning is cheap, costing not over ¾d. a lb., while inferior meat, such as is used for canning operations in America, is not worth more than ½d. a lb., whereas for such meat the American packer has to pay from 1d. to 1½d. a lb., and he could not buy such meat as ordinarily is here available under 3d. The difference in freight is very trifling, and the cost of putting up the meat need not be any more here than in America. It follows, therefore, that we should be able to capture this valuable trade.

Live Cattle.

The export of live cattle cannot be considered a success, nor is it likely to become one. There are difficulties in the way which could only be surmounted by good management, but this one essential has hitherto been conspicuous by its absence. The cost of freight, and the fact that the beasts are all bush cattle and not accustomed to being artificially fed, are the main drawbacks, otherwise there are no insurmountable obstacles. Given the right sort of cattle, proper ships, good and suitable food, and experienced men in charge, there is no reason why cattle cannot be delivered in England in first-class condition, but in any case the cost of freight will always be a very serious item.

Chilled Meat.

The four shipments of chilled meat that have been made to England have scarcely resulted in success. The first failed owing to a breakdown in the machinery. The money results in the second were good; but although the third shipment of beef arrived in a very satisfactory condition, it met with an exceptionally bad market, and as the beef was from New Zealand, and purchased in a high market, the shipment must have resulted in loss. Nothing but failure could have been expected from the fourth shipment, which was from Queensland, as the one essential was neglected, namely, the keeping the meat at an even temperature for which a thermometer was required, and none was used. Chilled meat is carried in America 1,500 miles to New York, then by sea 3,000 miles to Liverpool, and then railed over 200 miles further to London and delivered in perfect order. Great care is exercised from start to finish, but the beef is packed both in the cars and on the ships nearly as closely as if it were frozen. There would seem to be no difficulty in carrying beef from Australia to England at 28·50° F., that is, just a little below freezing point. The juices in beef, it may be remarked, freeze at 28·80° F., as against water at 32° F., and chilled meat should be carried at not under 29°, and if possible at about 31°. Many experienced practical men are satisfied that the conveyance of meat in a chilled condition to England will prove a success, and they are not in the least discouraged because the shipments so far have been attended by partial failure. If the meat be chilled in chambers in which the air has been sterilised, and out of which all moisture and gases emanating from the meat are extracted, and kept in cold, dry,

sterilised air till delivered in London, success will, in all probability, be attained. At the same time, it will most likely be found that if the meat be chilled at *the outset* in chambers in which the air is kept dry and sterilised, and from which the moisture emanating from the carcases is carefully extracted, that afterwards it may be carried safely in ordinary cool chambers; but this will have to be ascertained by actual experiment. The sterilisation of air, by means of which it is thought chilled meat can be successfully conveyed long distances could be very easily effected by a slight modification of the now discarded Haslem dry air system. But this system is much more expensive than the ammonia system. At the same time it may be mentioned here that some of the large passenger steamers are using the dry air machines in preference to the ammonia machines on account of the danger of leakage. There is no difficulty at all in carrying chilled meat by rail, for Dr. Perkins, of California, has successfully introduced a process by which the overflow air of the Westinghouse brake is ingeniously used for the supply of cold, dry, sterilised air in the conveyance of fruit or meat in the cars. Too much stress cannot be laid on the importance of bringing the conveyance of meat by this method to a successful issue, as once Australian meat is successfully put on the Home market chilled instead of frozen, future progress will be comparatively simple. To conserve and convey meat by cold, dry, sterilised air need not involve much expenditure, while the article produced will yield much higher returns than frozen meat, and will keep better after being opened up than meat chilled in the usual way.

Defrosting.

It is, however, more than possible that the lately introduced process of defrosting meat will give better results to the grower than chilling. So far, defrosted Australian meat of similar quality as American chilled beef has not been able to compete with the chilled, in spite of the smaller cost of conveyance, as chilled meat occupies more space than frozen. The system of defrosting must assist the sale of frozen meat, and it is perhaps just as well that it can only be successfully applied to really good meat that has been well taken care of. An independent witness writes of it: "I saw defrosted beef and mutton looking as fresh, clean, and bright, as if only a few hours from the slaughter-house. It was, I understood, for the West End trade." The operation of defrosting costs ¼d. a lb., while the meat thus treated realises ¾d. a lb. over similar meat not thus treated.

Future of the Trade.

That an immense future lies before the meat export trade of Australia is apparent when we consider the wonderful expansion of the New Zealand frozen meat trade, which from an export of a few sheep in 1882 has grown to over 2,000,000 head in 1894, valued at over £1,162,000. In 1883 only 5,400 tons of frozen meat was exported from Australasia and the Plate as compared to 118,000 tons in 1894. An increase from ·34 lb. to 6·81 lb. per head of population. The frozen

NOTE.—The values of meat are: first, best Scotch; then, best English; then, defrosted and, last of all, frozen.

meat received in 1894 in England was equal to 8 per cent. of the total consumption of beef and mutton in the United Kingdom, and last year no less than 4,500,000 frozen carcases were received. Again, although the irregularity of our frozen meat consignments is one of the gravest difficulties with which we have to contend, yet the gluts and low prices caused by this irregularity have been the means of forcing the meat into consumption; and the masses have become alive to its value. Until this occurred its use was confined to the middle and upper classes. Once the masses get over their prejudices, and get their teeth into good meat, retailed to them at moderate prices, we need not fear for the future. The opening of the Manchester ship canal, giving direct trade with Liverpool and Manchester, should be of great assistance in the expansion of Australian meat consumption, as Manchester itself is considered the greatest centre of distribution for Australian mutton in all England. Most of the important railways are connected with the canal, and within a radius of 40 miles of Manchester there is a population of some 8,000,000 of people, said to be the largest consumers of merino mutton in England. At present all our meat is shipped to London, situated in one corner of the country, whence it has to be railed into the provinces at a cost of a ¼d. and over per lb. By shipping direct to Liverpool, Manchester, Glasgow, Cardiff, and other ports considerable expenditure in rail freight will be avoided, as well as depreciation in the quality of the meat, while the advantages of having four or five centres from which to distribute, instead of only one, cannot be overestimated. The first shipment to Manchester arrived in excellent condition, and already steps are being taken to increase the facilities for distribution from this centre by the reduction of railway rates into Yorkshire. Excellent accommodation for storing perishable goods is available at Manchester, more especially for the reception of frozen meat, and the initiation of the trade has been under most favourable conditions. In 1883 experts declare that it was not possible to put Australian meat on the Home market at under 6d. a lb., yet it can now be sold at a profit at less than half that price. In 1883 a London salesman advised New Zealand exporters that a supply of 4,000 frozen sheep a week would be ample, and that any large increase on that number would create a glut; yet in 1893 the average monthly imports of frozen meat amounted to 75,000 sheep, and there was no glut. Moreover, the reduction in freight and charges enables exporters to net more now selling sheep at 3d. a lb. than they did formerly when sold at double the price.

There has been a remarkable development lately in the meat export works of our Colony, and within a few years some twenty sets of works have been erected. Shortly, almost every district of New South Wales will be supplied with a meat factory. During the past year two of our largest companies have duplicated their works: a third, which we may say started in that year, propose to greatly extend theirs, another has added meat-freezing works to their ice-making plant. The largest meat-preserving factory in the Colony has been enlarged and improved; another inland meat-preserving firm has greatly extended its operations. An extensive new freezing works, thoroughly up to date, has made a most successful start in Riverina. Two more inland chilling works have been completed, and three others are in course of construc-

tion. All this shows very plainly that those most intimately connected with the meat export trade are fully convinced that a most successful future lies before it.

Continental Trade.

Though it will probably be a considerable time before Australian frozen meat makes its way on to the Continent, yet it can only be a matter of time, for the interests which are at play at present to keep out imported meat must, sooner or later, give way. Once the Continent of Europe relaxes existing restrictions, and allows our meat to compete for place, our difficulty will be not to find a market for the surplus stock, but to find sufficient stock to supply the demand. Only a few years ago, France was an exporter of sheep; now we are told she requires 1,000,000 sheep and 20,000 cattle annually to meet her demands. Were it not for the restrictions which at present hamper the import of Australian meat into France, that country should be an excellent market for frozen merino mutton and canned meat. The last-named should more especially find a ready sale if put up in 1 l-lb. cans, for the use of restaurants; for in France joints are not so much in favour as stews and soups.

The prospects of the trade have of late become far more hopeful. The Special Commissioner of the *Sydney Morning Herald* writes that a new company initiated by Mons. Brun with a capital of £230,000, has built cold storage rooms, sale rooms, and insulated cars, to bring frozen meat from Havre. Beef and mutton is quoted wholesale in this market at 8d. to 12d. per lb., and choice joints run to 18d. per lb. retail. As the sheep most favoured in France is small, good lean young meat of from 35 lb. to 42 lb. the carcase, there should be an opening for exactly that class of sheep which at present it is found difficult to sell to advantage, viz., young ewes cast for wool and ewes 5 or 6 years old cast for age. If the Continental governments would open their ports, or even reduce somewhat the present duties and restrictions placed on Australian meat, great headway would immediately be made.

A comparison of population and live stock will afford some idea of the extent of the market. Germany, with 50,000,000 inhabitants, has only 14,000,000 sheep. France, 38,000,000 people, and 30,000,000 sheep. Belgium, 6,000,000 persons, and only 365,000 sheep. Already there are storerooms and refrigerating works in Hamburg, Berlin, Cologne, and other places, and with care and energy on the part of exporters, the huge continental outlet must ere long be won.

We think enough has been put forward to show that there is an unlimited market for our surplus stock if certain conditions are observed.

Conditions to be observed at this end.

In the first place, the supply of meat should be ample and continuous, in the second place it should consist of a palatable and marketable article, and, finally, the price should be sufficiently low to enable it to displace less attractive and less palatable food products. The first condition is the one most difficult to fulfil, not only is it difficult to keep up a continuous supply of fat stock fit for export; but occasionally it is no easy matter to maintain a full supply of the raw material,

as it were; that is to say, stock that can be put into marketable condition when the season is favourable. This first condition is the stiffest problem the Australian grazier has to solve. A combination of agriculture with grazing, by means of which large quantities of ensilage and hay might be conserved, not for a rainy, but for a dry day, would enable much stock to be saved through a drought, which otherwise would perish. These animals would be ready to be fattened when the season improved, but to fatten sheep right through a drought is, we fear, beyond the capabilities of the Colony. In spite of adverse seasons we are, however, of opinion that, given a good market at the other end, the requisite sheep will be readily fattened and supplied. Up to the present time there has been no inducement to graziers to fatten stock. The fat market has been most uncertain, and at times store stock has actually ruled higher than fat stock. The cry in New Zealand at the initiation of their great meat trade was that a supply, ridiculously small compared to present exports, could not be possibly kept up. But events have shown that, given a good market, the supply will be forthcoming. Wiseacres used to say that a supply of 300 to 400 head per day would soon deplete the Christchurch, New Zealand, district; but now 6,000 sheep per day are put through the two big works near Christchurch.

The second condition, that the meat shall be presented as a palatable and marketable article, is entirely in our own hands. We need not necessarily export heavy, or even prime fat sheep. The London market no doubt looks for prime crossbred sheep, sheep of moderate weight; but the markets which we hope to open up more fully by means of direct trade to Liverpool, Manchester, Glasgow, &c., prefer leaner and smaller mutton, such as we can so easily supply. The Londoner likes a fat sheep, but the artizan of Birmingham and Manchester working constantly amongst oil, has acquired a strong dislike to fat meat, and lean merino mutton should just suit. But it must in all cases be a good marketable article, well handled, well killed—in a word, well taken care of. There can be no doubt that the system in vogue in New South Wales in killing the stock close to their own pastures will be of the greatest assistance in producing a good article; and we are of opinion that the system of chilling inland and freezing later on at the port of shipment will be found more conducive to the production of a palatable and tender meat, than that of freezing inland where the stock are slaughtered. A sheep chilled from twenty-four to thirty-six hours, before being frozen, after having been cooled for six or eight hours previously, must necessarily be more tender and palatable than a sheep that is frozen within a few hours after it leaves the butcher's hook. It must be borne in mind, that the British consumer is still to a great extent prejudiced against frozen meat, and more especially against frozen beef. It is, therefore, necessary to make every exertion in every possible way to improve the article we put before him. That some progress is made is evident, for we are told that Australian sheep have during the last two years shown an all round improvement. The managers of meat export companies should resolutely decline to send away objectionable sheep, and under this head should be ranged, not only sheep too lean and shelly, but sheep too fat and gross. It would also be a great improvement were the sheep properly graded.

merino wethers, say, in two classes of 45 lb. to 55 lb., and 55 lb. to 65 lb.; merino ewes, 40 lb. to 50 lb.; crossbred wethers, 56 lb. to 60 lb., and 60 lb. to 70 lb.; and crossbred ewes, 50 lb. to 60 lb. No sheep outside these classes should be sent away. In this way the market can much more readily be met.

A good deal can be learnt from America. In the States the system for the disposal of meat products is almost perfect. Packers have found out by experience exactly the description of animal or of meat that suits the consumers in each portion of that immense territory. No packer, for instance, would consign light cattle to Boston or New York, or heavy beasts to Baltimore. They consider their customers' tastes and cater accordingly. Australia, on the contrary, dumps all her meat upon one market, and then finds fault with the taste of the consumers instead of endeavouring to meet their requirements. If success is to be secured, it must first be ascertained exactly what is the description of sheep in favour in different parts of United Kingdom, and then a wise descrimination must be shown in the shipments. The American "packer" never loses sight of his meat until it is actually sold to the consumer. The Australian, on the contrary, seems to think his responsibility and interest ceases when once the meat leaves the freezing room. It may be at zero to-day and at 20 degrees to-morrow for all he can tell, and as a matter of fact this not infrequently does occur on board ship. Sometimes it is exposed and softened and dust-begrimed between the ship and the market, where, as we have said, it is committed to the tender mercies of consignees competing to quit their stuff.

We must not leave to others what we should do ourselves, and we must not be discouraged by rebuffs and failures, but steadily put our meat on the Home market regularly and systematically, satisfied to accept a moderate average price one month with another. As to the third condition, the meat export trade of Australia can be indefinitely expanded only by the displacement of other food products in the Home market, and this fact is much overlooked. To achieve this either *a better article must be produced at equal price, or as good an article at a lower price.* Exporters must, therefore, seek profits not so much from high prices for the meat as from a lower cost in producing it. High prices would simply cripple the trade. It may be very pleasant for individual growers to hear of their meat selling well, but increased values will be followed by a decreased consumption, and a steady trade will be impossible. The reaction will not infrequently be to lower rates than would otherwise have occurred, and in fine, it is these fluctuating prices which to a great extent prevent the meat export trade from being put on a stable basis. Growers must not pay too much heed to the ups and downs of the Home market. Through good and bad times they should continue steadily to ship, for the low prices of to-day will be counterbalanced by the high prices of to-morrow, and a fair average will in the long run be obtained. If only 5 per cent. of the families in England would consume 3 lb. of meat additional per week, it would require 1,000,000 sheep to supply them. This may be achieved. The prejudice against frozen mutton is doubtless wearing away as consumers learn its value and become more expert in thawing and cooking it.

It is absolutely necessary that those who supply retailers should be in a position to give a steady, constant supply of meat at a uniform and moderate value. The aim should be, therefore, not high prices, but a large trade at moderate values and low cost. A large volume of business will enable ship owners to carry meat at reduced freight, will cause lower insurance and cold storage charges, and will enable salesmen to reduce their rates.

Conditions to be observed at the other end.

When we come to the conditions to be observed at the other end, in order to ensure success, we have a much more difficult problem to solve, especially when the matter is considered from this side. There seems to be very little doubt that there is among Home buyers that which is so much lacking among sellers—viz., organisation and combination. It will be generally conceded that Australian meat goes into too many hands, there are too many consignees, many of them the reverse of strong. Not infrequently very full advances have been made on meat received in England, and consignees do not care to increase the risk by incurring storage expense, which is extremely high, being $\frac{1}{16}$d. per lb. a month, as against $\frac{1}{16}$d. in the Colony; consequently the meat is put on the market irrespective of the state of supplies. More concentration and combination are wanted. As things are at present conducted the competition in the disposal of meat is among sellers instead of among buyers. It seems to be fully admitted by those who ought to know that Australian meat does not get fair play; and it is evident when Home-grown meat is at 6½d. to 7d., and good frozen mutton at a great deal less than half that, there is a screw loose somewhere. Here are some quotations with regard to the sale of Australian meat on the Home market:—"At Home our meat gets no recognition, and producers get no benefit." "The Smithfield salesmen and butchers get all the profit. These men naturally do not wish to expand a trade that is capable of making their fortune within its present small and compact limit." "Four million of frozen carcases may reach London in one year, and yet but little frozen mutton be found on the retail market. These frozen carcases disappear among the Smithfield butchers and cannot be traced." "The butchers make fortunes, the producers nothing. There is no doubt about the sheep exporter being bled by the London retailers, and still the Smithfield ring dictates prices." "The rise and fall of frozen meat here is simply a matter of bulls and bears."

There is no open sale, we are told, and most of the business is done in "whispers." A great deal of the meat passes at times through three or four different hands before it reaches the consumer.

Our meat is, for the most part, not sold on its merits. It is stated by shrewd men, who have carefully looked into the matter, and their statements are fully borne out by the sworn evidence of butchers, given before the Royal Commission on Meat Marking, that quantities of Australian frozen meat are sold as Welsh and even as English mutton, while a good deal more is sold as New Zealand, and the inferior only goes before the British consumer as Australian. It is evident this course of procedure must exactly suit the Home purveyor, for the lower the wholesale price for Australian mutton the more

profit he must make. Again, the way commission is paid to salesmen must militate against the exporter obtaining the highest price available, for salesmen are not paid commission on values realised but are paid on the weight of meat sold irrespective of value. It is of no consequence to them whether the meat fetches 2d. or 3d., they get their commission just the same.

We are apt to lay a great deal of stress on English prejudice; but if there be prejudice, it is better that it should be respected, and that endeavours should be made to remove it. This has not been the course pursued; but on the contrary, quantities of unsuitable and inferior meat is exported both from New Zealand and Australia. It has been well said that "It is only by carefully catering to the tastes and by respecting even the prejudices of foreign consumers that the export trade can be built up."

Reduction of Cost of Production.

Since the establishment of meat export companies by sheepowners, the consolidated charges for putting meat on the Home market have been reduced from 10 to 25 per cent. That means a reduction of about ½d. a lb., which, on a 56-lb. sheep, amounts to no less than 2s. 1d. When it is remembered that 1d. a lb. net return is more than the average received by growers, it will be seen that a reduction of ½d. a lb. in the charges means an advance of 50 per cent. in the net return to the grazier. The reduced charges enable Australian meat to be now sold in England at 2¾d. a lb., and still yield a moderate profit, and this figure is sufficiently low to displace the other foods such as currants, edible tallow, and hog products if a supply of good meat can be maintained. The cost of production must be brought to the lowest possible point, and as we cannot grow our meat for any less, it follows that we have been moving in the right direction by endeavouring to reduce the factory charges, freight, and other costs. It is in reduction of cost rather than in the advance of values that the efforts of Australian graziers must be directed. In this connection, it may be mentioned that during the month of January, 1894, the United Kingdom took from the United States no less than 35,200,000 lb. of bacon, equal to 700,000 50-lb. sheep. Bacon is worth in England wholesale about 5½d. a lb. Now, here is a food which should easily be displaced by good mutton. Before frozen sheep were put on the Home market, hog products were the cheapest meats going into consumption, but frozen meats have been sold at such a low price as already to displace large quantities of this food, a fact which is admitted by the Secretary for Agriculture for the United States.

Irregularity of Supplies.

Nothing so much retards the expansion of the demand for Australian meat as the irregularity of shipment. It is almost always a case of either a glut or a famine. Sometimes two months elapse without an arrival in England of frozen meat, and then two or three immense cargoes arrive together. One week the market is in short supply, the next it is over-stocked. And this is not altogether due to the intermittance in available freight, but to a great extent to the irregularity of the supply of tonnage. With seventy-six vessels in the Australian

and New Zealand trade, having a carrying capacity of over 2,500,000 sheep, and equal to the conveyance of 6,000,000 sheep a year, there should certainly be no difficulty as to tonnage, and if they could be sure that growers would regulate supplies at this end, there is no doubt that the owners of these seventy-six ships would manage to accommodate themselves to the trade. In fact exporters have it in their own hands whether to be at the beck and call of shipowners, or to have the movements of the vessels governed by the requirements of the trade. As an instance of the irregularity of shipments, it may be mentioned that in the first three months of 1893 there were 386,000 frozen carcases delivered in London; but in the first three months of 1894 there were only 216,000 so delivered, while for the remaining nine months of 1894 there were 1,800,000 carcases put ashore in London, as against 1,470,000 in 1893—a deficiency in the first three months of 170,000, and a surplus in the last nine months of 330,000. No trade can stand this. Again in 1894, owing to a short supply, Queensland beef went up in price, and unfortunately the only Queensland beef in the market was by no means prime. The result was that buyers turned to American chilled beef, and dropped the Queensland trade, and even lower prices did not bring them back. No attempt seems to have been made in the Colonies to remedy this, though action to that end has been mooted more than once. Obviously much could be done by having abundant cold storage in the Colonies. Better terms could then be made for freight, and the power to hold and to regulate supplies would to a great extent obviate gluts and famines at the other end.

Cold Storage.

There is now abundant cold storage in England, and more is being constantly added. It has been estimated that there is already room for 1,200,000 carcases of sheep. In addition to the extensive cold stores in London, there are others at Manchester, Bristol, Newcastle, Liverpool, and Cardiff, besides those of Nelson's, Eastman's, and the Plate. Cold stores have been lately erected at Sheffield, and are being erected at Birmingham and Hull, and it is intended to erect extensive premises at Glasgow and other places. The large new stores being built close to Smithfield will also be of great service to the trade; at the same time the charges for cold storage are far too high, and the erection of cold stores for the accommodation of New South Wales produce both in the Colony and at the other end is a matter well worth the consideration of our Government. There would be considerable advantage in increasing the cold storage accommodation in the Colony. There would be less probability of deterioration in the meat from exposure, &c., if held at this end, and the accumulation of meat in the Colony would affect prices less than the heavy stocks held immediately under the notice of buyers. The regularity of shipments could also much more easily be secured.

Distribution.

The opening of retail shops in the old country for the sale of frozen meat is strongly advocated by some people; but we are of opinion that what is required is an adaptation of the system that obtains in the

United States. Almost every town in the States is provided with a cold storage wholesale meat market, whence retail butchers are supplied with all they require, and where meat can be kept for them. If this system could be introduced into England, nothing could so much assist the expansion of the frozen meat trade. A great saving would be effected, and the Home consumer could be provided with Australian meat in a much more attractive form, especially if a defrosting department were combined with the wholesale meat market. If Home consumers could be encouraged to use cold storage for the preservation of their own food products, it would help greatly to introduce and accustom them to the use of frozen meat. Nothing would so much assist the expansion of the trade as the establishment of these cold stores throughout the length and breadth of the land. The possibility of providing cold storage all over England is a matter which should occupy the attention of Australian meat exporters, and is of far more importance, while being more practicable, than the establishment of retail shops. One handsomely fitted up shop might possibly be added to the wholesale meat market with advantage, but more in the way of an advertisement than for the purpose of direct profitable distribution.

Forward Business.

A considerable business is done with Australia and New Zealand on the c.i.f. principle, that is, cost, insurance, and freight are paid by the exporter, who either delivers over the ship's side at the other end, or f.o.b. at this end. The buyer of course takes all the risk of the market, a division of chances which should be encouraged as much as possible; for although it is the buyer's business to buy at as low a price as he can out here, yet it is necessarily also his business to keep the market up at the other end.

A considerable quantity of meat has been purchased in Sydney during the past year by Home speculators at about 1d. a lb. and under; but in order that the owners should get a fair margin of profit, it is necessary that 1d. a lb. should be netted after paying all charges. All meat sold for forward delivery should be approved by the consignee's agent at this end previous to shipment.

Inspection.

No meat should be allowed to be exported without a certificate having been first obtained from a Government inspector, declaring that it is sound and free from disease, and this should, of course, also be done in the case of all live stock sent away.

The United States has a complete system of inspection, and lately such stringent regulations have been issued as to cause exporters to object. But the result is that freedom from disease is guaranteed, and the consumer is satisfied. All animals shipped from the United States are examined at the centre of exportation and a tag fastened in the ear. A complete record is kept so that a beast can be traced. The most careful examination possible of hogs is made. Samples of every hog destined for inter-State commerce or export is taken and microscopically examined.

Sooner or later the Home authorities will stipulate that all exported meat shall be thoroughly inspected, and certified as sound, at the port of departure, and the sooner we forestall this development the better for the trade.

The following are the means by which, it is thought, assistance to the meat export trade can be rendered by the Government :—Special reduction of railway freights on live and dead stock for export might be conceded, with increased facilities for rapid transit; special legislation should be introduced annulling the power of the Sydney Municipal Council to claim dues on stock intended for slaughter for export, and the supervision under the direction of the Board of Health of all meat for export at place of slaughtering, including a certificate testifying to its fit condition for human consumption, should be provided, and the export of any meat without such certificate should be absolutely prohibited. There are several difficulties in the way of this development, however: first, to obtain men suitable for the work; secondly, to determine a standard of quality; and, third, where the inspection is to be made. It would be ruinous to graziers to have to freeze meat and pay rail freight to Sydney on meat afterwards rejected. It could then only be boiled down or canned at a heavy loss. The alternative is to place a Government inspector at each works.

Competition.

Powerful as the chilled beef of the United States is as a competitor with Australia, controlling as it really does the Home market (for whenever chilled beef is in heavy supply frozen beef has no chance at all, while frozen mutton also declines from sympathy), yet our most formidable competitor, in the future, is Argentina. Her resources appear to be almost inexhaustible, and her live stock export trade both in sheep and cattle is assuming enormous dimensions. While we have the Argentine competition we may once for all dismiss all idea of any higher average for merino mutton than 3d. a lb. Rather should the aim be to put it on the Home market at 2½d. A full and continuous supply, ensuring low freights and insurance, will enable growers in time to put down meat at a consolidated rate of 1¼d. a lb. from the seaboard; and even at the low rate of 2½d. a lb. this would leave the grower 1d. a lb. net for his merino mutton. This, in addition to the skin and fat, would give sheep-growers what they have been aiming at, in establishing their own works, namely, a satisfactory minimum price for their surplus sheep, for 1d. a lb. net, in addition to the value of the skin and fat, means a net 7s. for a 52-lb. sheep with a six months' fleece.

Mr. Gibson's interesting book on the Argentine Republic conveys some valuable information, for we find at the date at which that book was written that, in spite of the wonderful resources of that great country, their stock of sheep had decreased from a former maximum of 96,000,000 to about 80,000,000. As the country is capable, according to Mr. Gibson, of carrying 150,000,000 sheep, we must look for the cause of this decrease to adverse seasons and disease, and it is, therefore, just possible that the competition from Argentina may be thus considerably weakened. Nevertheless, Argentine owners have

an immense advantage in that they pay wages, rent, &c., in paper or silver currency, and are paid for their meat in gold at an enormous premium. Freight charges also only amounts to ⅜d. per lb. as against ⅝d., the rate from New South Wales.

Conclusion.

It was the sheep-farmer who initiated and found work for the first freezing companies of New Zealand and guaranteed them freight, and it was by the interest and guidance of these sheep-farmers that the companies were controlled. What New Zealand has done we can do. If Australia has disadvantages, she has also advantages; and if the meat export trade is economically and wisely managed it must result in great benefit to the whole Colony. It will not come in a month nor in a year, but it will come. As has been well said of the American trade, "It is a trade that like every other good thing has had to be fought for and conquered," and Australian stockowners need not expect to come out on top without a tough struggle. The capacity of European populations for meat-eating has never yet been tested. That is now our business, and we must not expect it to be all plain sailing. The population of the world is every day increasing, and in spite of all that can and will be done to develop the food-producing powers of land there is and must be an unlimited market for food. With a revival in trade, more meat will certainly be consumed. The population of our great competitor, the United States, is steadily, if slowly, overtaking the meat supply. That supply is not increasing, but has actually decreased during the past few years. In any case the States meat production is not likely to go beyond its former maximum, and an increase in the future can only come from more expensively fed stock, as by degrees what are called range, or merely grass-fed cattle, must die out. With economy in production, abundant, and inexpensive cold storage, with lower rates of freight and insurance, the frozen meat industry of Australia is indeed capable of great expansion. Fastidious British consumers may turn up their noses at our frozen meat; but in time the great mass of the people will find in it a palatable and necessary food, and it is to the masses we must look for support.

The possibilities of the expansion of our meat export trade with the United Kingdom are simply enormous. The country must take our meat. The awful consequences that would result from the cutting off of foreign food supplies from the United Kingdom were strongly urged lately in London, and attention was directed to the enormous amount of English capital invested in the live and dead meat trade. Even a few days' failure in the foreign meat supply of London would be a national disaster. The Board of Trade returns for September show that over 2,400 tons of frozen meat is landed in England every month in addition to 33,000 live cattle and 75,000 live sheep. We have only made a small start in what will prove to be one of the greatest industries in which New South Wales has ever engaged. Merino mutton at a price is becoming distinctly more marketable, not so much because consumers are changing their taste, as because we are finding out those consumers to whom that particular meat is acceptable. Doubtless, too, prejudice is being to some extent removed.

The last census showed that out of 38,000,000 people in England, 25,000,000 were represented by working men and their families. The scale of living in the old country is rising steadily, and the low price at which our frozen meat is being sold has introduced it to thousands who never otherwise would have heard of it. Our present Governor, Lord Hampden, drew attention lately in an address to the vast field which existed in the old country for Australian enterprise. "The old country," he said, "is prepared to take Australian produce almost without limit." A prominent London firm, in their circular of 1893, say, "that at moderate prices and with increased supplies reasonably regulated, there can be little doubt that the outlet will prove co-extensive with the producing capacities of the colonies."

There are great possibilities for frozen meat and even greater for canned in time of war, and as already stated, the European markets must before long be opened to colonial produce. "The markets of the civilised world disclose no growth in food production corresponding to the growth of population, and perhaps no greater boon has been accorded to the world of late years than the supply of good meat at low cost by means of the frozen meat trade."

We would in conclusion sum up our hopes as to the future of the meat export trade as follows:—That the supplies in the United Kingdom are decreasing: that the Continental nations from being exporters have become importers; that if the supply of frozen meat were cut off from England for one month there would be a meat famine; that the population of the United States, America, is increasing in greater proportion than the meat supply; that the reduction in the cost of the production of frozen meat is causing, and will still further cause the displacement of other food products; and that the prejudices against frozen meat are fast dying out.

The part of Australian stockowners is plain enough. To produce a good article—to put it on the markets of the world at as low a price as possible—to use all legitimate means in the distribution, and to open up all possible new markets. The world is before us—the whole business is in its babyhood—the possibilities of the future development of this great industry are simply immense. Let us then go to work with vigour, with hope and with a big heart, determining that no obstacles shall deter us, and that success must and shall crown our efforts. We must have a little patience and a good deal of perseverance. We can produce the best meat in the world in Australia, and at the lowest cost. We must, therefore, in spite of all difficulty, command the Meat Export trade of the world. The possibilities and future of this enterprise are as great as ever, and should inspire the weak-kneed among us with a little more hope and energy. The Meat Export Trade will yet save the Pastoral Industry.

Fish Industry.

By J. Douglas Ogilby.

Owing to the numerous bays and estuaries which everywhere indent its shores, the Colony of New South Wales is peculiarly adapted to the successful prosecution of various fishing industries, which should greatly increase the wealth of the community at large.

In the space to which I am limited it will be impossible to do more than enumerate the fishes which are likely to prove valuable to us, those families being specially selected which, from their numbers and quality, may in the future become available for export.

Apodes.—Several species of Eels are brought to our markets, but only one, the Long-finned Eel, *Anguilla reinhardti*, is obtained in sufficient quantities to entitle it to a place among our food fishes. Like all its congeners it is an excellent table fish, and as it is abundant in all the rivers and estuaries of our eastern watershed, and from its great tenacity of life may be depended on to remain fresh through weather which would quickly taint other fishes, it is always sure to command a high price.

Malacopterygii.—Among the Malacopterygians proper only one group which can in anywise lay claim to economic value occurs; this is the great congeries of families of which the Herring and the Anchovy may be taken as representatives.

It has long been known that at certain seasons our seas teem with Herrings (*Clupeidæ*) of various species, three, perhaps four, of which pass northwards along our coast in almost incredible numbers yearly, the season of migration being, roughly speaking, the last six months of the year.

Only two of these are, however, likely to become of commercial importance, though a more accurate knowledge of the composition of the mighty shoals which visit our shores may reveal the presence of at least two other species in remunerative quantities.

Of these four the Pilchard, *Clupea sagax*, is the most valuable, and is no doubt destined to become at some future period a source of considerable wealth to the Colony, perhaps even, when a regular fishery has been inaugurated and the necessary factories erected and worked under expert management, to enter into no mean rivalry with its more famous northern relative. In a fresh state its flesh is of equal excellence with that of the Atlantic Pilchard, and, given its capture in sufficient numbers, there is no reason why it should not compete successfully with the bloater and the sardine of foreign production; at the least we ought to be able to produce sufficient for home

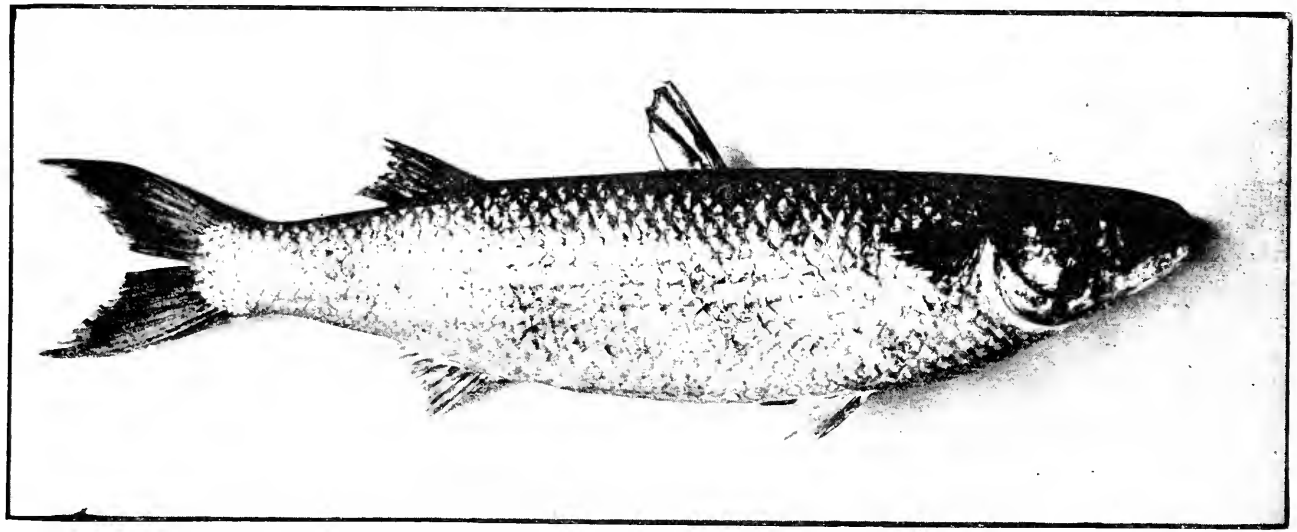
consumption, and thus check the annual outflow of money now expended in the importation of these luxuries, even if we fail to reverse the process by becoming in our turn exporters.

The only other species which bears any external resemblance to and is, therefore, likely to be mistaken for the Pilchard is the Maray, *Etrumeus jacksoniensis*, and it may be easily distinguished by the character of the ventral profile which is rounded, broad, and smooth to the finger, whereas in the genus *Clupea* the same part is compressed, sharp, and carinated. The Maray is said to pass northwards about the same season of the year as the Pilchard, and in the same prodigious shoals, and if this be the case it would, of course, be liable to capture and utilisation for the same purposes as that fish. In habits also it appears to be very similar, both species being exceedingly unwilling to approach the shore too closely, indeed so marked is this aversion in the Maray that the writer only knows of three examples in the two Sydney Museums. On their approach to the Queensland coast the shoals deflect in the direction of the open sea, and to insure the success of any fishery carried on beyond our borders, the fishing craft would have to be prepared to venture further afield, and to be provided with ice or salting chambers for the necessary preservation of the take; this deflection is doubtless due to the influence of warm currents setting in a southerly direction from inside the Great Barrier Reef.

Several other species of edible clupeiform fishes are found more or less numerously in our waters, among which may be mentioned the Big-eyed Herrings, *Elops saurus* and *Megalops cyprinoides* (*Elopidæ*), both of which attain a length of three feet, and the Salmon Herring or Sabalo, *Chanos salmoneus* (*Chanidæ*), which grows to at least a foot more; the two latter species, probably also the former, thrive well when kept in fresh- or brackish-water ponds or tanks. The Bony Bream, *Dorosoma richardsoni* (*Dorosomatidæ*) of our western rivers is said to be of good flavor, but so phenomenally full of bones that the flesh is not worth the trouble of separating from the framework, though it is said that by soaking them in vinegar prior to cooking this difficulty may be removed.

Iniomi.—Only one species, the Sergeant Baker, *Aulopus purpurissatus*, is worthy of inclusion among our food fishes, and as it is only taken by hook and line, and is of superior quality for the table, the demand is always in excess of the supply. The Cucumber-fish, *Chlorophthalmus nigripinnis*, is abundant at moderate depths outside, and might be taken plentifully by the trawl net, but is not of sufficient size to command a market, though they would probably be delicious if preserved like sardines. One or two species of Lizard-fishes (*Synodus*) are occasionally to be found in the market, but they cannot be considered further than in the light of stragglers.

Teleocephali.—In the suborder *Synentognathi* we find some of our most valuable food fishes. Among the Halfbeaks (*Hemirhamphidæ*) six species have been recorded from our waters, but two only can at present be considered with propriety as possessing an economic value; these are the Sea Garfish, *Hemirhamphus intermedius*, and the River Garfish, *H. regularis*, the latter of which, though the smaller, is generally considered the more delicious of the two. Both species



SEA-MULLET.

(*Mugil dobula.*)

are very common along our shores, and are taken in quantities by special small-meshed nets. The Sea Garfish, as its name implies, frequents the outer beaches and those of the more open portions of our bays and harbors, while its congener confines itself more strictly to the tidal waters of our estuaries; the deposition of the ova takes place during the three last months of the year, but as the parents rapidly recoup they may be regarded as being in good condition all the year round. I am not aware that any attempt has been made to preserve these fishes by a similar process to that to which the halfgrown Pilchards are subjected in order to convert them into sardines, but I have no shadow of a doubt that under a like manipulation they would as far excel that fish in their tinned form as they do in their fresh. Of course, for preserving in this way the immature Sea Garfish and the River Garfish would be the more suitable.

Percesoces.—Of the numerous families of fishes which frequent our shores there are none of such commercial importance as that to which the Sea Mullet and its allies (*Mugilidæ*) belong. At least eight species of Gray Mullets occur in greater or less abundance within our limits, all of which are justly esteemed as food, and several of which conjunctively constitute a large proportion of our fish supply. Some of these are marine forms which at stated seasons make their way from the open sea into our bays and estuaries for the purpose of depositing their spawn; others again inhabit the brackish water of our estuaries at all seasons of the year; while yet another section, whether from choice or otherwise, are permanent residents in fresh water, and successfully propagate their species therein.

In point of size and quality the Sea Mullet, *Mugil dobula*, stands out preeminent among its congeners, attaining to a weight of ten pounds and upwards, and affording, in one or other of its stages of growth, a permanent supply of excellent and wholesome food throughout the year.

During the latter part of the summer and the autumn months enormous shoals of these fishes make their appearance off the coast, moving in a general northerly direction; these shoals are composed entirely of adult individuals on the way to their spawning grounds, and are now in the most perfect condition, and admirably adapted either for consumption in a fresh state or for preservation; it is to these shoals, while on their annual migrations, that we must in future look to supply the ever increasing demand upon the resources of this our premier food fish.

From these vast masses a larger or smaller portion breaks off at such intervals of their passage northwards as enables it to arrive each at its special breeding haunt in time for the autumnal spawning. In our southern bays and estuaries this important function commences in March, but the season grows gradually later as we proceed northwards, until in the Richmond and Clarence district May, and even June, find the shoals still engaged upon the spawning beds.

As soon as the ova have been deposited upon the extensive mud flats which fringe the mouths of our rivers, the bulk of the fishes, such at least as have survived the numerous dangers to which they have been subjected on their passage to and during their operations on the spawning beds, make their way individually or in small parties seawards, and the ova having meanwhile rapidly germinated on the warm shallow flats,

the emancipated fry quickly seek the sheltered bays and quiet reaches of our rivers, and there, in such security as may be possible from their numerous enemies, pass this first and perilous period of their sentient existence. In such localities they remain for some eighteen months, during which period they have ventured out from the shallows and drop up and down with the tide, approaching the shore with the rising flood in search of food. At this age they average about twelve inches in length, and are of marketable size, and the pick of our Mullets for consumption in a fresh state. It is at this stage of growth that they are known to fishermen and dealers as the Hard-gut Mullet, and have received their specific name of *dobula*. During the spring and summer months shoals of these immature fishes are gradually but continuously working their way down from the nurseries to the sea, where they serve to reinforce the mighty armies of adults now gathering together for their annual pilgrimage.

In order to avert the impending destruction, or at best lamentable depletion of this valuable species, stringent regulations providing for and insuring its more efficient protection when on or approaching the spawning grounds are already requisite, and will soon become absolutely indispensable; and as these breeding places consist of the shallow muddy flats outside and just within the embouchure of our rivers (for the gravid females do not, as many suppose, penetrate to any great distance up the rivers) it is evident that once the shoals have passed inside the various "Heads," they should be jealously secured from further molestation until after this, the most important function of their lives, has been safely brought to a conclusion.

In both the adult and immature stages this species, when freshly caught, is justly held in high estimation for the table, and commands a ready sale at reasonable prices wherever offered; owing, however, to the lack of suitable establishments for preserving the captured fishes on a scale sufficiently large to make the industry remunerative, many tons weight are annually suffered to decompose, and thus a bountiful supply of cheap and wholesome food is wasted; and this waste, great as it frequently is, forms but an inconsiderable trifle in comparison with the myriads of unimpregnated ova which are totally lost through the ceaseless and short-sighted persecution to which the breeding fishes are subjected from the moment of their first appearance on the spawning beds until the last wearied and weakened survivor shall have successfully run the gauntlet of these countless dangers, and escaped for a season to the safer shelter of the ocean depths.

When to this appalling destruction of ova is superadded that of the young fry, which the continual sweeping of the foreshores of our harbors and estuaries by small-meshed nets necessitates, it is abundantly evident that no kind of fish, which is by its nature compelled to deposit its spawn within the shallow waters of the littoral zone can successfully cope for any length of time with the ravages caused by so great, so inexcusable, and so easily avoidable a drain upon its resources, so blindly ignorant and wilful a contravention of all natural laws.

In addition to the Sea Mullet, at least seven other members of the family are known to occur, more or less abundantly, within our limits; by far the most important of these, whether in regard to its numbers,

its size, or the delicacy of its flesh, is the Flat-tailed Mullet, *Mugil peroni*, which, though never attaining to the same dimensions, nor, in general estimation, to an equal standard of excellence as its more favored relative, is, nevertheless, a good fish for the table, and as well adapted for smoking as is that species.

The spawning season corresponds in the main with that of the Sea Mullet, but apparently extends over a longer period, specimens with fully developed ova being obtainable in the Sydney markets at any time between December and June. They chiefly frequent shallow sandy and sheltered bays, and have not been proved to migrate along the coast to the same degree as do their larger congeners, though a partial movement from one inlet to another, induced doubtless by the restlessness consequent upon the approach of the spawning season, is said to be perceptible.

Acanthopterygii.—Among the Acanthopterygians proper, the first family to claim attention is the *Berycidæ*, to which the Nannygai, *Beryx affinis*, one of our most delicious edible fishes, belongs. They are only caught by hook in moderately deep water, and, being in great demand, the small supply which finds its way to the markets is eagerly purchased at high rates. It is one of the most beautiful of all our fishes, attains to a length of twenty inches, and is said to be a great delicacy when slightly corned and smoked.

Several kinds of scombroid fishes frequent our coast, the most important of which is the Southern Mackerel, *Scomber australasicus*, That enormous shoals of these fishes visit our shores we cannot but believe on the evidence adduced, but the intervals between these appearances are so irregular, that the idea of a remunerative fishery dependent on the Mackerel alone is not for a moment to be entertained. The paucity or abundance of the supply of food is probably responsible in great measure for this irregularity of behaviour, so far at least as their presence in our bays and inlets is concerned, but it does not in such a degree affect the great shoals, which, by general consensus of opinion, are believed to pass northwards in the offing at or about midsummer, as with these shoals, being fully engrossed in the business of spawning or of reaching their accustomed spawning grounds, food is a secondary consideration. As is the case with the Pilchard and other ocean surface fishes, the Mackerel shed their spawn in the open sea *en masse;* owing to the contained oil globule, the ova are lighter than the sperm of the male fish, and, as when engaged in spawning the females swim at a slightly deeper level than the males, each extruded ovum as it rises gradually to the surface is obliged to pass through the slowly sinking masses of spermatozoa, and thus becomes impregnated and fruitful; the ova floating on the surface quickly germinate, and the liberated fry are wafted from place to place under the influence of the tides, currents, and winds, until, the yelk-bag being exhausted, the young fish enters untrammeled upon the primal phase of its free existence. Either fresh or pickled Mackerel are delicious eating, but they decompose with such rapidity that great care has to be exercised in selecting individuals for use at the table.

Among the Scads (*Carangidæ*) we find several species which, from their numerical abundance and their excellent food qualities, play no inconsiderable part in the fish resources of the Colony.

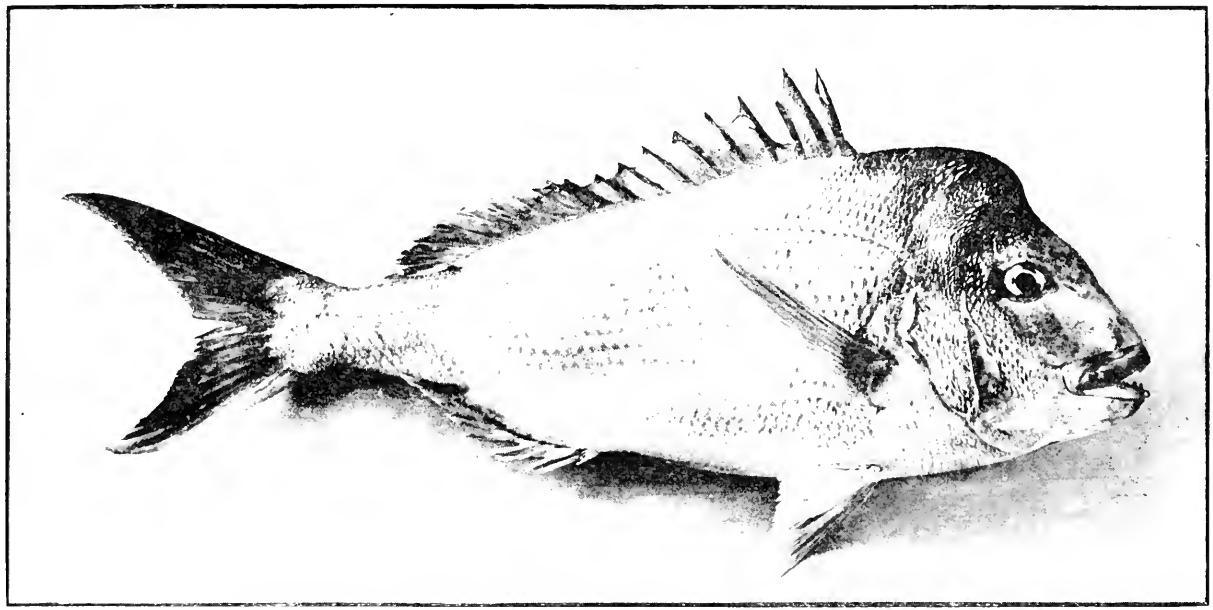
The Trevally, or more correctly Crevallé, *Caranx georgianus*, is another abundant fish along our entire sea-board from north to south, and forms a conspicuous feature in our fish supply; the young and half-grown are much more numerous than the adults, and are very generally present in our markets, while the latter prefer to keep off at some distance from the land, though not in so marked a manner as the adult Yellowtail, *Trachurus saurus*, does.

The Kingfish, *Seriola lalandii*, and its congener the Samson-fish, *S. hippos*, also belong to this family; the former is by far the more plentiful and is found along the entire length of our coast at all seasons; they school at the surface during the autumn when they shed their spawn, but it is a noteworthy fact that, unlike the two preceding fishes, the young do not appear inshore at a very early age, in fact not until they are of the marketable size of quite a foot in length. It is a bold predacious fish, and does considerable damage to the inshore fisheries, such as those which are carried on for the different kinds of Mullets, Whiting, &c., by harassing the parents when on the spawning beds, as well as by the consumption of the fry, which is illimitable on account of its insatiable voracity. The Kingfish attains to a weight of sixty pounds, and when even a small shoal is enclosed within a net it frequently proves no unmixed blessing to the owners, for their determined efforts to escape often prove triumphant, the rush of so many large fishes, acting in concert, being irresistible. Smoked or salted, the Kingfish, when taken in sufficient quantities, would doubtless form a desirable article of export.

Closely allied to the *Carangidæ* is the family *Pomatomidæ*, of which the Tailor, *Pomatomus saltatrix*, is the sole representative. The spawn is shed in the open sea but within tidal influence, and the young fishes soon find their way to the shelter of the harbors and estuaries, where they rapidly increase in size, and whence they are sent to market in large numbers for sale as bait in company with Yellowtails, &c. The half-grown and adult fishes form a conspicuous feature in our markets, and are bought up with avidity, being indeed one of our most delicious food fishes, though care must be observed in selecting individuals for the table, as the flesh deteriorates very rapidly; they take smoke excellently, and no doubt, when our factories shall have become *un fait accompli*, will be turned to profitable account in that way, while there is no reason to doubt that, carefully prepared in tins, they would readily commend themselves to purchasers, and form no mean rival to the imported Salmon for home consumption.

In the great family of the Basses (*Serranidæ*) several species claim our attention, either because of the excellence of their flesh or because the capture of them may at some future time attain to such dimensions as to necessitate their taking rank among those of economic importance.

First in the list may be placed the Australian Perch, *Percalates colonorum*, a common fish of our cismontane rivers and estuaries, which is often well represented in our markets, where it commands a ready sale, being held in some estimation as a food fish. The range of the species is rather limited and may be roughly given as the coastal rivers of south-eastern Australia, from the estuary of the Richmond to that of the Murray River, and northern Tasmania. Within



THE SCHNAPPER.

(*Sparosomus auratus.*)

these limits, however, it is plentiful in suitable localities, such as the Gippsland Lakes, and might well repay a little care in its culture and preservation, especially as it lives and thrives in land-locked ponds, is very hardy, grows to a weight of three pounds and upwards, and gives good sport to anglers.

In the Murray Cod, *Oligorus macquariensis*, our western rivers can boast of a fish far beyond the Perch in intrinsic value, a fish too which, in the quality of its flesh and the great size to which it grows, is the compeer of any known purely fresh-water species.

To the species above mentioned must be added several marine Serranids which occur more or less numerously on our coast. The best known and most esteemed of these is the Black Rock-Cod, *Epinephelus dæmeli*, a fine fish which grows to upwards of a hundred pounds in weight and is in great request for the table, but has from some cause or other become very scarce in the metropolitan district, and is now rarely seen in our markets and then of small size, even though it always commands a high price. On other parts of the coast, however, such as the Seal Rocks and the Solitaries, and at Lord Howe Island and Elizabeth Reef, they may be taken of the largest size and in almost any quantities, and if regularly sought for—which would be the case if there were an assured market—would probably develop into a valuable article of commerce whether salted, smoked, or tinned. An allied species, the Giant Cod, *Epinephelus itaiara*, is taken not unfrequently in the estuaries of our northern rivers, and attains to at least three times the weight of its congener. Another well known species is the Wirrah, *Acanthistius serratus*, which is much more common, but does not nearly grow to the size of the Black Rock-Cod, nor is its flesh so much esteemed.

The small family *Arripididæ* is represented on our coast by the so-called Salmon, *Arripis trutta*, and as this species is exceedingly abundant, and schools at the surface at stated periods, it might be taken in enormous numbers during its migrations, in the same way and by the same nets as the Mullet, as well as by the seine on the ocean beaches, and such as are not consumed locally could be utilised to form an inferior brand of salt fish.

One of the most important families which frequent our seas is that of the Sea Breams (*Sparidæ*), to which belong some of our most common and valued edible fishes, such as the Schnapper, *Sparosomus auratus*, the Black Bream, *Chrysophrys australis*, and the Tarwhine, *C. datnia*.

So much has been written about the Schnapper and Schnapper-fishing that it seems supererogatory to increase the literature of the subject here. In this Colony the supply of Schnappers is almost entirely due to the line fishermen, who seek them on well known reefs at moderate depths, and off rocky points and bomboras. During the early summer months these fishes school, the shoals consisting of adults intent on breeding; but as to where, or under what circumstances, this important operation is carried out, or in what localities the ova are deposited, we are still in the dark. They cure well, and are said to be equal to the finest Cod, and much superior to Ling for that purpose.

The Black Bream is everywhere abundant in our seas, and makes its way up our rivers even beyond the limits of the tide; its favorite haunts are, however, sheltered bays and estuaries, where it is taken in

large numbers, both by net and hook, affording with the latter good sport to the amateur fisherman. The Tarwhine is more distinctly a northern fish than its congener, differs but little from it in its habits, and might be utilised in the same way.

To the *Kyphosidæ* belong several edible species, such as the Sweep, *Cæsiosoma æquipinnis*, the Drummer, *Pimelepterus sydneyanus*, the Blackfish, *Girella tricuspidata*, the Ludrick, *G. simplex*, and the Bluefish, *G. cyanea*. The Blackfish is abundant in the metropolitan markets at all seasons, and when perfectly fresh is a good pan fish, as it is also when smoked. The Sweep, Drummer, and Ludrick occur in moderate numbers during the year, but the Bluefish is scarce with us; this is mainly to be accounted for by its preference for the open sea; thus we find it very abundant at Lord Howe Island, where neither of the other species is found, and where it is a staple article of food among the inhabitants, either salted, smoked, or fresh; from thence and from Elizabeth Reef it could be brought in any quantity required and transhipped to other countries.

A small but well flavored fish, which inhabits our inlets and swims in large shoals, is the Silver-belly, *Xystæma ovatum* (*Gerridæ*). It grows to a length of about eight inches, and would no doubt be delicious preserved like sardines.

Among the Gropers and Parrot-fishes (*Labridæ*) we find several species, which have a great reputation for the table, and are always readily saleable, but they are never caught in such quantities as to be of economic importance; among them may be mentioned the Blue-spotted Groper, *Chœrops ommopterus*, a fine firm-fleshed fish, attaining to a length of two feet and upwards, and common in our northern districts; the Blue and Red Gropers, *Achærodus gouldi* and *badius*, the former of which is abundant in all suitable localities, and is highly esteemed, the head and shoulders being considered an especial delicacy; and the Pigfishes, *Lepidaplois oxycephalus* and *bellis*.

A very important family in our seas is that of the *Sciænidæ*, though but two marketable fishes belong to it; these are the Jewfish, *Sciæna hololepidota*, and the Teraglin, *Atractoscion atelodus*. The former is very common along the coast of New South Wales, from north to south. The Jewfish grows to the length of five feet, but for the table the half-grown examples of two feet and under are preferable; at this stage they are sold as "Silver Jews," and roam along the coast in large shoals, entering the various harbors and inlets, and thus coming within the scope of the seine fishermen to whom they prove a valuable harvest, as they are always readily saleable at fair prices.

The Teraglin is a much better fish for the table than even the Silver Jew, but is not obtainable at all seasons as is its relative, nor does it grow to so large a size. The air vessels of all the members of this family are of very large size, and as the best quality of isinglass is manufactured from them it would be necessary when our factories shall have been established, to devote some time and space to the collection and preparation of this product.

The *Cottidæ* hold a place in our list by virtue of the Flatheads (*Platycephalus*), five species of which occur in the Sydney markets. By far the most abundant of these is the Common Flathead, *P. fuscus*, which may fairly be reckoned among our best food fishes.

To many persons, the writer among the number, the Whitings will commend themselves as being, perhaps with the sole exception of the *Hemirhamphidæ*, or Halfbeaks, at once the most delicate and the most deliciously flavored of all Australian fishes. Two species minister to the wants of our tables, the larger of which attains to a length of twenty inches, is a clean, handsome fish, and is taken in numbers both on the outer and inner sandy beaches, either by net or by hook. This species is the Sand Whiting, *Sillago ciliata*, but though its congener, the Trumpeter Whiting, *S. maculata*, does not reach to such dimensions, it is held by many to be the more delicately flavored fish of the two. It is as a rule more partial to the flats and reaches of our estuaries than the more exposed beaches which its congener prefers. Both species deposit their spawn in holes formed in the sand, and both old and young bury themselves in the sand or mud when threatened by any danger.

A very interesting family (*Gadopsidæ*), which only contains a single species, *Gadopsis marmoratus*, is an inhabitant of our southern rivers. This family has been generally included among the Anacanthines, but its affinities apparently approach more closely to the blennioid type; it is a common fish in many of the rivers of our south-eastern watershed, and is said to be excellent eating; it takes a bait freely.

Heterosomata.—The Flounders (*Pleuronectidæ*) furnish us with two or, at most, three species worthy of mention as an addition to our food supply. These are the Large-toothed and Small-toothed Flounders, *Paralichthys arsius* and *multimaculatus*, both of which are fairly common, and the Long-nosed Flounder, *Ammotretis rostratus*, which is scarcer, but is a thicker and even better flavored fish than either of the others.

Only two species of Soles (*Soleidæ*) can be classed among our marketable fishes, namely—the Narrow-banded Sole, *Aserragodus macleayanus*, and the Black Sole, *Synaptura nigra*, the latter being the most abundant of our flat-fishes.

Plectognathi.—The Trigger-fishes, *Balistidæ*, are well represented in our seas by numerous species of Leather-jackets, several of which grow to an edible size, and must be classed among the most delicate of our fishes, care being taken to skin them before cooking.

I cannot conclude these observations without once again pointing out that a remunerative trade might, with little initiatory expense, be developed with China in shark fins, and that the oil extracted from the livers of the Plagiostomes contains valuable medicinal properties.

Mining Industry.

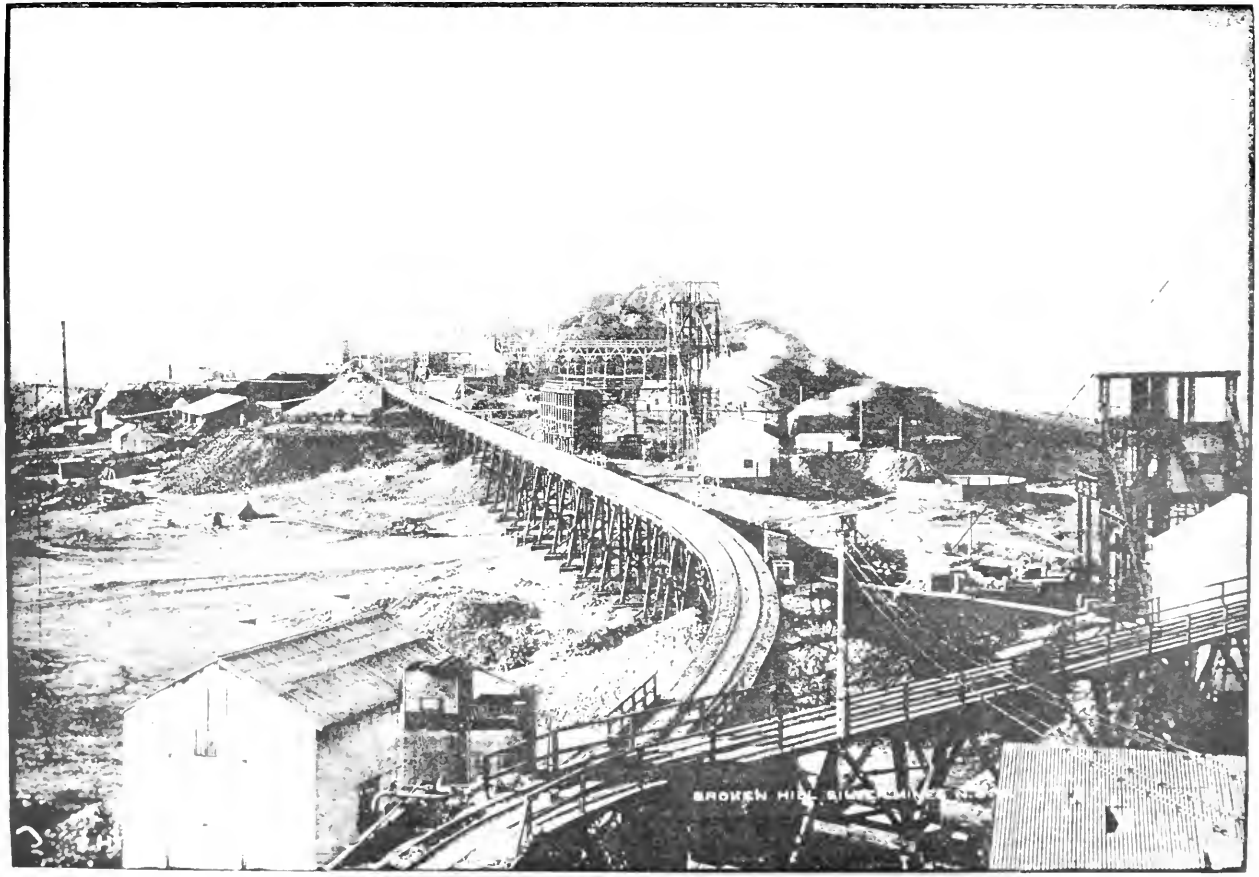
By W. H. J. Slee, Esq., F.G.S., Chief Inspector of Mines, &c.

The gold-fields of New South Wales are very numerous and extensive, stretching from Mount Browne, the extreme north-westerly part of the Colony, on to the river Murray, a distance of nearly 700 miles, and the extent of the auriferous area at present known covers fully 80,000 miles.

The Mount Browne Gold-field was first discovered in October, 1880, in an arid country, the average annual rainfall being about 8 inches. The district is known as Sturt's Stony Desert, and here, owing to a severe drought, the explorer, Sturt, was obliged to camp for some months in 1845 on a water-hole now known as Depôt Glen. Here, too, the second in command named John Poole died; the exploring party underwent great hardships and privations; John Poole's grave has since been discovered and fenced in, and is now a historical spot in New South Wales. Within 200 yards of Depôt Glen, the first payable gold on the Mount Browne Gold-field was discovered just thirty-five years after Sturt and his party departed from Depôt Glen.

The geological formation in which the gold occurs is silurian slates and granite, and the highest elevation—that is, Mount Browne and Mount Poole—is about 300 feet above the surrounding cretaceous plains; forming, as it were, an island surrounded by the former cretaceous sea; the extent of the auriferous area is about 40 miles in a north-easterly by south-westerly direction, and from 1 to 5 miles in width. The gold generally is coarse and water-worn; nuggets up to 30 oz. in weight have been obtained; the gold is of the highest quality, the local price being £4 per oz. Generally the gold is found on the surface or in shallow sinking, but lately ground from 150 feet to 200 feet has been worked with payable results. The quartz reefs, which vary in thickness from a mere thread to several feet, have in several instances proved payable, and new payable discoveries have only very recently been made. A 10-stamp battery for quartz-crushing and gold-saving purposes is on the field. There are also a large number of puddling machines erected all over the field, which are, however, frequently idle for want of water. Milparinka and Tibooburra are the principal towns, and are now connected by telegraph.

Cobar, about 300 miles from Mount Browne, also in our north-western district, was opened about twenty-five years ago for copper-mining, and thousands of miners were employed. Notwithstanding this, rich and extensive gold discoveries were only made within the last five years, and that within only 3 miles of the copper-mine referred to, proving beyond doubt new gold discoveries may be made throughout the Colony



BROKEN HILL SILVER-MINES.

in close proximity to our older mining districts. Highly payable crushings have lately taken place from the Cobar gold-mines, such as the Occidental, Albion, Young Australian, Chesney, and others.

Gold was also discovered about 20 miles westerly of Cobar on places known as the Billygoe and Mount Drysdale, which only recently turned out some enormously rich yields. There are now five different crushing and gold-saving plants, consisting of stampers and Huntingdon mills within 3 miles of Cobar. Huntingdon mills have also been erected in the Mount Drysdale district.

Peak Hill, a gold-field situated about 42 miles from Dubbo, and about 30 miles from Parkes, was discovered in 1890. There are to be found both quartz and alluvial deposits, some of which turned out very rich. In May, 1881, a shaft was bottomed in dry alluvial at a depth of 130 feet; the size of shaft being only 5 feet long by 2 feet wide, thickness of wash 3 feet from which 7½ oz. of gold were picked by hand as the auriferous wash was brought to the surface. In consequence of this a large rush set in, and within a fortnight the population increased from 1,500 to 12,000. But as only a few claims obtained payable gold, the population decreased, and is now about 1,500 to 2,000. Some rich discoveries have only very lately been made in the district.

The Parkes district has for many years supported a large mining population. The gold deposits consist of alluvial and quartz. The alluvial has been very extensive, shallow and dry, and the quartz reefs have proved to be permanent and rich. Some of these quartz mines have yielded, and are now yielding, thousands of pounds sterling to the fortunate shareholders. There are several quartz crushing plants with the latest improved gold-saving appliances on the field. About 50 miles west of Parkes are the recently discovered Burra, Fifield, and Platina gold workings.

At Forbes, about 22 miles from Parkes, where enormously rich alluvial gold deposits have been worked in shallow as well as deep and wet leads for the last thirty-five years, mining has lately received a fresh impetus through the discovery of rich quartz veins in the vicinity of Grassett's Lead.

In the Wellington district, at a place known as Mitchell's Creek (Daviesville), quartz reefs which had been abandoned years ago were reopened with satisfactory results. These reefs prove at a depth of 600 feet to be well defined; average about 20 inches in thickness, and have yielded during the year 15 dwts. 14 grs. of gold per ton; no free gold can be seen in the quartz, the latter being heavily charged with pyrite. The machinery consists of a 15-stamp crushing battery; the crushed stuff runs over copper plates and mercury wells, then through wooden shoots about 400 feet in length on to the Vanners, after which the concentrates are treated by the process of chlorination.

The Mudgee district is also very extensive, both for alluvial and quartz; of the latter Hargraves and Clarke's Creek are the principal. Some satisfactory returns are still obtained from capital and labour. In the alluvial, such as Gulgong, Happy Valley, and other localities, very large auriferous deposits have been worked, and out of small claims 120 ft. x 120 ft. over £30,000 worth of gold has been won. The Gulgong Gold-field was discovered twenty-eight years ago, and it still contributes

largely to the production of gold. New and rich discoveries of alluvial gold have recently been made in said district near a place known as Cobbora. The auriferous area in the district is very extensive, and has only been partially prospected. In the Bathurst and Hill End district, gold-mining operations are still carried on with various success. Some very rich finds were made at Hawkins' Hill, Hill End, of which some may be mentioned, namely, the proprietors of Krohmann's claim crushed 436½ tons quartz, yielding 24,079 oz. 8 dwt. gold, valued at £93,616 11s. 9d., and Beyers and Holtermann crushed 415 tons of quartz, yielding 16,279 oz. 6 dwt. 3 grs. of gold, valued at £63,234 12s. From the Monte Cristo Mine, several crushings were taken out of a quartz vein, yielding 200 oz. of gold per ton. Recently new shoots of gold have again been discovered.

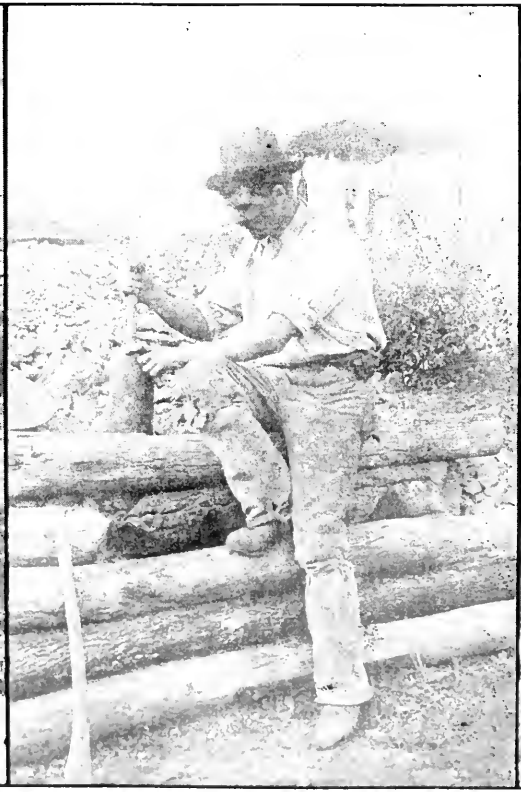
The Blayney, Carcoar, and Cowra districts also largely contribute to the yearly yield of gold. At Brown's Creek, near Blayney, a 60-stamp battery, with all recent improved gold-saving appliances, is now in course of erection to work the large deposit of the old Brown's Creek Mine.

A great deal of gold is still obtainable in the Orange district, the Lucknow Mines alone contributed last year 36,208 oz. of gold, valued at £128,197 sterling. The quartz in the Lucknow Mine is heavily charged with pyrites, and although there is large crushing power, and improved gold-saving appliances on the field, only the free gold is dealt with on the spot, and the concentrates are forwarded to Europe for the extraction of gold. New gold discoveries have also very recently been made at Gilgunnia, about 30 miles from Nymagee, and the same distance from Mount Hope. So far, only quartz veins have been discovered. These occur in an altered sandstone and slate formation, and vary in thickness from a few inches to several feet. Several crushing from 5 to 20 tons were treated at the Clyde Works, near Sydney, with highly payable results. Crushing and gold-saving machinery is now in course of erection; but, being in a very arid part of the Colony, water is scarce. Here, like Mount Allen, the gold is associated with iron. This district, only a few weeks ago, was a mere sheep-walk; it is now a settlement of about 500 persons, which number is likely to increase and remain for years to come.

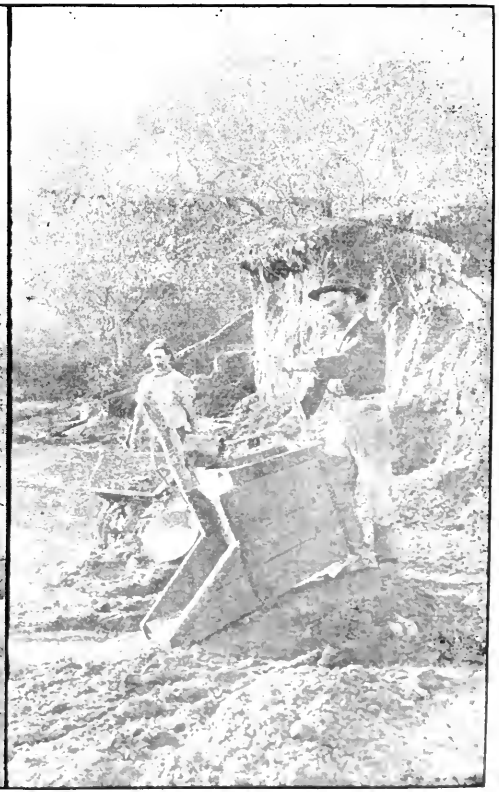
The Mount Allen district has also largely contributed to our yearly yield of gold. The gold is greatly associated with an iron deposit. This part of the Far West has not as yet been thoroughly prospected, and new gold discoveries may be looked forward to in different parts of the district.

The Kiandra Gold-field, situated in the Australian Alps, has yielded very large returns of gold, both in alluvial and quartz, but specially in alluvial. The gold is generally found in the creeks and river flats, and ground sluicing is mostly the mode by which the gold is extracted from the auriferous drifts. Here, too, a trial was made with extensive hydraulic sluicing, but owing to the great thickness of non-auriferous strata, from 80 to 120 feet, which had to be sluiced away before the 2 to 3 feet auriferous wash was reached, and the inability to obtain sufficient fall in the tail race, the enterprise had to be abandoned and the old system of driving and timbering reintroduced. Nevertheless there is a very large amount of sluicing carried on throughout the Australian

PANNING.



CRUSHING QUARTZ.



CRADLING.

Alps by small parties of miners who have constructed dams and races, and are generally able to sluice at least nine months out of the twelve months.

New discoveries of gold-bearing quartz reefs have recently been made in the mountains of the Upper Murray in the Albury district in a locality known as Bulgandra, several samples from 5 to 50 tons have been crushed with highly payable results.

Gold was also discovered by boring on the river Murray Flats, near Corowa, and payable prospects were obtained at a depth of 320 feet. It is now considered a certainty that those deep rich alluvial leads which are so successfully worked in the Rutherglen district in the Colony of Victoria will be traced across the river Murray into New South Wales, and for this object a local company has already started operations at Corowa in the vicinity of the bores referred to.

Numbers of persons are earning a living in the Monaro country working in quartz reefs, or for alluvial in the creeks and gullies in the Cooma district.

In Adelong great improvements have lately taken place in the yield of gold. The Adelong quartz reefs proved very rich; but blanks occurred in the quartz, the consequence of which was that some of the best mines were abandoned. They have, however, been retaken after lying idle for some years, and after sinking through the barren quartz only a few fathoms, the gold again appeared in highly payable quantities. For instance, the Gibraltar Mine, within 2½ miles of Adelong, had been lying idle for years, it was retaken, sunk through the barren quartz, and since then several hundreds of tons of quartz have been crushed, yielding about 5 oz. of gold per ton. The reef averages about 18 inches in thickness, and is impregnated with pyrites rich in gold.

Some years ago, the Great Victoria Company, of Adelong, received the Government reward of £1,000 for having been the first quartz mine in New South Wales which obtained payable gold below the depth of 1,000 feet.

There are at present two crushing machines on the Adelong Goldfield. One known as the Perseverance consist of a 45-h.p. engine with a 20-stamp battery of five stamps in each box. After the crushed stuff discharges through fine gratings, it runs over two sets of copper plates and wells charged with mercury into Chilian mills, of which there is one to each five stamps; from the mills it passes into Denny's pulverisers, of which there is also one to each five stamps; from here on to the usual blanketing tables into a patent buddle to concentrate the pyrites, the residue passing afterwards into a Renfray's separator for further treatment, and after this into a reverberatory furnace, thus reducing the loss of gold and mercury to a low minimum. Further improvements are intended to be made by adding the most recently improved gold-saving appliances obtainable.

The other crushing plant is driven by water power, and is known as the Reefer's Machine. There are two water-wheels, one overshot, the other undershot, giving a double power from the one water race; a 15-stamp battery, and all the modern gold-saving appliances. For a public battery, that is a battery only crushing for the public, it is probably the best and most complete of the kind in New South Wales.

The Adelong quartz reefs are heavily charged with pyrites, mispickel, galena, zinc blende, and copper; hence more attention has been given to the saving of gold than has been done in districts where free gold in quartz veins predomiuates.

In the Gundagai district large quantities of gold have been obtained both in quartz and alluvial, and only recently very rich discoveries have been made. Prospecting is very extensively carried on. There are several crushing plants in the district; the deepest quartz mine is only 300 feet in depth.

Temora, in the Bland district, where gold was first discovered in 1880, is again coming to the front. Some very rich reefs have been discovered lately at a place known as Scrubyards, where one party has just finished crushing 286 tons of quartz, yielding 1,788 oz. 12 dwts. of gold, or about 6 oz. 5 dwts. of gold per ton, with a quartz vein from 3 to 12 inches in thickness, the country rock being soft. This reef has now reached the depth of 100 feet, and has so far been traced over 400 feet along the surface. There is an extensive tract of auriferous country between Scrubyards, Temora, Reefton, Barmedman, Wyalong, and Yalgogrin, which is well worthy of a thorough prospecting.

Reefton, Barmedman, and Wyalong are, so far, essentially quartz-reefing districts, no payable auriferous alluvial discoveries have been made. But there is no reason why auriferous alluvial discoveries should not be made in those localities. Only very recently several new gold discoveries have been added to our already known mineral wealth. Foremost are those at Wyalong in the Bland district. The first discovery of the Wyalong Gold-field was made in October, 1893, when the locality was a wilderness and mere sheepwalk. In March, 1894, the first actual rush set in, and in a few weeks the population reached about 10,000. But the present number is about 3,000, and the latter number is likely to be settled on the field for some years to come. Nearly 20,000 tons of quartz have been crushed from this field, yielding, with the gold from the concentrates, about 29,500 oz. of gold. The gold is valued at nearly £4 per oz.

Wyalong is a poor man's gold-field; the reefs occur in decomposed hornblendic granite and diorite; can be easily worked without explosives, and have been tested to about 200 feet, or water level. The yield of gold has varied from a few pennyweights to 10 oz. per ton. Up to date no gold leases have been granted on the Wyalong Gold-field. This course has been adopted by the Hon. Sydney Smith, M.P., Minister for Mines and Agriculture, for the purpose of preventing monopoly, and encouraging a systematic and thorough prospecting of the field. When an application for lease has been made for any particular area, no other person can interfere with same, and no labour need be employed until the lease is granted, and then fewer persons are required to comply with the labour conditions than would be if the same area were held as a quartz claim by virtue of the miner's right. Hence it will be seen that the course adopted by the Hon. Sydney Smith, M.P., Minister for Mines and Agriculture, was a far-seeing, prudent, and wise one, whereby great encouragement has been given to the individual miner to follow his avocation of prospecting unmolested, and without fear of trespassing on some area held under application for lease.

All claims at Wyalong are held by virtue of the miner's right, which costs 10s. per annum, and entitles the holder to occupy and work 60 feet along the line of any quartz vein or reef by 100 feet in width, eight such chaims may be conjointly held, that is, 480 feet along the line of reef by 400 feet in width. As a rule, four, six, and eight men's claims are the areas worked.

There are forfeiture clauses in the Mining Regulations, by which a miner's right holder can apply to the Local Warden to be put into possession of any share, interest, or claim, which has not been efficiently represented and worked for a period of three consecutive days, and which the Warden, after taking evidence on oath, declares abandoned and hands over to the applicant. This cannot be done under the leasing system, as the Hon. the Minister for Mines and Agriculture has alone the power to cancel a lease on account of the nonfulfilment of the labour conditions. This is the reason that the leasing system is in favour with capitalists, as they consider the title of a gold lease is better than if the same area were held under miner's right only. The real fact is that a claim, or mining area, held by virtue of a miner's right, must be efficiently worked, or it becomes liable to forfeiture, whereas leaseholders have many safeguards, even if they do not comply with the labour conditions of their lease.

In addition to the claim allowed by virtue of the miner's right, a miner's right holder is also entitled to occupy one quarter of an acre of land for residence purposes.

No gold leases are granted in alluvial, unless in old or wet ground, which requires large capital, and is beyond the means of the individual working miner.

The area allowed in alluvial, that is, in dry and shallow ground, is 100 feet by 100 feet for one man, and 300 feet by 300 feet for six men, the largest area allowed for one claim.

The Wyalong quartz veins are not large, they vary from a mere thread to about 18 inches, and the gold is associated with galena and zinc blende, hence they may be classed as refractory ores which require a special treatment. Where the concentrates have been saved they have yielded as high as 4 oz. of gold per ton; and it is roughly estimated that during 1895 fully 3,000 oz. of gold have been extracted from said concentrates, which have mostly been collected by the primitive mode of blanketings. Hitherto these concentrates have been forwarded to the Clyde works, near Granville, and some to Victoria and South Australia for treatment; there are now, however, in course of erection and just completed, improved gold-saving appliances, including chlorination works, which will in future do away with the forwarding of concentrates to other parts for treatment.

The Lambing Flat, or Young Gold-field, once so famous for its shallow alluvial gold deposits, is still producing gold in sufficient quantities to a number of miners. Grenfell is famous for extensive quartz and alluvial auriferous deposits. This gold-field was discovered in 1866, and at one time yielded as much as 8,000 oz. of gold per week. It has supported a large number of miners ever since its first discovery. The Grenfell quartz reefs are generally of a great width; in one instance as much as 15 feet, yielding 1½ oz. of gold per ton, whereas quartz reefs in the same district yielded as much as 7 oz. of

gold per ton, with reefs from 3 to 6 feet in width. In only one instance the workings have been carried down to the depth of 720 feet. But the remainder of the reefs, of which there is a large number, have not been worked below the depth of 400 feet. Lately an impetus has been given owing to the payable yields from the Young O'Brien's, the Homeward Bound, the Enterprise, and other reefs. Extensive prospecting operations are also carried on all over the field, on which there are two quartz-crushing batteries; but the gold-saving appliances are rather primitive.

The Hillgrove Gold-field in the Armidale district may be considered as being at present the greatest gold-producing field in the northern districts, employing the largest number of men and most extensive machinery both for crushing and gold-saving purposes. At the Eleanora Company a 30-stamp battery has been erected, and as antimony is associated with the auriferous quartz, furnaces and other machinery have been erected for special treatment. The yield of the gold from some of the Hillgrove mines has been extraordinary. The Baker's Creek Mine is on payable gold 772 feet below the surface, or 600 feet below the creek. This mine has a 40-stamp battery in full work with all the most improved gold-saving appliances. Over £210,000 has been paid in dividends out of this mine. There are a large number of mines in the district, all more or less payable, and indications are not wanting to prove that these quartz reefs may be profitably worked at a very great depth.

The auriferous area extends in all directions around Armidale.

At Nundle and Hanging Rock quartz-mining has been successfully carried on, and sluicing on a large scale has been carried on for some considerable time.

Mining operations, both quartz and alluvial, are also in full swing in the districts of Uralla, Walcha, Swamp Oak, Niangala, Tamworth, and Bendemeer. At Barraba rich gold discoveries have very recently been made in calcite veins, and at Stewart's Brook and Bingara the gold-mining industry is making satisfactory progress. The same may be said of Tenterfield, Grafton, Nana Creek, and Dalmorton.

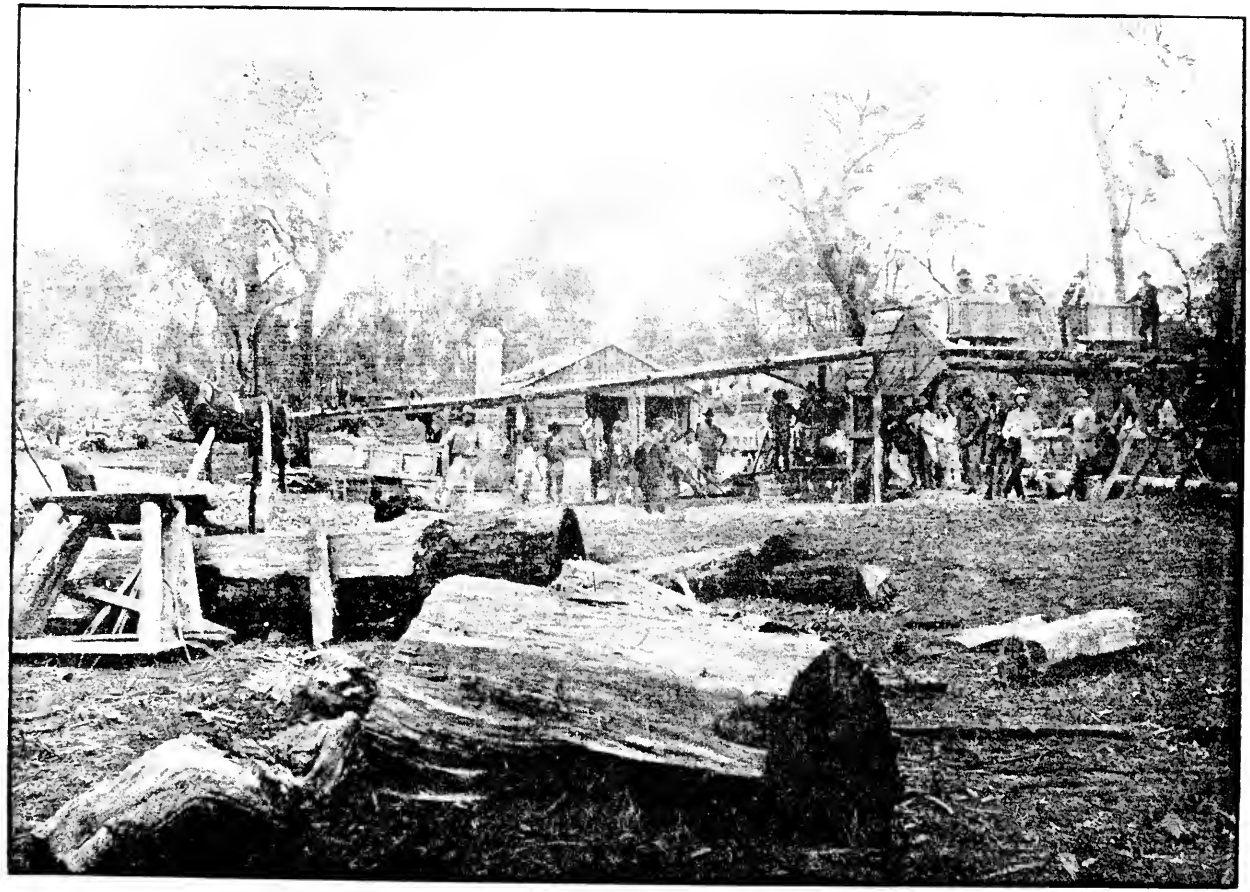
The beach-mining industry in the Ballina and Maclean districts have lately largely contributed to the annual yield of gold.

In the Fairfield or Drake district there is a large area of auriferous country still unprospected, and a number of persons are obtaining a living by working in the numerous creeks and gullies for alluvial gold. Some of the quartz reefs are yielding highly payable returns.

Silver.

Notwithstanding the low price of silver, there are still several mines in the Colony paying highly satisfactory dividends to the shareholders.

The most extensive and important (silver) argentiferous deposits are being mined upon in the Barrier or Broken Hill district, near the borders of South Australia. Here the ore deposits are very rich. They contain all the different species of silver ore, some of the chlorides or horn silver have been of very high quality, and it is generally admitted by mining experts that the deposits in the Proprietary Mine, Broken Hill, cannot be surpassed in quantity or quality by any of the present known argentiferous deposits in the world.



"WESLEY" TIN-MINE — FLANNERY'S WASHING-PLANT.

In addition to silver, the ore deposits also contain a fair percentage of gold, a large percentage of lead, also copper and zinc.

The following total yields, taken from the last report of the Proprietary Mine, Broken Hill, from 30th November, 1886 (the commencement of the Company's operations), up to the 28th November, 1895, being nine years, speak for themselves:—

Ore treated (gross) including moisture.	Concentrates.	Flue dust.	Ore treated (net) including flue dust.	Bullion obtained.	Fine silver.	Lead.
Tons cwt.	Tons cwt.	Tons. cwt.	Tons cwt.	Tons cwt.	Oz.	Tons cwt.
2,512,742 5	53,748 8	26,664 17	2,400,388 6	289,336 17	74,276,099	287,061 5

The profit of the company for the half-year ending 31st May, 1895, amounted to £344,760 7s. 8d. This is certainly the principal company in the Colony in connection with the silver-mining industry. There are other large mines at Broken Hill, such as Block 10, the Central, the South Broken Hill, Block 14, British Blocks, the Junction, and North Junction, and others, which are all producing silver in payable quantities. About 5,000 miners are employed on these mines. Payable argentiferous deposits have also been discovered in different parts of New South Wales, some of which are now in actual work. Boorook, in the Tenterfield district; at Emmaville and Inverell, Glen Innes district; also in the Scone and Armidale district; at Sunny Corner, and other parts of the Bathurst district; Lewis Ponds and other parts in the Orange district; also near Binalong, Grenfell, and other places. In fact, the argentiferous area in the Colony is very extensive. The greatest question of the day in connection with our silver-mining industry is the successful treatment of our sulphide ores. If once this problem can be satisfactorily solved then a large increase in the production of silver may be looked forward to. Large and costly experiments have been made to solve this vexed question, and little by little one difficulty after another is overcome, and silver ores which only two or three years ago were considered as too refractory can now be treated with a profit. Strong companies are now starting with the sole object of buying and treating sulphide ores. The value of machinery in connection with the Barrier Silver-mines alone is estimated over £1,000,000, and this machinery is still being added to from time to time.

Copper.

There is a large area of cupriferous formation in different parts of New South Wales, covering an area of about 1,500,000 acres. The largest and most important lodes or deposits so far discovered are in the arid part of the far west. Of these lodes Cobar has the most important. The Cobar lode varies from 6 to 100 feet in width; the ore being of a very high percentage. The greatest depth so far obtained is about 600 feet. Even at the present low price of copper the Cobar mine is dividend-paying. All the different classes of copper ores have been met with in working this mine during the last twenty-five years. But up to date the sulphides form the principal deposits,

all the richer and easier smelting ores are nearly worked out. The same may be said of the Nymagee and the Mount Hope mines situated in the same tract of country as Cobar.

Copper lodes and deposits have also been worked, and some of them are still working with profitable results (one formerly known as Thompson's Creek, now Burraga, has employed a large number of persons for the last eighteen years), at the Canoblas, Cadia, Peelwood, Cow Flat, Wiseman's Creek, Carcoar, Molong, Goodrich, Balara, Snowball, Frogmore, Currawang, Wellington, Murrumbidgee, and other districts. Thus it will be seen that New South Wales possesses a large area of cupriferous country which, with improved machinery and methods must sooner or later greatly add to this Colony's output of copper. Although the low market price of copper has greatly retarded enterprise in copper-mining; nevertheless there are at present about 1,500 miners profitably employed in the industry.

Tin.

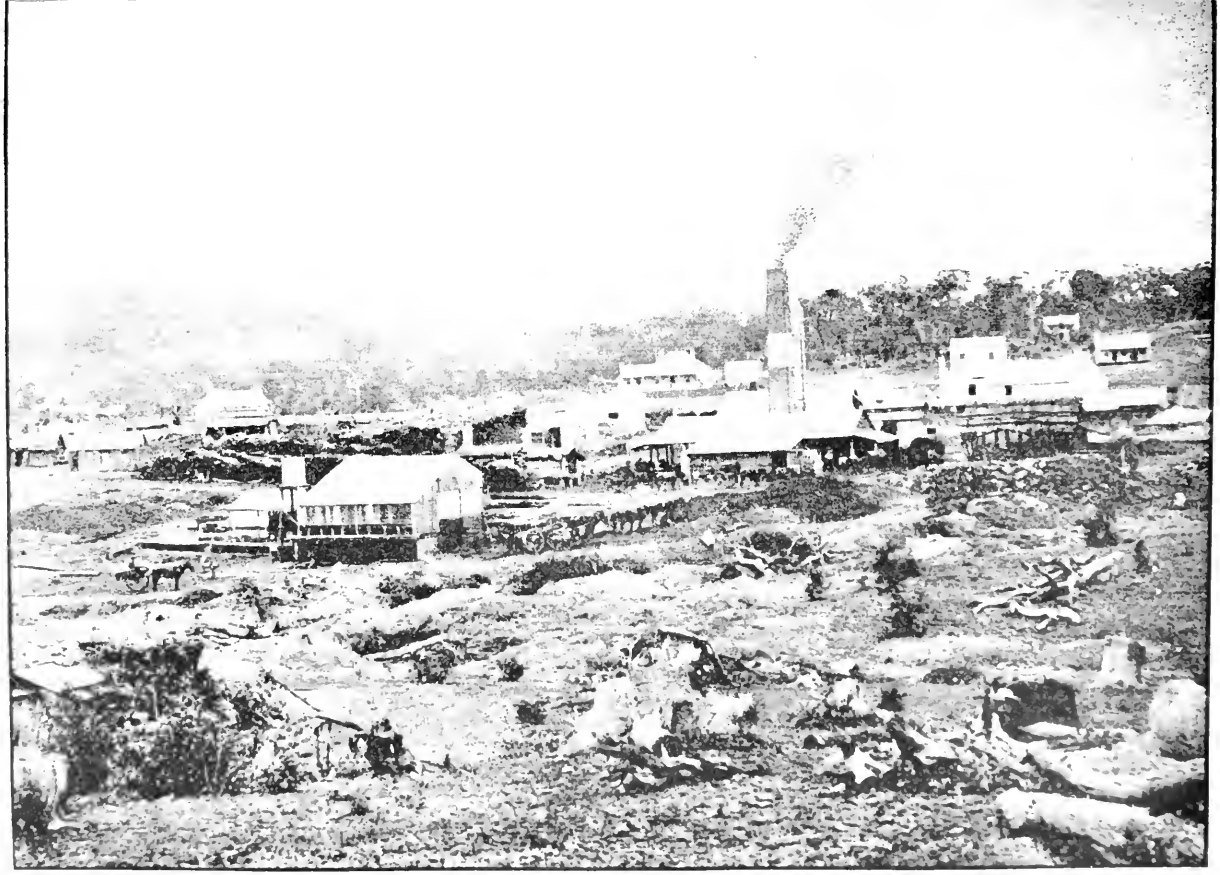
Our principal tin deposits occur in the Vegetable Creek (Emmaville), Copes Creek, the Inverell and Tenterfield districts. The stanniferous deposits, as far as is known, occupy an area of 5,500,000 acres. Tin, both in alluvial as well as lodes, has also been found at Jingellic and Dora Creek, Albury district; also at Tumbarumba, and at Sandy Creek, Tumut district; also at Tibooburra, and some Toadseye or Wood Tin has been discovered in the auriferous drifts at Milkman's Flat, near Grenfell. But as stated above, the Tenterfield and Glen Innes districts have supplied the principal of our tin productions.

Some of the alluvial stanniferous deposits were very rich, and in some instances as much as 10 feet in thickness has yielded 300 cwt. of stream tin of 72 per cent. to the ton. Large fortunes have been made by working miners in alluvial tin-mining; but so far, with the exception of one lode near Tent Hill, Emmaville, known as the Ottery Lode, few, if any, of the numerous lodes have had even a fair trial.

Professor David, one of New South Wales's most eminent geologists, gives it as his opinion that very extensive stanniferous areas covered over by basalt will sooner or later be prospected and worked, and bring forth a large increase in the production of tin ore. Careful geological surveys made by Professor David have brought out facts on which he based his belief that numbers of deep channels or leads covered over by basalt, are still lying undisturbed; hence, with the rise in the price of tin, we may look forward to a great production of tin, and a healthy reaction in that industry. About 1,500 miners are still employed in tin-mining.

Antimony.

Antimony in payable quantities has been found in several parts of the Colony, but principally in the northern district. At Hillgrove, in the Armidale district, the Eleanora Company alone produced several hundred tons of smelted antimony, which is only one company of many. A large quantity of antimony is also produced in the Hillgrove district by individual miners. Deposits of antimony have also been discovered at Lunatic Reefs, in the Drake district, at Deep Creek near



TENT HILL TIN-SMELTING WORKS, EMMAVILLE.

Bellinger, and at Bowraville and Taylor's Arms, in the Kempsey district. Large blocks of antimony were also obtained at Pyramul, in the Windeyer district.

Iron.

Iron ore is plentiful in almost all parts of New South Wales, but so far New South Wales can hardly claim to have amongst its many industries that of iron mining.

Chromium.

Chrome mining has recently made great strides, inasmuch as large deposits of high quality chrome have been discovered and worked in the Gundagai district, and it appears to have become a permanent industry. Chrome in large quantities have also been found at Bowling Alley Point, in the Nundle district, and other places.

Bismuth.

This mineral has been found in large and small deposits in different parts of the Colony; the principal deposits were found in the Glen Innes district (in the north), and the Pambula district (in the south). But as there is so little demand for bismuth no extensive works have been carried on.

Platinum.

Platinum has also been discovered in different parts of New South Wales, on our northern beaches north and south of Byron Bay. Also, near Broken Hill, in the far west, and recently in connection with the auriferous alluvial deposits at Burra Burra, Fifield, and Platina, localities situated about 60 miles west of Parkes, on and near the Melrose Plains. This field was opened in 1893, and since that time several thousand ounces of platinum have been won, the price given is from 20s. to 22s. 6d. per oz.

Wolfram.

This mineral has been found in various parts of New South Wales, mostly at and near our tin-fields; but as the market is very limited little, if anything, has been done to develop said deposits.

Cobalt, Nickel, and Manganese.

Although these minerals have been found in various parts of the Colony no mines have been opened, and no miners are employed. A few tons of cobalt have been forwarded from the Carcoar district to the European market, but nothing further has been done in the matter.

Plumbago.

This mineral is also plentiful in New South Wales, but so far it has not been discovered in really good quality, being generally impure. A shipment has lately been sent to England, and if results turn out to expectation a start may be made in the industry.

Diamonds.

These precious stones are found in large quantities in the Bingara and the Inverell districts; but they are generally very small, which depreciates their market value. It is stated that the Bingara and

Inverell diamonds are the hardest of all diamonds which reach the Amsterdam, London, or New York markets from any part of the globe. Diamonds have also been found in the Mudgee, Mittagong, and other districts.

Sapphires, rubies, topaz, garnets, and zircons are plentiful in the stanniferous drifts of our tin-fields.

Opals.

This mineral is now found in different parts of New South Wales. The principal opal mining is now carried on at the White Cliffs, about 60 miles from Wilcannia, and 160 miles from Broken Hill. The White Cliff opal, which is of very fine quality, is found in the cretaceous formation, in small veins varying from a mere thread to 2 inches in thickness at different shallow levels, the deepest so far obtained being about 60 feet; and the only guide the miner has is small veins of common opal known to the miner as potch. Although these opal fields have only been opened comparatively for a short time, about £100,000 worth of opals has already been extracted. The stratum is soft, and generally horizontal. As much as £20 has been paid on the field for 1 oz. of opal. The population on this opal field is about 500. There is a very extensive area of this cretaceous formation between White Cliffs and Tibooburra, or from Wilcannia, including White Cliffs, Milparinka, and Tibooburra, on to the Queensland and South Australian borders, where, sooner or later, precious opals may be discovered which may be the cause of turning this hot and arid country, now mere sheep walks, into flourishing mining localities. Precious opals have also been found in the Carcoar and other districts.

Emeralds.

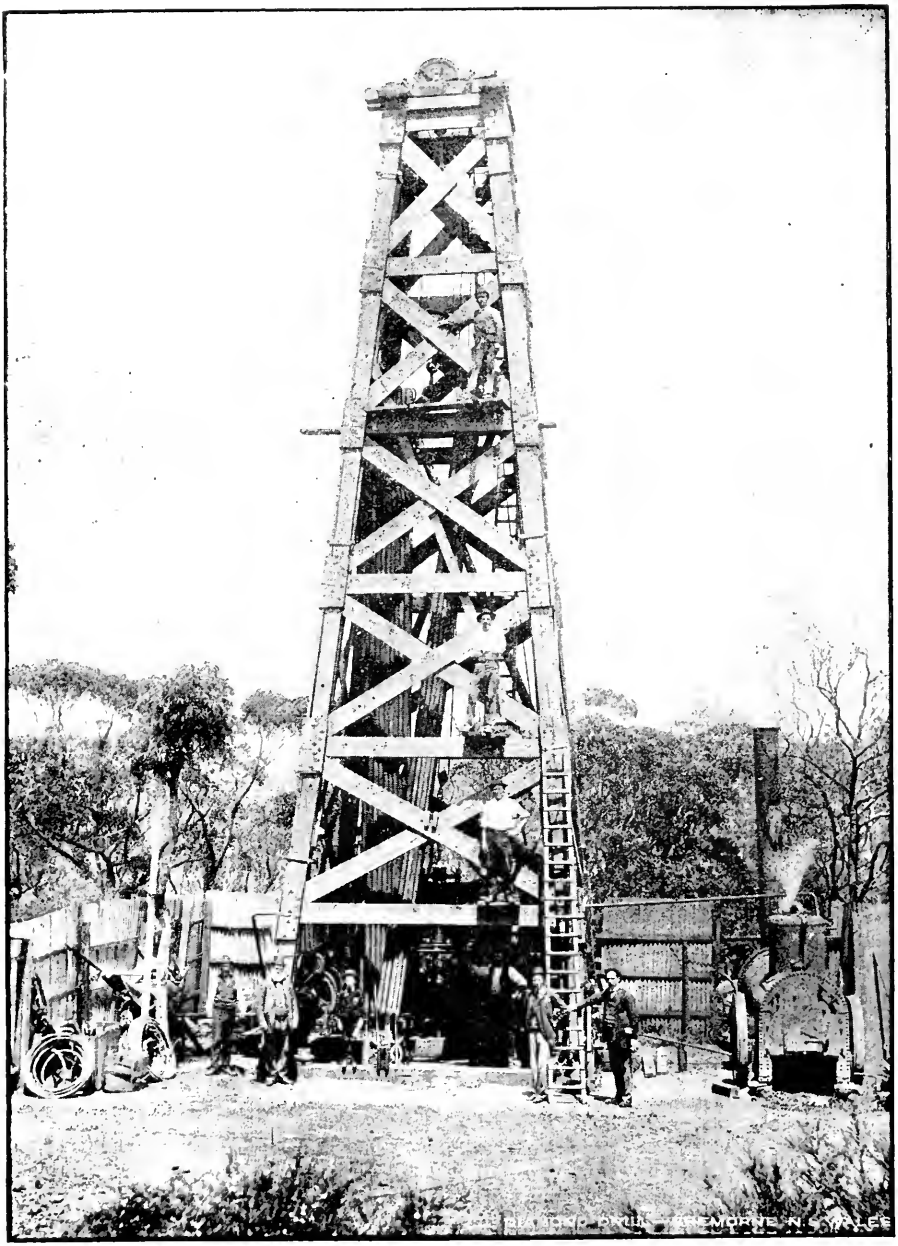
These were frequently found on the Vegetable Creek (Emmaville) Tin-fields. A lode was discovered at Emmaville containing some very valuable emeralds; but owing to the hard nature of the country in which they occurred requiring blasting the emeralds became flawed and fractured, and therefore valueless; hence very little has been done in emerald mining.

Turquoise.

Works are now carried on in connection with this mineral in the Wagonga district, but it has not as yet been sufficiently developed to rank it with payable mining operations.

It will thus be seen that there are great opportunities for mining enterprise. Almost every known mineral, or precious stone, is found in New South Wales; the extent of our mineral resources is enormous. Machinery for the reduction, extraction, and saving of the several minerals is daily improving, and mines which were abandoned and considered not payable have lately been retaken, and by improved machinery are yielding payable returns.

Mining in New South Wales is certainly only at the first stage of its existence. Perhaps poor men's fields such as Lambing Flat, Braidwood, Mudgee, parts of the Tenterfield district, and similar others may not again be discovered. But gold and tin in large deposits and areas may be discovered and profitably worked in our extensive river



DIAMOND-DRILL PLANT.

flats, and in the large areas of country covered by basalt in various parts of New South Wales. Our quartz reefs and lodes will be worked to greater depth than hitherto, and at a far lesser cost. New discoveries of rich and payable deposits of different minerals may be expected to be made not only at or near the old mining fields, but in the hitherto sparsely prospected mountainous country and the vast scrub lands of the far west.

Does mining pay? This is a question frequently asked which can be easily answered in the affirmative. Mining does and will pay provided it is made a business, like any other profession, trade or calling. It requires honesty of purpose, system, economy, energy, and perseverance, tempered by common-sense and blended with practical and scientific knowledge. If such methods were adopted, then the lethargy towards mining investments would disappear; our mining industry would be placed on a solid foundation. Capitalists and miners should work hand in hand for the mutual good; they should place confidence in each other, as the injury of one section must leave behind injurious effects on the other; such actions would tend towards the employment of large additional numbers of miners and the payment of dividends for capital invested in our mining industry.

The Government Diamond Drills under the supervision of Mr. W. H. J. Slee, Chief Inspector of Mines and Superintendent of Diamond Drills, have been the means to a very great extent of the rapid development of our mining industry. This is generally admitted and duly appreciated by the public. These drills can be obtained from the Government on very easy terms at a certain rate per foot. As they are costly, they are never handed over, or allowed to be worked by parties; but are worked by men engaged and paid by the Government under the supervision of the above said officer. These drills, while really assisting in the discovery and development of the great mineral wealth of this Colony, are almost self-supporting, and very little, if any, loss to the State. Through gain of experiences, and alterations, and addition in machinery, the cost of boring with Government Diamond Drills has been considerably lessened.

Collieries.

By John Mackenzie, F.G.S., Examiner of Coal Fields.

New South Wales can, without any exaggeration, claim to be in possession of the richest, most accessible, and most extensive coal-fields in the Southern Hemisphere, and with such elements of wealth and greatness, it possesses the essentials to national prosperity and power, which are so necessary to make it become a country of the greatest industrial importance.

Its bituminous, semi-bituminous, splint, anthracitic, and cannel-coals are equal in thickness and quality to any found in other parts of the world, and we have numerous deposits of boghead mineral or petroleum oil, cannel-coal, equal, and some superior to any found in England or elsewhere. With such resources, the country has the creative power that must in time (especially as labour becomes cheaper, as it is now doing) bring to its smelting works and furnaces large quantities of iron, copper, tin, galena, argentiferous, and other ores, not only from within its own territory, but from other countries adjacent to and at a distance therefrom; and coupled with its extensive and varied deposits of rich iron ore, it will be able to produce iron in sufficient quantity to supply the wants of a nation in times of war and peace. Great Britain and America furnish instances of the value of coal to those who have and utilise it. The continued prosperity of the former country depends upon the duration of its coal-fields, and all available means are being taken to economise this primary source of her prosperity and greatness.

The area over which the coal measures are found embraces an area of about 23,950 square miles which once formed one large coal basin, and since its formation upheavals and disturbances of the strata near the edge of the basin, have there thrown it into a series of anticlinal and synclinal curves.

During the last few years, the output of the New South Wales coal trade has increased from 2,830,175 tons, valued at £1,303,164, in 1886, to 3,738,589 tons, valued at £1,095,327, in 1895; and the boghead mineral (torbanite) from 27,462 tons, valued at £67,239, in 1885, to 59,426 tons, valued at £75,218, in 1895.

Newcastle Harbour (the principal Coal Port of the Southern Hemisphere) and its Facilities for Shipment.

Newcastle, in the county of Northumberland, the trade of which is second only to that of Sydney, owes its great commercial importance to the different coal-mines which have been opened out close to and within 32 miles of the harbour.

NEWCASTLE, FROM THE CUSTOM-HOUSE.

On the south or town side of the harbour, there is a continuous line of wharf 3,607 feet long belonging to the Government, 2,130 feet of which is occupied for cargo berths for deep draught vessels, 500 feet reserved for Sydney passenger steamers; and the remaining 977 feet is used as a general cargo wharf, including a lumber berth for loading vessels with timber. The whole length of this wharf is lit with gas.

At Bullock Island, on the western side of the harbour, a substantial timber Government wharf, 7,760 feet in length, and four ballast jetties, each 50 feet long and 200 feet apart, has been constructed along the face and round the south end of what was formerly known as the Ballast Dyke; at present 5,550 feet of this wharf is set apart chiefly for the shipment of coal. The loading is performed by hydraulic cranes of which twelve are erected, capable of shipping 1,000 tons of coal each in twenty-four hours—six being 15-ton, four 9-ton, and two 25-ton cranes, the latter for discharging heavy machinery, &c., and three 15-ton steam cranes. The remainder of the wharf and the ballast jetties are used by vessels discharging ballast or waiting their turn to load. Ships of the largest class can load under the hydraulic cranes, and proceed direct to sea through deep water channels recently dredged. It is proposed to spend immediately £150,000 to further increase the shipping facilities at Bullock Island. This wharf is now lit by electric light, which greatly facilitates the loading of coal at night, and is one of the finest systems of electric lighting in existence, consisting of fifty large arc lamps, each 5,000-candle power.

A branch double line of railway connects the wharf with the Great Northern railway, and along the back of the wharf is laid a very extensive system of sidings and standage room for working coal traffic.

A sand dredge is reclaiming foreshore in front of the hydraulic engine-house, where 2,000 feet of wharf will be erected as a commencement of a 90-acre basin inside the present wharf, which basin it is intended to dredge to a depth of 25 feet where vessels will be able to lie in slack water, and the whole will be lit up with the electric light.

At Stockton, on northern side of harbour, there is a Government wharf 600 feet long with a shoot capable of shipping 1,000 tons in twelve hours. A sand dredge is also reclaiming foreshore at Stockton.

In addition to these Government cranes, the Australian Agricultural Company have three large private shoots capable of delivering 2,000 to 3,000 tons of coal per diem. Vessels loading from them can discharge their ballast on to the company's ballast wharf, lying alongside at a draft of 18 feet 6 inches, and upwards. Vessels drawing 22 feet can load at the company's shoots. The Waratah Company also have a shoot at Port Waratah capable of shipping about 50 tons per hour, and Messrs. J. and A. Brown have two shoots on the Hunter River, at Hexham, 10 miles from Newcastle, capable of shipping 100 tons per hour.

Newcastle Facilities for Shipment of Coal.

The present estimated capabilities for shipment of coal at the above-mentioned places in Newcastle Harbour is about 21,000 tons per day by the hydraulic cranes belonging to the Government, and about 4,800 tons per day by private companies.

At Catherine Hill Bay, near Lake Macquarie, the Wallarah Coal Company have a jetty 1,060 feet in length, 30 feet above high-water, with two shoots capable of shipping 1,000 tons in eight hours.

Coal shipped from Newcastle Harbour.

The quantity of coal shipped in 1895 to foreign and intercolonial ports was 1,920,378 tons, valued at £678,217; and the largest quantity of coal taken by a steamer (May 30, 1895) was 5,235 tons, by the "Port Stephens," and by sailing vessel, 4,558 tons, by ship "Royal Firth," on June 14, 1895.

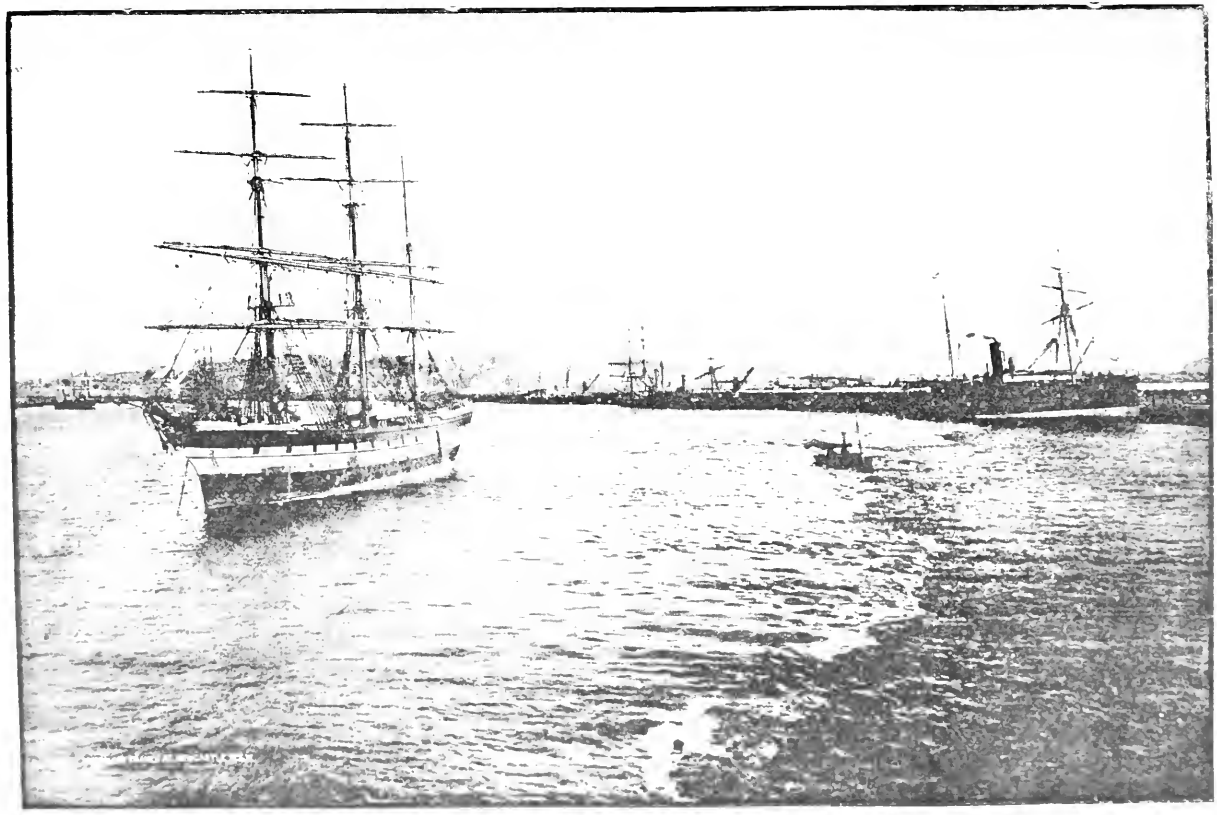
Collieries at Work, &c., in the Northern District, viz., Newcastle, Four-mile Creek, Maitland, Greta, East Greta, Singleton, Curlewis, and Gunnedah.

In 1895 there were sixty-nine collieries at work and opening out in the Northern district, which raised 2,631,221 tons of coal, valued at £813,227, and the number of men employed in and about the collieries was 6,777. The Borehole coal seam is the principal one worked at the Newcastle collieries, and it varies from 18 feet to 4 feet 2 inches of marketable coal. It is very free from faults, and lies almost horizontal. It is a bright, bituminous, caking coal, of first-class quality for steam, smelting, household, and coking purposes, and a good gas coal. The cost of hewing it is now 2s. 8d. to 3s. per ton, and the supposed selling price 7s. per ton delivered on board vessels at Newcastle Harbour. The cost of hewing the Burwood coal seam, proved to be the next best in quality at and near Newcastle, is 2s. 7d. per ton, and the selling price is about 1s. less than the Borehole coal. The cost of hewing the Greta coal, situated 35 miles by rail north-west of Newcastle, is about 2s. per ton.

The Newcastle-Wallsend Coal Company has the Government railway contract for furnaces at Eveleigh, at 6s. 6d. per ton; the New Anvil Creek Coal Company has the Murrurundi district contract, at 5s. 4d.; the East Greta Coal-mining Company has the Newcastle and Singleton district, at 5s. 6d. per ton; the Centenary Coal Company the Werris Creek, Narrabri, and Armidale district, at 8s.; and Green and Curley, of Gunnedah, have also the latter contract at 7s. 9d. per ton—this colliery being situated 294 miles from Sydney.

Illawarra District, and its Facilities for Shipment of Coal.

The Wollongong Harbour and Basin is situated 45 miles south of Sydney Harbour, and at low tide there is a depth of 13 feet of water at its entrance and alongside the wharf, where there are three cranes capable of shipping 1,800 tons of coal per hour. The Belmore Basin has a depth of 17 feet of water at its eastern side, where there are four shoots, each capable of shipping 100 tons per hour; but as only two vessels can load there at the same time the largest quantity of coal shipped by them is 200 tons per hour, or 2,000 tons per day. The largest steamship which has coaled at the harbour drew about 15½ feet of water, and carried about 900 tons of coal; and the largest sailing vessel has taken away about 700 tons of coal.



NEWCASTLE HARBOUR, SHOWING STEAM-CRANES.

In addition to the Government appliances for shipment of coal at Wollongong, the Coal Cliff, North Illawarra, Bulli, Bellambi, South Bulli, and Mount Kembla Companies, have jetties of their own, from which coal is sent by steam colliers, &c., to Port Jackson and elsewhere.

The Coal Cliff jetty has a depth of 18 feet of water at high tide, and 14 feet at low tide, and can ship 100 tons per hour.

The North Illawarra Coal Company, Bulli, Bellambi, South Bulli, and Mount Kembla Jetties have a depth of about 26 feet of water at their shoots and can ship about 120 tons per hour.

Coal Shipped at Wollongong Harbour, or the Jetties, and sent by Rail, &c.

The coal raised in the Illawarra and southern districts in 1895 was 910,123 tons, valued at £239,035.

Collieries at Work in the Illawarra or Southern District.

In 1895 there were twelve collieries at work in the Illawarra district that raised 681,782 tons of coal, valued at £174,780, and the number of men employed in and about the collieries was 1,477, and one colliery (Metropolitan) in the southern district, at Helensburgh, adjacent to the Illawarra and South Coast Railway, 27 miles from the Metropolis and 29 miles from Darling Harbour, Sydney, that raised 228,341 tons of coal, valued at £64,255, and employed 403 men in and about the mine. The coal seam worked at these twelve collieries is the uppermost one or No. 1 of the upper coal measures. It is a semi-bituminous coal used for steam, smelting, household, blacksmith, and coking purposes, and varies from 10 feet to 4 feet in thickness. With the exception of the Metropolitan and South Clifton Collieries, the coal is principally wrought from adits driven into the seam in the high ranges fronting the Pacific Ocean at heights of from 20 to 750 feet. The coal seam is very free from faults, and lies almost horizontal.

The cost of hewing the coal is now 2s. per ton, and the selling price at the jetties and Wollongong Harbour is supposed to be about 6s. per ton.

The Metropolitan Coal Company have the Government railway contract for supply of coal to southern district railway depôts and portion of Penrith railway requirements at 5s. 4d. per ton, and for Metropolitan District at 5s. 10d.

Collieries at Work in the South-western District.

The South-western Collieries (3) are situated at Joadja, Mittagong, and Moss Vale, near to the Great Southern Railway. In 1895 they employed 69 men in and about the collieries, and raised 6,379 tons of coal valued at £2,803.

The Western Collieries, their Railway and Shipping Appliances.

The Western Collieries are situated 91 to 158 miles from Sydney, and are adjacent to, or within a short distance of, the Great Western and Mudgee railway. Their coal meets with a ready sale for railway,

manufacturing, household, and other purposes in all the suburban and inland towns, and large quantities of slack are there sold for brick and tile making.

Collieries at work in Western District.

In 1895 there were fifteen collieries at work, that raised 190,864 tons of coal, valued at £40,260; and the number of men employed in and about the collieries was 296. The coal seam worked is the lowest one in the upper coal measures. It is a splint coal, used for steam, smelting, household, and blacksmith purposes, and is 10 feet to 11 feet in thickness. About 5 feet 8 inches of it is the portion wrought and sold. The coal seam is free from faults, and lies almost horizontal.

The cost of hewing the coal is now 1s. 8d. per ton, and the Lithgow Coal Association supply it to the Railway Department, for their Penrith requirements, at 4s. 9d. per ton, and for the western district other than Penrith at 5s.; and the Cullen Bullen at 4s. 3d. per ton, delivered at colliery sidings.

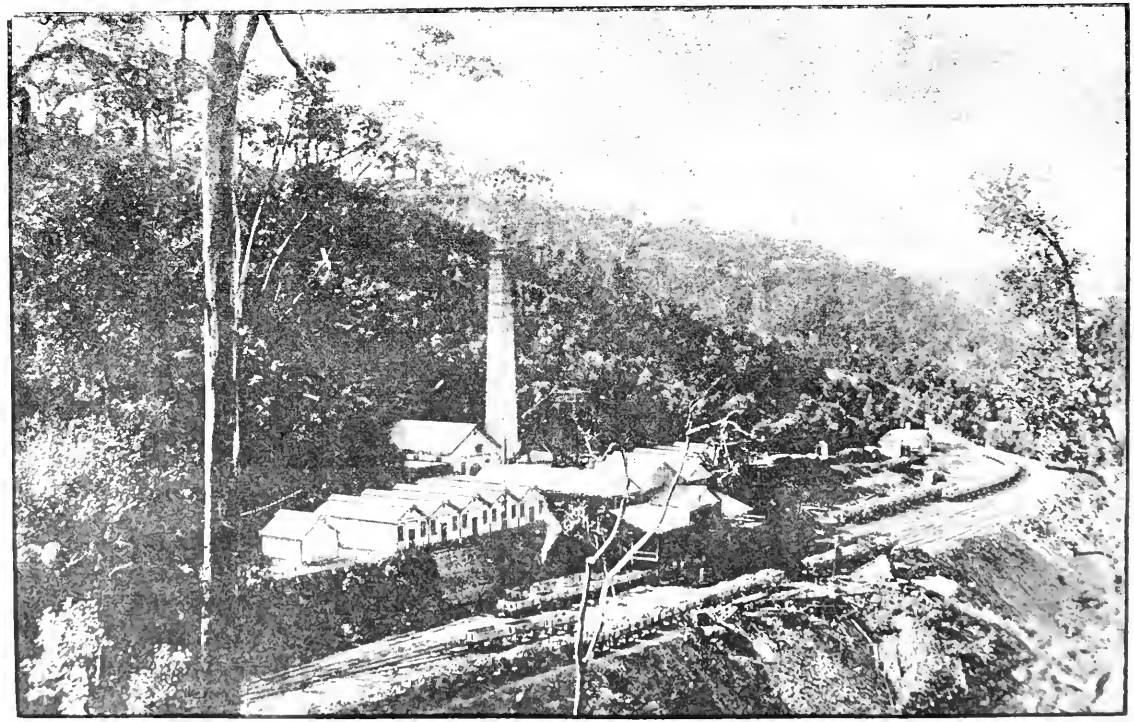
The Cremorne Bore.

On 9th November, 1893, the Sydney Harbour Collieries Company bored through the Illawarra No. 1 coal, at a depth of 2,917 feet, at Cremorne, adjacent to the Sydney Harbour, 10 feet 3 inches in thickness, of splint and bituminous coal, which proves the correctness of the opinions expressed by myself and others that the metropolis is near the centre of our extensive coal basin, and that the Newcastle and Illawarra coal measures would be found there. The Company are in treaty for some land adjacent to their harbour leasehold, on which two shafts are to be sunk.

Boghead Mineral and Petroleum Oil, Cannel-coal Deposits.

These deposits are very irregular in their area, and are found in isolated patches, generally at a considerable distance apart, in the midst of the workable coal measures of New South Wales. Whilst the coal seams are very regular in their character (with the exception of their generally improving in quality, and thickening as they leave the edge of the coal basin), the Boghead mineral (torbanite) is most irregular, and there is nothing to guide us in telling where the seam is likely to be, but by finding pieces of it at or below its outcrop. Near the edge of the deposits this rich mineral deteriorates, and gradually changes into indurated clay, bituminous and non-bituminous shale, coal, or ironstone.

There are four companies getting and selling the mineral, and two of them manufacture oil and other products therefrom. These mines are situated at Hartley Vale, Genowlan, Ruined Castle, and Nellie's Glen in the western district, and at Joadja in the southern district, and prospecting is going on in the Capertee Valley, situated about 150 miles north-west of Sydney. The richest of the mineral yields about 100 to 130 gallons of crude oil per ton, and 17,000 to 18,000 cubic feet of 35 to 40 candle gas when gas only is extracted from it.



METROPOLITAN COLLIERY, HELENSBURGH.

28 miles south from Sydney. Depth of shaft, 1,100 ft.; depth of shaft under top of ridges, 1,500 ft.; output, 1,200 tons daily; coal, steam, 75 per cent. fixed carbon; seam, 11 ft. 6 in. thick; winding-engines (indicated horse power, 800, cylinders, 34 in. x 5 ft. 6 in.; fan, Schiele type, producing 400,000 cubic feet per minute; twelve Lancashire boilers, 70 to 180 lb. pressure.

The following are extracts from a report furnished by Mr. W. A. Dixon, F.C.S., F.I.C., upon the analyses of coals from the principal coal-fields of Great Britain, which come or may come into competition with the coals of New South Wales :—

Specific weight of Newcastle (New South Wales) and British coals :—

			Average.	Highest.	Lowest.
1st.	14 samples,	Newcastle, New South Wales...	1·311	1·347	1·280
2nd.	17 ,,	Newcastle, England	1·246	1·286	1·150
3rd.	8 ,,	Derbyshire	1·284	1·317	1·264
4th.	28 ,,	Lancashire	1·279	1·350	1·209
5th.	36 ,,	Welsh, from the Admiralty Investigation Report ...	1·318	1·385	1·252

The averages and highest and lowest percentage of sulphur in Newcastle (New South Wales) and British coals :—

			Average.	Highest.	Lowest.
1st.	14 samples,	Newcastle, New South Wales ...	0·91	1·46	0·49
2nd.	17 ,,	Newcastle, England	1·24	2·85	0·06
3rd.	31 ,,	Welsh	1·34	3·42	0·64
4th.	8 ,,	Derbyshire	1·06	1·42	0·72
5th.	28 ,,	Lancashire	1·37	3·04	0·52

The averages and highest and lowest quantity of ash in Newcastle (New South Wales) and British coals :—

			Average.	Highest.	Lowest.
14 samples,	Newcastle, New South Wales		4·97	7·80	3·84
31 ,,	Welsh		4·15	11·37	1·62
17 ,,	Newcastle, England		3·82	9·12	0·20
8 ,,	Derbyshire		2·54	4·64	1·23
28 ,,	Lancashire		4·64	14·34	1·09

The averages and highest and lowest percentage of bituminous matter and water in Newcastle (New South Wales) and British coals :—

			Average.	Highest.	Lowest.
14 samples,	Newcastle, New South Wales		37·55	42·84	33·23
31 ,,	Welsh		21·15	37·63	9·57
17 ,,	Newcastle, England		36·44	43·80	26·91
8 ,,	Derbyshire		39·12	45·90	32·82
28 ,,	Lancashire		40·61	47·87	32·43

The above results show that the coal from our northern coal-fields is practically equal for all purposes to the best English coal, and that for gas-making it is on a par with English Newcastle.

The specific gravities of our southern (Illawarra) coals compared with Welsh coal from Admiralty report :—

	Average.	Highest.	Lowest.
7 samples, Southern coal	1·374	1·404	1·252
36 ,, Welsh	1·318	1·385	1·354

On the average these numbers would give a gain in economic weight of about 5 per cent. in favour of our coals over those of South Wales. The results of the other constituents are :—

Sulphur.			
7 samples, Southern coal	0·65	0·99	0·28
31 ,, Welsh	1·31	3·42	0·64
Ash.			
7 samples, Southern coal	10·25	11·28	8·76
31 ,, Welsh	4·14	11·37	1·62
Bituminous matter.			
7 samples, Southern coal	20·84	23·51	18·22
31 ,, Welsh	20·09	32·78	8·57

The following shows the average composition of our Western District coals from nine analyses which have been made :—

	Average.	Highest.	Lowest.
Specific gravity...	1·347	1·400	1·326
Water	2· 29	2· 90	1· 95
Volatile matter...	30· 42	35· 02	25· 84
Fixed carbon	55· 94	61· 34	49· 97
Ash	10· 31	12· 91	9· 26
Sulphur	1· 03	1· 75	0· 57

Summary.—Persons employed, number of fatal accidents (deaths), and ratios of the number of persons employed, and the number of fatal accidents in and about the United Kingdom and New South Wales coal-mines during the last five years :—

	United Kingdom.				New South Wales.			
Year.	Persons employed.	Lives lost by accident.	Persons employed per life lost.	Death-rate from accidents per 1,000 persons employed.	Persons employed.	Lives lost by accident.	Persons employed per life lost.	Death-rate from accidents per 1,000 persons employed.
1890	613,233	1,160	529	1·891	10,315	13	793	1·260
1891	648,450	979	662	1·509	10,820	21	515	1·940
1892	664,300	982	676	1·478	10,910	8	1,364	0·733
1893	683,008	1,069	644	1·551	9,971	13	767	1·303
1894	795,240	1,127	704	1·410	9,126	7	1,303	0·767

TABLE showing the Quantities and Average Value per ton of Coal exported to Intercolonial and Foreign Ports respectively, the Quantity of Coal consumed in this Colony, and the average price per ton of the Total Output of the Collieries from 1858 to 1895 inclusive.

Years.	Exports to Intercolonial Ports.			Exported to Foreign Ports.			Total Export.			Home Consumption.	Total Output and Value.		
	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.		Quantity.	Average per ton.	Value.
	Tons.	£ s. d.	£	Tons.	£ s. d.	£	Tons.	£ s. d.	£	Tons.	Tons.	£ s. d.	£
1858-1877	6,467,476	0 11 7·98	3,772,400	3,952,331½	0 11 0·02	2,766,997	10,419,807½	0 12 4·22	6,539,397	5,650,100½	16,069,910	0 10 3·89	8,295,516
1878	623,323	0 13 8·77	427,954	383,097	0 14 7·69	280,452	1,006,420	0 14 0·93	708,406	569,077	1,575,497	0 11 8·28	920,936
1879	621,087	0 13 6·75	421,198	376,962	0 14 6·13	273,509	998,049	0 13 11·05	694,707	585,332	1,583,381	0 12 0·12	950,878
1880	550,672	0 11 2·67	309,004	202,684	0 11 5·70	116,295	753,356	0 11 3·48	425,299	712,824	1,466,180	0 8 6·36	615,336
1881	657,135	0 7 9·31	255,572	372,709	0 8 8·29	161,958	1,029,844	0 8 1·30	417,530	739,753	1,769,597	0 6 9·55	603,248
1882	760,226	0 9 9·51	372,331	501,319	0 10 11·50	274,609	1,261,545	0 10 3·09	647,033	847,737	2,109,282	0 8 11·97	948,965
1883	855,704	0 10 5·75	448,356	656,741	0 11 7·31	381,306	1,512,445	0 10 11·65	829,662	1,009,012	2,521,457	0 9 6·40	1,201,941
1884	994,087	0 10 8·66	532,938	696,676	0 11 5·14	398,107	1,690,763	0 11 0·15	931,045	1,058,346	2,749,109	0 9 5·71	1,303,076
885 ...	991,924	0 10 7 13	525,113	764,432	0 11 6·52	441,320	1,756,356	0 11 0·09	966,663	1,122,507	2,878,863	0 9 3·72	1,340,212
1886	1,027,775	0 10 7·22	514,821	708,090	0 11 1·31	402,178	1,735,865	0 10 10·93	947,002	1,094,310	2,830,175	0 9 2·53	1,303,164
1887	1,077,270	0 10 5·89	565,084	713,172	0 11 1·08	395,155	1,790,442	0 10 8·75	960,539	1,132,055	2,922,497	0 9 2·57	1,346,440
1888	1,039,764	0 10 10·25	564,293	884,108	0 11 3·77	500,179	1,923,872	0 11 0·78	1,064,472	1,279,572	3,203,444	0 9 1·02	1,455,198
1889	1,310,228	0 10 1·21	678,200	1,077,474	0 11 1·88	601,071	2,387,702	0 10 8·58	1,279,271	1,267,930	3,655,632	0 8 11·20	1,632,848
1890	1,149,544	0 10 6·96	608,108	672,330	0 11 3·31	379,065	1,821,874	0 10 10·04	987,173	1,230,002	3,050,876	0 8 4·29	1,279,088
1891	1,397,256	0 10 0·50	700,380	847,473	0 10 10·43	460,595	2,244,729	0 10 4·12	1,160,965	1,793,200	4,037,929	0 8 7·58	1,742,795
1892	1,318,008	0 8 10·89	587,016	873,697	0 10 1·24	441,379	2,191,705	0 9 4·61	1,028,395	1,589,263	3,780,968	0 7 8·82	1,462,388
1893	1,160,258	0 8 6·05	493,372	674,852	0 9 6·35	321,557	1,835,090	0 8 10·57	814,929	1,443,238	3,278,328	0 7 1·78	1,171,722
1894	1,175,372	0 7 1·73	419,751	950,053	0 8 1·26	385,018	2,125,125	0 7 6·88	804,769	1,546,951	3,672,076	0 6 3·55	1,175,573
1895	1,198,504	0 6 9·69	407,271	969,726	0 7 6·75	366,683	2,166,230	0 7 1·73	773,954	1,572,359	3,738,589	0 5 10·31	1,197,527

Water Conservation, Irrigation, and Drainage.

By H. G. McKinney, M. Inst. C.E., Chief Engineer for Water Conservation.

One of the most remarkable characteristics of the continent of Australia is the absence of high mountains and of great mountain chains. Perpetual snows which elsewhere feed the rivers during spring and summer are almost unknown, so that Australian rivers, as a general rule, are irregular in their flow, while in many cases they disappear altogether in marshes or on sandy plains. These serious drawbacks are felt throughout Australia, and constitute a formidable barrier to the progress of settlement; but their effect throughout a large portion of New South Wales is slight in comparison with other parts of the continent. The mountain range which runs through this colony from south to north, approximately parallel to the coast, and the summit of which is roughly about 70 miles from the coast line on an average, is the source of many important rivers flowing both east and west, and is also the source of vast deposits of rich alluvium on the western plains and of smaller though important and not less rich deposits in the coastal districts. But the Dividing Range, as it is termed, is not the only one which exercises great and far-reaching effects in connection with the water supply of New South Wales. This range extends northward through Queensland; but near the southern boundary of that colony, the range which forms the northern boundary of the drainage area of the River Darling, strikes off in a north-westerly direction. As it passes westward, this watershed becomes less clearly defined, and is in places represented merely by high rolling downs. The area in Queensland south of this watershed is considerably over 100,000 square miles, so that New South Wales receives surplus water and silt from that area beyond its northern boundary. In addition, it is considered to be now practically proved that the source of the splendid supplies of artesian water which have been found in southern Queensland and in the northern and north-western districts of this colony have their source in the watershed described.

The Dividing Range varies generally from 2,000 to 5,000 feet in height, but the Snowy Range, which is the name given to the most elevated part of it, is seldom, if ever, without snow in some of its ravines, and among its peaks includes Mount Kosciusko, the highest mountain in Australia. The Snowy Range is the source of the River Murray, while the Tumut River, the principal tributary of the Murrumbidgee, heads from the northern side of the same watershed. With such a source as this it naturally follows that both the Murray and Murrumbidgee have an abundant flow in the spring months, while

the former always, and the latter generally, has a good supply during the greater part of summer. These two rivers are the most valuable in the Colony as a source of water for irrigation purposes, and as their courses, after leaving the mountains, pass through immense alluvial plains of great fertility, the utilisation of their waters in irrigation canals is a question to be dealt with in the near future. Schemes for this object have, in fact, already been prepared. The rivers north of the Murrumbidgee, which flow westward from the Dividing Range, are more uncertain in their supplies. The land along the courses of these rivers is of a very fertile description, and has been proved to be well adapted for irrigation.

The outline of the country east of the Dividing Range differs widely from that of the country extending westward. In the case of the latter there are broad expanses of tableland, the mountains decline gradually till they finally disappear beneath the great sea of alluvium, and the plains which thus extend from the slopes of the hills, though to all appearance perfectly level, have a fall varying generally from 3 feet down to 1 foot per mile. On the other hand, between the summit of the Dividing Range and the coast the mountains generally fall rapidly, and, beginning abruptly from their base, the alluvial flats, including extensive areas of swamps, and of land subject to inundation, extend seaward.

For the consideration in outline of questions relating to water conservation, irrigation, and drainage, and, in fact, for the elucidation of important points in connection with settlement on the land, it is most convenient to regard the Colony as consisting of four great natural divisions. These are, first, the coast district; second, the Dividing Range and the high tableland; third, the western slopes of the Dividing Range; and, fourth, the great plains of the interior.

The Coastal District.

Taking the coastal district as a whole, it may be broadly stated that as the eastern slope of the Dividing Range is steep, the fall of the rivers rapid, and the alluvial flats difficult to irrigate satisfactorily, the conditions, as a rule, are not favourable for any large schemes for water conservation and irrigation. Besides, the average rainfall is so nearly sufficient for ordinary farm crops that irrigation would not, as a general rule, be remunerative even under favourable conditions as regards the nature of the land, and the facilities for obtaining water. It is otherwise in the case of crops like fruit and vegetables, which require more care, and the value of which per acre is comparatively high. For such crops, irrigation, if conducted under fairly favourable circumstances, and in a business-like manner, is highly remunerative. In the best instances of this in the coastal district the land irrigated consists of rich and deep river deposits underlaid by boulders and drift and the water is raised by steam power to a height of thirty to fifty feet. The soil is sufficiently porous to allow of gradual percolation down to the drift and boulders, which provide excellent subsoil drainage. Under such circumstances, experienced fruit-growers have found that an initial outlay of £20 per acre on pumping plant and fittings is more than justified by the results.

Hitherto irrigation has been carried on in the coastal district in comparatively few places, and on a very moderate scale. The results have, however, been sufficient to indicate fairly the direction in which further development may be expected. The alluvial deposits along courses of the coastal rivers and their tributaries are in many, if not most cases underlaid by drift and boulders in which good supplies of water can be obtained. There is a strong probability that water derived from such sources will play an important part in future irrigation. Water can be obtained direct from the rivers and streams in many places by pumping, and in a few by gravitation; but as the coastal rivers rise and fall rapidly, and their range of surface level is generally great, there is considerable risk and expense with either method.

The question of drainage is more important than that of irrigation, so far as the coastal district is concerned. Extensive areas of low-lying swampy land are found near the mouths of the majority of the rivers, and in some cases extending to a long distance up their courses. These tracts of swampy land are, as a rule, adjacent to the tidal portions of the river, and they are generally composed of rich deposits washed down from the higher parts of the river basins. The early settlers soon discovered the richness of these delta lands, and all the parts easily accessible were soon taken up. As a large proportion of the delta lands were subject to inundation from the rivers, while in addition there were extensive areas which were more or less liable to be affected by tidal waters, the necessity for drainage works was obvious. It proved, however, that legislation was necessary to authorise the construction of such works, and to compel all landowners who benefited by them to contribute to their first cost and cost of maintenance in proportion to the benefits received. Hence the "Drainage Promotion Act" was passed, an Act which has been of very considerable service, particularly on the alluvial lands of the Macleay, Hunter, and Shoalhaven Rivers.

Notwithstanding the fact that the alluvial lands of the coast district are, as a rule, of great fertility, and that the means of carrying out drainage works by co-operative effort have been available for more than thirty years, the progress made with the drainage and reclamation of lands subject to inundation has been comparatively small. Doubtless this is in a large measure accounted for by the immense areas of land available for settlement which did not require such labour and expenditure as are involved in the construction and maintenance of a system of drains. As labour has become more abundant, and labour-saving appliances are more efficient and better understood, there is a near prospect of a more extended effort being made to utilise to the best advantage the extensive areas of deep and fertile soil which only require systematic drainage, and the produce from which will, in most cases, have the great advantage of water carriage. The best evidences of the results of successful drainage are to be seen on some of the larger properties, where swamps which were of little or no value, have been converted into first-class land for pasturage or agriculture. Enough has been done to indicate the importance of the question of drainage and reclamation and to give some idea of the great development which will result from systematic and well-considered action.

The Dividing Range and the High Tableland.

As regards water conservation, irrigation, and drainage, this portion of the Colony calls for little remark. Possessed of a fair average rainfall, and a comparatively temperate climate—the average temperature at Cooma, in the southern part of the tableland, for instance, being almost identical with that of Paris—the necessity for irrigation is seldom felt. This division of the Colony must in the course of time become a highly interesting one as regards water conservation; for here, and on the western slopes of the Dividing Range, storage reservoirs will be required to regulate the supply of water in the western rivers. The site of one such reservoir has been fixed near the head waters of the Murrumbidgee; but works of this description will naturally await definite action towards fully utilising the supplies of water at present available.

The Western Slopes of the Dividing Range.

The part of the Colony included under this head extends from the border of the high tablelands to the edge of the great western, or, rather, central plain. Referring to the map of the drainage area of the river Murray, it will be observed that on the east, south, and north sides of this basin there are important tributary rivers which flow into the great central plain. This central plain may be compared to a sea of alluvium, in which tracts of ridgy country, and occasional isolated ridges and hills, stand out like islands. On the slopes of the watershed the courses of the rivers lie through mountainous or hilly country, and follow ravines or well-defined valleys; but from the places where they reach the great central plain, their valleys cease to be defined, and the courses of the rivers are in a state of perpetual change. The points on the principal rivers of this Colony at which this change occurs are Bungowannah, about 6 miles below Albury, on the Murray; Narrandera, on the Murrumbidgee; Forbes, on the Lachlan; Narromine, on the Macquarie; Gunnedah, on the Namoi; and Pallamallawa, on the Gwydir.

As only currents of high velocity will move boulders and pebbles, it is naturally found that while the western rivers carry fine silt for hundreds of miles, the coarse deposits are, as a rule, found only near the mountains. Thus it may generally be assumed that the soil in the valleys of the western slopes of the Dividing Range is underlaid by boulders, pebbles, or coarse drift. Hence these valleys are specially adapted for irrigation, and as instances of this fact there is an irrigated farm near Gunnedah which has no superior in the Colony, and irrigation has been practised with success at Forbes, on the Lachlan, and on the Tumut River which is a tributary of the Murrumbidgee. The valleys in this division of the Colony can in some cases be watered by gravitation, in others by pumping from the rivers, and in others by pumping from wells sunk into the drift. The depth and fertility of the soil will in many cases warrant considerable outlay on irrigation works. The adaptability of such land for producing under irrigation first-class crops of fruit, fodder, cereals, tubers, &c., has been abundantly proved. In every case where the watering of crops has been dealt with in a scientific and business-like manner the result has been highly satisfac-

tory. But the population is still sparse, and only a few of the landowners understand the value of water, while of those who do only a small proportion know how to manage irrigation systematically. Hence, although in favourable seasons good crops have been obtained without artificial watering, the true capabilities of the valleys of the western slopes of the Dividing Range are comparatively little known.

In connection with this division of the Colony, it is worthy of special mention that this is probably the safest place for the novice in irrigation to gain experience. It is a common mistake for the beginner to use far more water than is required. In many places this would be ruinous to the crop, but here, on account of the generally porous nature of the soil and the excellence of the subsoil drainage, the risk of loss from over-watering is reduced to a minimum.

The Great Central and Western Plains.

This division of the Colony, in which is included the whole territory west of the Dividing Range, is the great field for water conservation and irrigation. While a large proportion of the land is fertile, the rainfall is light, especially in the extreme west. The courses of the rivers after entering the Great Central Plains flow generally through alluvial land, and the waters are diminished by absorption, percolation, and evaporation, while there is no inflow of drainage to compensate for these losses. The deposits of silt in the lower parts of the river channels has contracted the waterways, so that the channels are unequal to the task of carrying off the flood waters. Extensive inundations are therefore frequent, while in many cases the overflowing waters form effluent creeks, the great majority of which are liable to become dry when the river falls.

The early settlers who took up the land for pastoral purposes found at the outset that without tanks and dams only a small proportion of the land could be utilised. With commendable enterprise, and notwithstanding the want of any suitable law dealing with water rights, and in many cases, despite a precarious tenure of the land, the pastoralists expended large sums of money on works for conserving water. The construction of dams at intervals along the courses of creeks was followed by the excavation of tanks in suitable places to catch and retain the surface water. Subsequently, wells were sunk wherever a surface supply could not be obtained, and where there was reason to hope for underground water. The supplies thus tapped were made available by horse power, and more recently by windmills. The stock-carrying capacity of the Colony has thus been enormously increased, and extensive tracts of country, which in the early days of settlement were classed as uninhabitable, now afford sustenance to hundreds of thousands of sheep. The importance of the pastoral industry thus rose with the numbers of tanks, dams, and wells, which made the existing pasturage available for stock.

Throughout the western districts of the Colony, and particularly beyond the River Darling, the storage of water was a matter of much difficulty, owing to the lightness of the rainfall and the extreme dryness of the climate; but the discovery that artesian water in large quantities is to be found throughout a great part of the north and

north-west of the Colony has put a new and much-improved complexion on the position of the landholders. A large number of successful artesian bores have been put down by the pastoralists, and the water from these bores is conducted in some cases to a distance of many miles for the convenience of the stock. The water thus obtained and distributed has had a most important effect in increasing the stock-carrying capacity of a number of large pastoral holdings.

In some cases the pastoralists combined to construct works affecting great lengths of creek frontage. Two works of this description, which were carried out without any aid from the Government, have had an important effect in the districts in which they are situated. One of these works was the improvement of the Great Anabranch of the River Darling by deepening the outflow from the river, and constructing a series of dams along the course of the Anabranch. The other work referred to was the construction of a dam at the head of the Teryaweynya Creek to prevent the return to the River Darling of the flood waters which pass down the Lower Tallywalka. In each of these cases the effect of the work constructed was to create several hundred miles of water frontage, and to store large quantities of water in lakes and depressions.

A heavy expenditure was incurred by pastoralists in improving Yanko Creek, a natural effluent from the Murrumbidgee, and the Willandra Billabong, a similar outlet for flood water from the Lachlan; but in both of these cases the results were disappointing till the works were taken in hand by the Government. Formerly, when moderate to high floods were passing down the Murrumbidgee, Yanko Creek carried off a portion of these waters to the Billabong Creek, the waters of which flow through the Edward River to the Murray. With the improvements which have been made in the channel of Yanko Creek, it has been practically transformed into a continuously running stream. As the united lengths of Yanko Creek and its effluent, Colombo Creek, is about 250 miles, the result of the improvement has been that about 500 miles of water frontage has been created.

The Willandra Billabong in its natural state flowed only during the short and uncertain periods when the Lachlan was in flood. In this case, also, the pastoralists expended a large amount in improving the effluent channel; but the results were not commensurate with the expenditure. When the Government took up the matter, it was found that in addition to further improvements of the creek channel it was necessary to construct a weir, so as to raise the surface level of the River Lachlan about 12 feet at the outflow. A cribwork weir was accordingly constructed, and its effect has been that a portion of the waters of the Lachlan has flowed almost without intermission in the Willandra Billabong since the weir was completed nearly five years ago. This weir, which has successfully stood through an exceptional series of floods, and has thoroughly fulfilled its object, is shown in the accompanying view. As the river rises, the difference in level above and below the weir diminishes; hence, as the view was taken when there was a considerable depth of water in the river, a large portion of the weir was covered. As the course of the Willandra Billabong

extends through a fertile but very dry district to a distance of considerably over a hundred miles in a direct line from its head on the River Lachlan, its importance for water supply purposes is obvious.

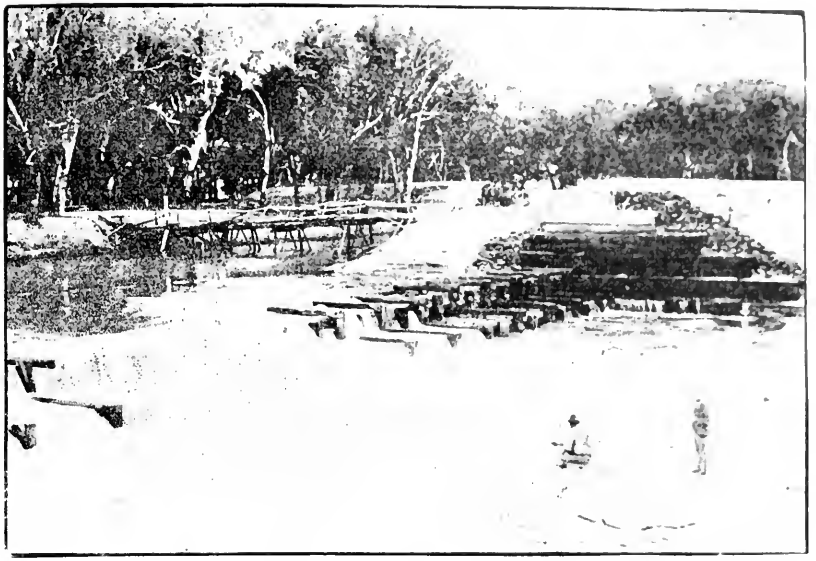
A weir on the Macquarie River, near Warren, with objects similar to those of the Willandra weir, is now almost complete, and another weir on the Macquarie, and a second on the Lachlan, are about to be commenced. In all these cases, the effluent creeks, which constitute ready-made distributaries for the water available from the rivers, are to be utilised to the fullest extent practicable. The weirs which are being constructed differ in design according to the circumstances of each case. That at Warren, which is shown in the accompanying view, is constructed entirely of timber, while the weir about to be commenced at a point about 30 miles further up the Macquarie will be of concrete.

A comparatively small and inexpensive, but nevertheless important work for water conservation, constructed by the Government, is a self-acting floodgate, which retains water in Lake Cudgellico. This lake, which is over 4,000 acres in extent, is filled in times of flood by the overflow from the River Lachlan; but under natural conditions nearly all the water would flow back to the river as the floods subsided. The erection of the floodgate has made the supply in the lake permanent.

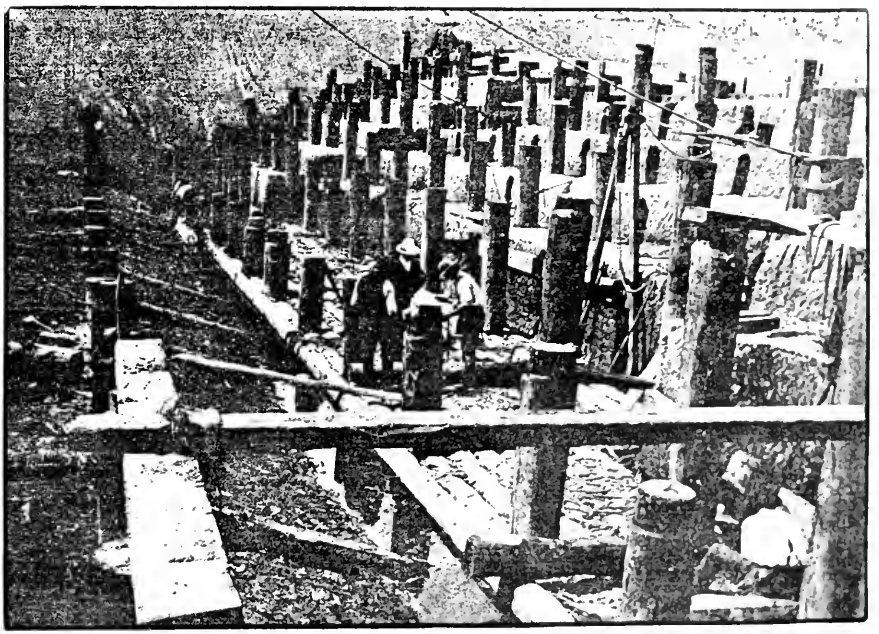
The outline given of the means by which water has been, and is being conserved for stock and domestic purposes throughout the country west of the Dividing Range shows that both the landholders and the Government are fully alive to the importance of the question. The arrangements for water supply are, in fact, so far advanced that in times of drought the stock suffer much more through want of food than want of water. The time is therefore ripe for considering what is best to be done to supplement the food supply for stock, to compensate in some degree for the inequality of the seasons, and to lessen the liability to losses through droughts.

The same class of enterprise which the early settlers showed in adopting means for utilising the pasturage in the dry districts, has already been shown by some of the present landholders in increasing the food supplies for stock by irrigation. An interesting experiment bearing on this subject was made some years ago on the Lower Darling, in a district so dry that it was not considered safe to estimate that the land could sustain more than one sheep to 10 acres on an average. The object of the experiment was to determine how many sheep could be kept in good condition by the produce of one acre of irrigated lucerne. The result showed conclusively that over twenty sheep could be so sustained. This was merely an experiment, but its result was highly suggestive. The adoption of irrigation in connection with the pastoral industry has, however, gone beyond the experimental stage.

On the lower parts of the courses of some of the rivers, the banks are higher than the land adjacent to them. Taking advantage of this, some of the landholders have made cuttings out from the rivers so as to flood the land by gravitation. Wherever this can be done at moderate expense, the result is highly satisfactory, and it has proved remunerative to irrigate even the natural grasses in this way. As an instance of the increase of grass produced by this method of irrigation, it may be mentioned that two larger paddocks near the Lower



WILLANORA WEIR, LACHLAN RIVER.



WARREN WEIR-WORKS, MACQUARIE RIVER.

Showing floor of cushion.

Lachlan, which had failed to sustain 4,000 sheep in the season before the flooding commenced, successfully supported 12,000 sheep, 120 cattle, and 200 horses in the first season during which the flooding was in operation. The rivers which can best be utilised in places for this class of irrigation at a moderate expense are the Murrumbidgee, the Lachlan, and the Macquarie.

Pumping from the rivers or creeks is, however, the commonest method of supplying water for irrigation. Although no great area has been irrigated in any one instance, there are steam pumps used for this purpose on almost every river west of the Dividing Range, and on some of the more important creeks. As the river or creek bank is frequently the highest ground in its neighbourhood, and the land slopes away gradually from the bank, the natural facilities for distributing water raised by pumping are excellent. The crop most commonly grown by irrigation in this manner is lucerne, but wheat for hay, cereals, and root crops have all been grown successfully, while an irrigated orchard and vegetable garden is now looked on as a proper, if not a necessary adjunct to every homestead possessed of water frontage.

The artesian bores which have already been referred to as providing supplies of water for stock in the dry districts of the north-west part of the Colony, have another most important function to fulfil, namely, providing for the means of adding to the food supply. In some cases the artesian bores have even now become the centre of little oases of cultivation, but the question of the proper utilisation of the artesian water is still in its infancy. The great value of reserves of fodder and other crops to assist in tiding over droughts is beginning to be more widely understood, especially in such dry districts as those in which the artesian water is obtained. The altered conditions which may be looked forward to when this part of the colony will be dotted over with artesian bores, each of them the centre of an irrigated farm, will amply justify the statement that the discovery of the extensive supplies of artesian water was equivalent to the addition of a new province. As this water has a high temperature, is frequently well-suited for wool-scouring, and sometimes rises with such force as to be capable of working powerful machinery, the field for its usefulness is wide and varied.

The classes of irrigation already referred to are all such as have been carried out by enterprising landholders for the improvement of their own properties. But there is a wide field for works of an extensive character which will benefit large areas, and provide the means for high-class cultivation and closer settlement. This is no mere theory or opinion, as the practicability of such works has been established beyond question by comprehensive surveys carried out at the expense of the Government. The Murray and the Murrumbidgee are by far the best sources of supply for irrigation canals, and the country between these rivers is singularly adapted for irrigation on a large scale. Westward from Albury on the Murray and from Narrandera on the Murrumbidgee, this district may be described as a great alluvial plain in which the ground falls in a north-westerly direction from the Murray and in a south-westerly direction from the Murrumbidgee. Schemes have been prepared for irrigation on an extensive scale from both rivers, and the conditions in both cases are highly favourable. It is estimated that

on the construction of the proposed canals on the south side of the Murrumbidgee there will be a fair return on the outlay if the water be let on lease at the rate of £30 per annum for a right to 540,000 gallons per day. As the lessee of such a right would have to take the risk of the available supply in the river falling short of requirements, it was necessary to calculate what the holder of such a right would have received during the last ten years, and what rate the water would have cost. It was found that during that period the actual cost of water to such a leaseholder would have been at the rate of 22,800 gallons for one penny.

A scheme has also been prepared for irrigation on a large scale on the north side of the Murrumbidgee, and the extent to which such schemes are practicable in connection with the other rivers west of the Dividing Range has been determined. Hitherto the great obstacle in the way, not only of large schemes, but of irrigation even on a moderate scale, has been the want of suitable legislation dealing with water rights. This drawback is likely to be remedied in the near future, as the Government has the matter in hand.

The great question of locking the river Darling, which, in point of length, ranks among the more important navigable rivers of the world, has been entered on. This will have the double effect of providing cheap and permanent water carriage, and of affording greatly improved and extended facilities for irrigation by pumping.

It will be seen from the foregoing that the progress of water conservation and irrigation in the country west of the Dividing Range has been steady and natural. Bearing in mind that in the absence of legislation dealing with riparian rights, the works in use exist only on sufferance, the progress made must be regarded as creditable. Operations have been conducted on safe lines; and if less has been done than in some other countries and colonies, it is so far satisfactory that serious mistakes have been avoided. When the question of water rights is placed on a sound footing, there is every reason to anticipate that opportunities for water conservation and irrigation will rapidly be availed of to meet the requirements of the country.

ARTESIAN BORE, WARREGO DISTRICT. Depth, 1,729 ft.; flow, 4,000,000 gallons daily.

The Rise and Progress of Artesian Boring.

By J. W. Boultbee, Superintendent of Public Watering Places and Artesian Boring.

Artesian boring is an enterprise of comparatively recent date in this Colony, and although the existence of supplies of artesian water was demonstrated as far back as 1879, by a successful bore sunk by Mr. David Brown at Kallara Station, it did not then attract the attention it deserved, and private enterprise languished entirely until the successful completion of a bore put down by Mr. Davis upon the Kerribree Station, on the Bourke to Hungerford road. From this inception the work has spread until the present moment, and from information collected by the Department it is shown that over one hundred bores have been sunk by private enterprise, yielding a supply of over 30,000,000 gallons of water per diem. By this means many stations hitherto dependent upon wells, or the precarious supply provided by the conservation of the rainfall, and run off in tanks and dams, are provided with a copious and permanent flow, which gives such properties an increase in value that cannot be estimated. The water distributed by channels 20 and 30 miles in length throughout the length and breadth of the holdings, gives a double frontage in each case far superior to that of the river area.

The Government commenced operations in 1884 by undertaking a series of bores upon the Bourke to Wanaaring road, under the direction of the Superintendent of Drills. Some success attended the efforts made —the cost of the work and the ineffective appliances used induced the Department to adopt the contract system, then in vogue successfully in Queensland. This system was adopted in 1890, and since that date the progress has been rapid and assuring. There are now forty-three Government bores, yielding a supply of over 16,000,000 gallons per diem. The work is carried out under the direction of the Secretary for Mines and Agriculture, by the Superintendent of Public Watering Places and Artesian Boring. The policy of the Government in undertaking this work has been primarily to provide water upon the dry and impassable stock routes of the arid portions of the Colony, and by a judicious selection of sites to also furnish geological evidence of the limit and extent of the water-bearing formations.

It was until quite recently supposed that artesian water would only be found to occur in the cretaceous formation, which occupies approximately an area of 42,000 square miles in the north and north-western portions of the Colony. Palæontological evidence, however, in the form of fossil plants, *tæniopteris daintreei* and *thinnfeldia odontopteroides*, discovered by the Government Geologist, Mr. E. F. Pittman, in the strata from the Coonamble and Moree bores, demonstrates the

existence of artesian water in rocks of triassic age. The importance of this discovery cannot be estimated, as it practically opens up a new field for this enterprise, and if, as the Government Geologist hints, the formation possibly extends across to the Leigh Creek coal beds in South Australia, the area in which the occurrence of artesian water may be looked for is enormously enlarged.

One of the most important questions that can be raised in connection with our Artesian Supply is that of its permanency. This has been fully dealt with by Mr. Jack, the Government Geologist of Queensland, who recently, in a most able paper, read before the Brisbane meeting of the Australasian Association for the Advancement of Science, gave an account of his researches and explorations, in which the intake beds of the cretaceous system were followed and marked out, showing such an enormous increase in what had hitherto been supposed to be the whole of the intake, that he could only presume the exhaustion of the supply under conditions of such drought that would mean the total annihilation of man and a greater part of the Australian fauna. His report reads thus :

It is not within the scope of a single paper to consider the whole subject of artesian water. My object in addressing this section has been to point out what light has been thrown on the question, so far as it affects Queensland, by recent investigations. We have shown that an intake at sufficient altitude to account for the flow of water in the artesian bores of the west exists along the eastern margin of the lower cretaceous, and having found a simple explanation in agreement with known physical laws, I go no further in search of another. I have argued that the loss of water by the river Darling, and probably a similar loss of water by the western Queensland rivers, proves that the water-bearing strata must leak into the sea, and hence that unless the strata be periodically replenished the sea level would ultimately become the level to which the water would rise. A drought sufficiently long to bring about this result would, no doubt, have for a prior result the destruction of the greater part of the land fauna of this part of Australia, including the genus homo.

Since that date, in a paper read before the Royal Society of New South Wales (December, 1895), Mr. Pittman, the Government Geologist, reports the result of his examination of the intake beds of the triassic rocks, and shows that these occupy an enormous area to the east of (and additional to) the intake beds of the cretaceous formation as surveyed by Mr. Jack.

An important discovery was made by our Government Geologist during 1894. By an inspection of a supposed opal field in Bidura Parish, County of Caira, about 40 miles north of the town of Balranald, he discovered that cretaceous rocks occurred nearly 250 miles to the south of the southernmost limit hitherto assigned to them. In a report dated 14th June, 1894, he writes :

One fact in connection with these rocks is of very great interest, viz., that they have all the appearance of the upper cretaceous beds, while the underlying clays, together with the occurrence of concretionary fragments of calcareous sandstone, under the sand ridges over a considerable area of this country, appear to indicate that the lower cretaceous beds are also present.

The journey from Hay to Oxley was made during the night, and, therefore, I was unable to examine the geological formation of the country between these two places ; but from a point about 12 miles west of Oxley to Bidura, and thence southward to Balranald, the same formation appears to extend.

It would thus appear that the cretaceous rocks occur nearly 250 miles to the south of the southermost limit hitherto assigned to them, and the importance of this occurrence, in view of the possibility of their containing artesian water, can hardly be over-estimated. The south-western corner of the Colony is very subject to long-continued droughts, and the advantages to be obtained from supplies of artesian water away from the river frontages would be very great indeed.

It may be that these cretaceous rocks are merely an outlying or isolated patch, in which case it is hardly likely that they would contain artesian water, as I am not aware of any high ground to the eastward, where porous beds come to the surface in such a way as to form an intake for the rain supplies ; but, on the other hand, it is quite possible that the area under consideration may be an extension southwards to the great northern and north-western cretaceous basin, and, if this be so, the possibilities in regard to its containing artesian water are very great.

I therefore venture to recommend that, with a view to testing the question, a bore be put down on a travelling stock reserve within the area indicated.

In a report of later date (31st December, 1894), Mr. Pittman writes as follows upon an area examined lying to the west of the Paroo River, bounded on the north by the Queensland border, and on the south by the line joining Broken Hill and Wilcannia:—

Perhaps the most important conclusion at which I have arrived is that the artesian basin has probably a much further extension southwards than had been previously assigned to it. It has hitherto been considered that the southern boundary of the cretaceous basin was formed by a bar, or buried range of palæozoic rocks, stretching westward from Cobar, through Wilcannia, to Scropes' Range. At Wilcannia the rocks forming this supposed bar were regarded as Devonian, and this opinion appears to have been formed on lithological evidence only, as there is no record of any Devonian fossils having been found *in situ*, nor of any geological section in which the relation of these Wilcannia sandstones is described with regard to older sediments. But in my opinion the lithological character of these sandstones points to their being of mesozoic rather than of palæozoic age, and the small amount of geological evidence, that can be obtained from a surface examination, seems to strengthen that view. Deposits of hard sediments which I observed at certain localities—such as at the west of the Koko range, at Kooningberry, at the western end of Mount Murchison, at the western end of Woychugga Lake, at the Springs, and at the northern end of Scropes' Range—may be, and probably are, of Devonian age. They consist of hard, dense, thick bedded quartzites, similar in character to those of Mount Lambie, near Bathurst, showing slicken-sided joints, and, as a rule, lying at a high angle with the horizon. But the rocks at Wilcannia are of a different character. They consist of soft, yellowish, greyish, and whitish grits and sandstones, frequently containing bands and pockets of kaolin, and lying, as a rule, at a very low angle of inclination. In fact, while one set of rocks shows abundant evidence of both metamorphism and disturbance, the other is remarkably free from signs of either.

My conclusion in regard to these rocks is that they are probably of upper cretaceous age, and if this be correct it means that, instead of the cretaceous basin being cut off on the south by an east and west boundary through Wilcannia, there may be a deep channel somewhere between Woychugga Lake and Mount Manara, by which the Artesian basin may have extended far to the southwards, possibly even under Eocene beds of the Lower Darling of the north western portion of Victoria and part of South Australia to the neighbourhood of Mount Gambier, where fresh water has long been known to escape as springs on the sea coast, as was first pointed out by the Rev. Tennison Woods. It is quite possible that this water, however, may be derived from the Eocene beds themselves, and not from underlying cretaceous beds.

The policy of the Department has not been to confine its proposed operations to any stated district or area, but to give attention also to the wants of the north-western and northern parts of the Colony, viz.,

Silverton to Milparinka, Milparinka to Wanaaring, Wanaaring to Bourke, Bourke to Hungerford and Barringun, Bourke to Cobar, Narrabri to Moree, Moree to Boggabilla, Collarendabri to Angledool, Nyngan to Coonamble, Walgett to Coonamble, Brewarrina to Nyngan, which are for the most part arid districts; and this policy as now extended will be found to be of great benefit to the country at large, and do much to open up the country and promote settlement.

The Department has in all let 21 contracts for Artesian Boring, and together with 3 contracts taken over from the Works Department, make a total of 24. These comprise in all 81 bores, of which 43 have been completed. Of these contracts one has just been recently let for bores at Mulga Valley and Cobham, on the Wilcannia to Milparinka road, and bores at Yalpunga and to the north, on the Milparinka to Wompah road.

Complete records of the Government Bores, as to strata, depth, flow, temperature, pressure, diameter, casing, &c., are kept by the Department for reference, and samples of the strata are preserved. Also analyses of the waters and soils are made, with a view to the future possibilities in the way of irrigation by means of artesian water. The following is an extract made from a report of Mr. J. C. H. Mingaye, F.C.S., M.A.I.M.E., Analyst and Assayer to the Department of Mines, on the question :—

It has been stated that our artesian waters are unsuitable for irrigation purposes, and that when a water contains 30·40 or 50 grains per gallon of total solids, its use after a time will kill all vegetation. That is so, as would also be the case with the ordinary river water in time, without any system of proper drainage, the evaporation of the water causing the saline matter to crust on the surface of the soils, and thus tend to destroy plant life. A most important constituent in the composition of the total solids in these waters is the rather large proportion of potash present, thus contributing this important fertilizer to the soils which are irrigated with the waters. A large amount of valuable work has been performed in America and India, *i.e.*, use of saline waters for irrigation purposes, where in places great difficulty has occurred as to the rise of "reh" in the soils. Our soils in the western district, where the most of these artesian bores are situated being of a sandy nature, and good depth, a water containing a fair amount of saline matter could be used for irrigation, where the same water if applied to another class of soil, *i.e.*, stiff clay or loam, for some years, especially if the drainage was not properly carried out, and occasionally the soluble salts worked out, cause the soil to become saturated and in time kill all vegetation. It has been found in America that the carbonate of soda is the worst form of salt that has to be contended against in the use of these saline waters for irrigation purposes. It renders the soil caustic and corrosive, and dissolves the humus which is shown by the dark colour of the water standing on alkali spots, and the black rings left when such water evaporates. By the use of gypsum (Calcium sulphate) in small quantities its corrosive action can be remedied to a great extent. A chemical action takes place, the gypsum in contact with the carbonate of soda forming carbonate of lime and sulphate of soda (Glauber's salt). The first is beneficial to the soil, and the latter is a neutral salt, which, according to Professor E. W. Hilyard, is from ten to twenty times less injurious than the carbonate of soda. In America, in districts affected with the carbonate of soda in the soil, it has been found in numerous cases that the simple use of gypsum, conjointly with summer tillage to keep the soil loose, has sufficed to enable land that never before produced anything of value to bear abundant crops. By the aid of deep tillage and rotation of crops it is often possible to absorb a large amount of these soluble salts or "reh" in the plant. Beets, carrots, and many other root crops are known to absorb a large amount of soluble salts (*vide*

Reports of Examination of Water and Water Supply, by Professor E. W. Hilyard, Agricultural Experimental Station, University of California). As already pointed out, many of the soils in the districts where irrigation has been carried on in America and India contain already a fair proportion of "reh," *i.e.*, highly soluble saline. In a report furnished to the Government of India by E. E. Oliver, Esquire, Department of Punjab, it is pointed out that "reh" is rarely developed in sandy soils. Mr. Ibbertson, another Indian authority on irrigation, says: "Within his knowledge it never appears in sand. It is seldom very apparent in stiff clayey soils, but loam is affected to an enormous extent." In India the antidote used for "reh" is nitrate of lime, this salt being recommended by Dr. Brown, late Chemical Examiner to the Punjab district, who shows that mixed with the injurious salts of "reh" decomposition occurs, and nitrate of soda, with the sulphates of carbonates of lime, are produced. These salts being directly beneficial to vegetation, the nitrate of soda supplying the plants with the nitrogen they so much need, and the sulphate of lime absorbing ammonia from the air. We have now a large number of artesian bores in the waterless western district, which yield water suitable for human consumption and sufficient surplus water for the irrigation of small holdings or farms, orchards, &c.

Mr. Mingaye concludes his report by the significant statement that the amount of potash salt contained in these waters is decidedly beneficial to plant life.

These analyses together with the results from the experimental farms at the Native Dog and Barringun Bores must indeed go far to remove the doubt that exists as to the suitability of these waters for the encouragement of plant life.

This phase of the question has not received as yet the general consideration it merits. The possibilities are unlimited, but beyond initiating a few experimental farms at some of the Government bores, little has been done in a practical way, the most serious effort being that initated at Pera Bore, 8 miles from Bourke, upon the Wanaaring Road. At this place the land has been surveyed into 20-acre blocks, which are offered under the Homestead Settlement provisions of the Crown Lands Act, with a water right equivalent to 35 inches of rain for the year. So far these have been fairly taken up; an area of 57 acres has been reserved as a Government farm, where a range of products and fruits from the Temperate to the Torrid Zones are being grown with success. The settlement is in its infancy and its progress and development are being watched with the keenest interest. The transformation of a sombre wilderness of gidgea scrub to the verdant areas of lucerne, maize, and fruit is very marked and gives encouragement for dreams of progress and development in this district, perhaps one of the most arid in the Colony, far beyond the calculation and conception of the present nomadic and purely pastoral population.

In America great strides are being made in the development of irrigation from artesian wells. It may not perhaps be generally known to what extent this is now being used.

As illustrative of the American experience, the following extracts are given from Colonel Richard Hinton's valuable reports "The Artesian and Underflow Investigation," published by the Secretary of Agriculture, Washington, in 1892. Colonel Hinton states:

Artesian water is used more extensively for irrigation purposes in California than in any State in the Union, as at the end of the year 1891 it was estimated that out of 100,000 acres irrigated from artesian wells west of the 97th meridian, 50,000 acres were in

California. Irrigation with artesian water for raising all kinds of fruit, lucerne, vegetables, and to a small extent of grain, has been practised for years, and can be looked on as a permanent success. This water, however, is generally too valuable for cultivation of grain, and is mostly devoted to the intense cultivation, now so largely carried on in fruit growing districts.

Engineer William Hall in his report on Perris Irrigation District, dated August, 1891, states:

Between 1880 and 1884 the canal of the Riverside Colony was a line of demarcation between land worth no more in the market than 10 dollars (£2) per acre, and other readily saleable at 250 dollars (£50) per acre. Those above the canal were without irrigation, and there was but a vague hope of ever securing it. But the building of the Upper Riverside or Gage Canal (source from artesian wells) in 1885-6 made water rights available for these upper lands, they paid a big bonus for the water privilege, and are now selling at 200 dollars (£40) to 500 dollars (£100) per acre, without improvements.

It may also be of some interest to quote from the report of Professor Hill, Geologist for Texas, New Mexico and Indian Territory, U.S.A. He points out that there are over 1,000 flowing wells in Texas, and adds "their vast capability and adaptibility for making secure agriculture, always rendered uncertain under high temperature, has not become a matter of general understanding." He further adds that in the development of such wells their use for irrigation was not dreamed of originally, but that now they are being widely utilized. It may not perhaps be generally known that the celebrated fruit ranch of Riverside, San Bernardino Co., S. California, derives a portion of its water supply from artesian wells, and which works are known as the "Gage" system. There are 12,000 acres under fruit, served by 38 artesian wells. The success of this system has encouraged others, and there is now in progress another undertaking of a similar nature known as the Whittier system, located in the Upper San Gabriel Valley, Los Angelos Co., comprising 14 artesian wells. The works consist of 11 miles of cement conduit, bottom width 4 feet for a distance of 9 miles, and 6,200 feet of fluming on piles and trestles. In the San Luis Valley there are 3,700 flowing wells. The Alamosa Town well in this valley is described as the principal source for the 30 miles of irrigating ditches within the corporate limits of Alamosa.

In Utah the artesian wells in the Salt Lake Valley were first used for irrigation about eight years ago, since then the area of cultivation has increased from 25 to 35 per cent.

To go nearer home, in Hawaii, on the margin of Pearl Harbour, 20,000 acres of rice and large areas of bananas are under irrigation from artesian wells, in addition to which they provide power for several large mills. The immense strides in Algeria are perhaps too well-known to refer to. All these facts are distinct encouragement to us here, and it is marvellous that so little is being done by private enterprise in this direction, and few recognise the immense value of the water now being poured aimlessly on the thirsty soil of the western districts.

The following return showing the extent of the Department's operations from the inception of the contract system up to the present time, will give some idea of the magnitude of the work. The bores are directly reproductive to a certain extent, while the indirect benefit

accruing to the State and community generally by enabling stock to travel, and facilitating the carriage of stores and wool to the rail centres and thence to the Metropolitan markets and the seaboard, cannot be over-estimated.

Return re Government Bores, New South Wales.

Number of flowing wells (three in progress)	30
Number of pumping wells	12
Number of failures	4
Number of bores in progress	14
Number let, but not yet commenced	24
	84
Less, included twice	3
Total	81

Total depth bored to date	79,890 ft. 11 in.
Total cost of forty-three bores completed	£111,397 0s. 11d.
Average cost per foot Do	£1 16s. 6d.
Average depth Do	1,420 ft. 3 in.
Total cost of twenty-six flowing wells	£69,299 17s.
Total depth bored Do do	36,941 ft. 3 in.
Average cost per foot Do do	£1 17s. 6d.
Average depth Do do	1,420 ft. 9 in.
Total cost of twelve pumping wells	£30,531 10s. 6d.
Total depth bored Do	15,882 feet
Average depth Do	1,323 ft. 6 in.
Average cost per foot Do	£1 18s. 11d.
Estimated supply from thirty flowing wells ...	15,807,505 gals. per diem.
Estimated supply from twelve pumping wells ...	517,000 gals. per diem.
Estimated supply from forty-two wells	16,324,505 gals. per diem.

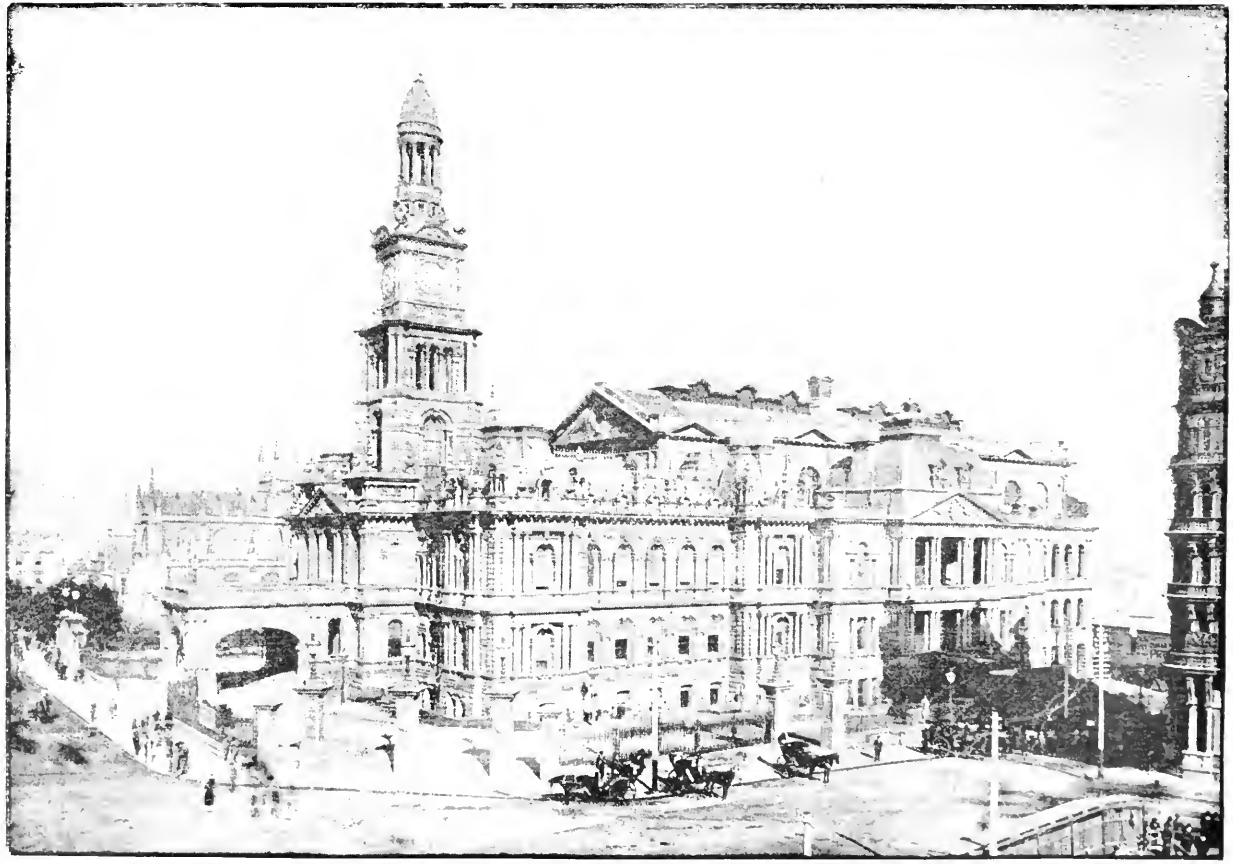
NOTE.—The cost of above Bores covers casing and all other charges.

Sydney and Principal Towns.

By Frank J. Donohue.

The four cities of San Francisco, Chicago, Melbourne, and Sydney stand almost alone as examples of the rapid growth of towns of the first rank under modern conditions. The cities of the old world are, according to the general rule, the result of centuries of the peaceful or turbulent aggregation of human atoms, of growth in wealth, and of expansion to meet the circumstances of national and urban life. The cities named have no such long-drawn-out record behind them. In the historical sense it is but as yester-year since Captain Phillip pitched his tents at the head of the Tank Stream under primeval trees, and as yesterday since the new population and the new era came in with the gold discovery. To-day Sydney ranks as the third city in the empire, estimating on the basis of the annual rating value. It has a population of about 400,000 in the city itself and the congeries of suburbs immediately surrounding it, a total capitalised value of ratable property amounting to over £109,000,000 sterling, and over 70,000 houses and business premises, covering an area of about 91,000 acres. When it is stated that the annual rating value of metropolitan property stands at upwards of £6,600,000, and is nearly three times as great as that of Birmingham, almost twice as much as that of Liverpool or Manchester and Salford, and about £2,500,000 above that of Glasgow, some definite evidence is given of the wealth and expansion of a city which has only been incorporated since 1842.

Figures like these tell their own tale of progress and prosperity, and it is as well to begin with such a definite starting-point as they suggest. Although in point of population and wealth Sydney is not to be compared with London, yet the visitor never fails to be struck with its metropolitan air; and for the same reasons as in the case of the city on the Thames, though, of course, on a reduced scale. The population of Sydney bears an even more disproportionate relation to that of the rest of the country. The city itself is given up to business, so that on Sundays and after nightfall the closed warehouses and comparatively silent streets of what by day are among the busiest quarters strikingly recall "the City" eastward of St. Paul's. The population is out of town in the spreading suburbs that fringe the harbour or the ocean beaches, or stretch away beyond Botany or towards Parramatta and the distant outlines of the Blue Mountains, or cluster along the highlands of the northern railway-line. Here the people of the metropolis make their homes, withdrawing more and more as time goes on from the city proper. Like it, each suburb may be said to have its own municipal establishment, controlling local affairs, and supervising the expenditure of rates to the best interests of the suburbs and its residents. Hand-



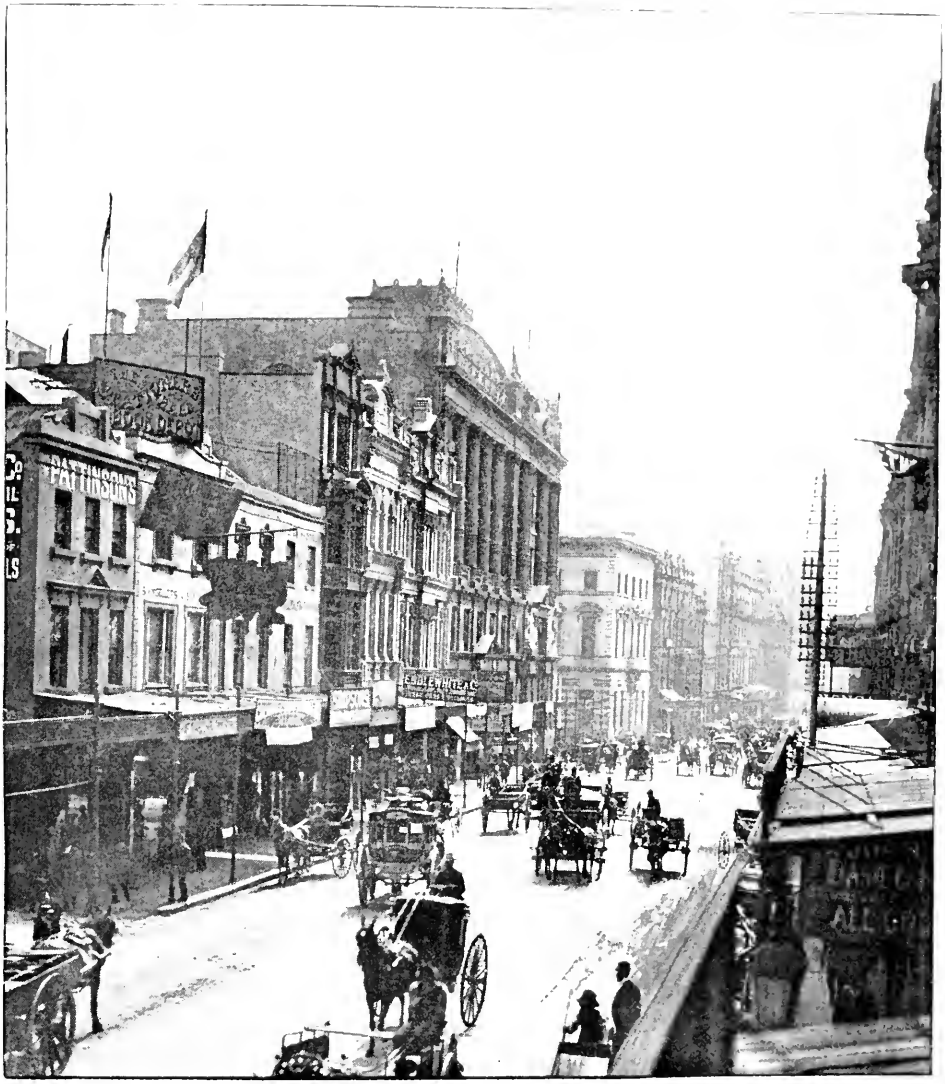
TOWN HALL, SYDNEY.

some town halls bear evidence to the generally prosperous condition of the municipal councils and to the stability of the institutions, and at the head of these stands the monumental edifice of the Sydney Town Hall, completed in the centennial year. Its great hall is one of the largest in the world, covering a superficial area of 14,110 feet, the length, breadth, and height being respectively 166½, 85, and 65 feet. The splendid proportions and 200-feet tower of the Town Hall make it a conspicuous object in the centre of the city, and a fitting centre for that municipal organisation which has dotted the face of New South Wales with important and well-governed towns during the past fifty years. Among other noticeable edifices which serve as the landmarks of the city may be named the University and associated college buildings, giving an old-world air to the scenes in which they are appropriately placed; the two cathedrals, the palatial public offices of the Colonial Secretary, Lands, and Works; the Post Office with its tower of 250 feet and its splendid Italian façade of colonnaded granite and sandstone 353 feet in length; the Museum, many of the banks, insurance officers, and commercial buildings, and the Australia Hotel. In certain parts of the city, as in Pitt-street, the way is lined with a succession of these magnificent buildings, testifying at once to the wealth of the metropolis and to its position as the great commercial port of the continent.

The history of the growth of Sydney has been plainly written in its ground-plan and in the direction of its streets. Here, again, we get something of that distinctively old-world look which has struck so many travelled observers as characteristic of this metropolis. It grew up from year to year as settlement progressed, without much forethought, and certainly without much deliberate plan. In the old charts and views the outline of what is now George-street and the main artery of the city may be traced as a winding bullock-track, starting from the vicinity of Dawes Point or of what was once the King's Stores, and pursuing its sinuous way round obstacles and past certain fixed points without any regard whatever to mathematical directness. These general characteristics the great thoroughfare still preserves, though its course is now marked by great buildings and the most valuable business frontages in this part of the world. On the promontory that lies between Circular Quay and Darling Harbour still survives a good deal of picturesque old Sydney, with its rocky cuttings, its narrow streets rising by steep steps, and its quaintly old-fashioned houses, the whole reminding the observer in its general features more of the appearance of the older parts of Naples than of what might be expected in an Australasian city. The movement of progress is rapidly clearing away these features, and assimilating this oldest quarter and by-drift of the city to the conditions that rule everywhere else. But even in the city itself the streets, which are sometimes narrow and winding, have that picturesque and comfortable irregularity which never fails to have a pleasing effect on the eye, while in the hot summer months these peculiarities afford a grateful shade which the citizen would sadly miss. The process of beautifying the city is continually going on, not without regard to this accidental picturesqueness, though the enormously increased value of street frontages is an obstacle in the way. In some portions of the metropolis the casual observer might

almost think himself within a walled town like those of old Europe, when the streets had to be made narrow to accommodate house-room for the population within the walls, and palaces and cathedrals were almost concealed from view for lack of space to give a prospect, or by the meaner buildings that crowded and shouldered them out of sight. Palaces like those of the Borghese in Rome or the Riccardi in Florence are lost in the narrow streets and crowded ways of the older parts of those ancient cities, and it is not until one passes the portals and discovers the broad, open courtyard within that any adequate idea is gained of the impressive character of these edifices. But of the public buildings of Sydney it may now be fairly said that they do not labour under such disadvantages. Generous spaces have been cleared and reserved, compared with which the Piazza Colonna at Rome or the Piazza della Signoria at Florence cannot for a moment compete in point of space. Few cities, too, are so well situated for architectural display and picturesque street effects; and though these were not much regarded in the early days when the capital was allowed to grow in its own haphazard and careless fashion, we may take credit for having done something to adapt our public buildings to their surroundings so soon as the claims of the subject made themselves felt. Our Post Office has been relieved of the neighbouring buildings that cramped its effect, and the widening of Moore-street has given us a central *plaza* of which any city might be proud. The block of buildings in which the Town Hall and St. Andrew's Cathedral are comprised once had much to contend with; but the removal of the police-station and the substitution of a splendid building for the City Markets has done much to throw these architectural monuments into relief. The new Hospital in Macquarie-street has cast new light on the possibilities of that fine thoroughfare, as it defines the crest-line of the hill between the city and the Domain. Doubtless the day will come when the idea these possibilities suggest will be carried out, and the noble sites of the present Sydney Mint and Legislative Chambers will be occupied by edifices more worthy of that position. An adequate House of Parliament—perhaps to accommodate a Federal Legislature—will be fittingly balanced by new Law Courts at the other end of the street, and it would be difficult to imagine a better site for this much-required building than is afforded by the situation at the top of King-street, with the Domain on one side, St. Mary's Cathedral and Hyde Park on the other, overlooking the Queen's Square, and commanding the sunlit perspective of one of our principal streets.

This prospect gives us one of the characteristic street views of a city singularly rich in that and other elements of the picturesque. It crowns and slopes from a succession of gentle hills, falling away citywards in one direction, or to one or other of the innumerable reaches of the waters of the harbour on the other. Macquarie-street and York-street define these higher outlines, and between them the business streets of the city lead down to the Circular Quay. Such an arrangement could not do otherwise than lend itself to picturesque street-views. Sometimes the perspective of the street architecture closes in round sunny glimpses of blue water, as when one looks down towards Darling Harbour. Sometimes it is lost among the towering spars and idle sails of a forest of shipping, as when the eye traverses Pitt-street



GEORGE-STREET, SYDNEY.

and sees the bows of tall merchantmen from all quarters of the globe projecting across the very footway, so that passers-by walk under them as they go to and fro about the city's busy affairs. Sometimes it frames a block of buildings like the Joint Stock Bank, or a quiet church, or a space of green grass and trees in one of the public parks. Looking citywards from the Domain entrance at Bent-street, the view is made up of massive buildings outlined against the sky; and as the observer looks up Bridge-street from the Exchange, the trees and public offices lead the eye until the view is closed by Government House gates. From Flagstaff Hill, near the Observatory, the prospect is of a different character. It takes us away from the city across the near arm of the harbour to where the two rivers thread their silver way among the trees towards the folded hills that bound the blue horizon; just as from the corresponding elevation near Governor Bourke's statue the eye follows the windings of the harbour until they reach the imposing water-gates of the Heads, seven miles away. Perhaps no city in the world has a fairer outlook. For mile after mile on either side the shore-line winds in and out in sweeping curves round an endless succession of bays and small peninsulas, where green lawns slope down to the waterside from pleasant residences, and where the native trees grow up to the very houses of the city. The blue water sparkles in the sun as the morning mists rise and disclose new vistas of beauty. Here and there a green islet breaks the expanse of water, and the ships of war ride at anchor near at hand. From the Palace Garden the view is one not to be lightly paralleled. Just below the eye falls on the mass of green of the Botanical Gardens, and then on the bright waters of the bay, where the sunlight plays in silver beyond the dead white of a gliding sail. Perhaps an ocean-liner is going down the harbour, delivering the first deliberate half-power strokes of those that are to drive her round the world. On the northern side the eye follows the sinuous coast-line, tracing its cool bays and leafy shades until the point is reached which conceals the entrance of Middle Harbour, another arm of Port Jackson with a beauty all its own. The beaches curve against the blue "like sickles of white sand," and all the added charm that long distances and hidden mazes can give are here to enhance the attractiveness of the harbour and beautify it. This much-lauded charm and beauty of Sydney Harbour are unique in their way. Other places have beauty and many have charm. The Bay of Naples is seen at its best at the close of a summer evening from the Capri terraces some miles away. The whole sweep of the bay is before the observer, from the tomb of Virgil at one side to Sorrento on the other. The soft sky, the rosy air, the strange blue of the Mediterranean, the outline of distant Vesuvius with its cloud-wreath of smoke vanishing lightly into the dim azure, the castle of St. Elmo overlooking the town, the ruins of the buried cities and of the pillars of Pæstum near at hand, make up a picture as enchanting by its beauty as it is fascinating by its historic and classic interest. From the heights above Hongkong the windings of the Ly-ee-Moon Pass, the harbour with its merchant fleets of all nations, and the stretch of the China Sea behind dotted far and near with the junks of Chinese fishermen, picturesque in the distance, and deluding the eye and the fancy together with their suggestion of the

galleys of old romances, are scenic effects to be treasured in the traveller's memory. The brilliant colour and tropical charm of the harbour of Colombo; the fairyland beauty of the Japanese Inland Sea when the draped and pleated sails float down against the sunset or in the glow of early morning; the blue seascape seen from the terraces of Monte Carlo, like the picture-scene in an opera; and the port of Marseilles, with its curious suggestion of certain aspects of Sydney Harbour—all these make striking and memorable pictures. The harbour at Rio Janeiro is said by those who have seen it to rival the waterway of Sydney, but certainly none of the others named, as the writer has seen them, can pretend to excel it in purely natural beauty. It is, then, hardly much matter for wonder if our people value their possession of this beautiful natural advantage; or that we appear to strangers, as one of them has told the world, almost as proud of our harbour as though we had excavated its basin ourselves.

No description of Sydney would be complete without some reference to the Botanic Gardens. Although the city grew up under somewhat haphazard conditions, the citizens have always been indebted to the foresight of Governor Phillip in setting apart certain areas for public reserves. Among these are Hyde Park and the Sydney Domain, to which the Botanical Gardens adjoin. Had this precautionary measure not been taken it is more than likely that, in the expansion of the city, what are now valuable breathing spaces would have been overgrown with streets and houses, and the population would have to go much further afield for recreation than is the case now. The site of the Gardens was originally occupied by farms, whence the name Farm Cove. But this admirable position has for many years been devoted to its present purpose, and the beauty of its situation, with its far-extending water frontage, has been used to make of the Gardens as beautiful and attractive a pleasure ground as may be found anywhere. The immediate purpose of the Gardens is, of course, to serve as a place for the collection of botanical specimens from all parts of the world; but while this object is in all respects efficiently served, the Gardens fulfil the further office of a public park under the most perfect conditions. Here tropical foliage, flowers and shrubs of all kinds, and trees brought with sedulous care from their native regions in all quarters of the globe, unite to give interest to the scene. Here are cloistral walks and shady pleasances, and broad stretches of lawny grass, and cool air-wafts from the bay to temper the summer heats from which the citizen seeks refuge, setting the flowers astir and gently touching to a pleasant murmur the leaves of grateful trees. There is the green arbutus by whose like Horace loved to lie lazily extended in the shade, while he crystallised the life and philosophy of his time into the odes and epodes and satires he has left us. Here is a Spanish cork-tree like those under which Cervantes or his Don Quixote may have squeezed a wine-skin by a wayside of La Mancha. Here are waving plumes of palms, like those that first made the islands of the South Seas distinguishable above the sea-line to the eyes of early Austral adventurers. Here are rustic bridges spanning pretty watercourses, with the old sun-dial, and a sound of the voices of doves in the air. The sunlight lies broadly across the lawny stretches of fresh grass, and some way off an occasional marble figure gleams white in

the clear air against the cool green shadows beyond. From rustic seats under shady trees one gets vistas of green distance framed in leaves, or sharply cut off by a brown shaft that flowers out overhead into a canopy of palm, or set aside from the rest by the Japanesque tracery of the reedy stems of far Eastern bamboos. All this suggests a wonderful variety; and it is claimed, indeed, for the Sydney Gardens that they contain a larger variety of plants growing out of doors than the famous collection at Kew, and probably the most complete in the world. The curator, Mr. Charles Moore, has spent nearly fifty years at his post, having been selected by Lord Grey in 1847. During his time most of the improvements have been made. The first harvest was reaped on the farm here the year after the Colony was founded. In 1816 it first received its present name, and vines and fruit-trees were cultivated up to about 1850. The Lower Gardens were reclaimed ten years later, while the circular sea-wall dates from about 1865. A complete botanical arrangement has been carried out in the Lower Gardens. Among the other recreation reserves of the metropolis may be named Moore Park, and the Centennial Park—a noble reserve dedicated in 1888, to commemorate the centennial year of the Colony's progress. Not many miles southward from the city is the National Park, where thousands of acres of woodland and river, with miles of ocean frontage, were set aside for a people's playground by Sir John Robertson. For summer resorts the citizens have the highlands about Katoomba and Bowral, where they can escape the moist heat of the city during the most trying days of that season.

Suburban Sydney is a greater city outside the city proper. While the strictly urban population was set down at the official enumeration four years ago as 107,652, that of the suburbs amounts to 275,631. To south, west, and north the city is continually spreading, and nothing can show the rate at which the process is going on better than a comparison of the population returns at ten years' interval. Thus, in 1881, while the population of the city proper was 100,152, or, practically, much the same as it is now, the suburban population was only 120,832, and only half that number in 1871. In the last ten years, while the urban population has been almost stationary, that of the suburbs has considerably more than doubled itself. Instead of about 21,000 houses, these suburbs have now over 52,000, or about three times as many inhabited buildings as the city. This rush of population out of the city has, of course, given rise to a rapid increase in the value of suburban building allotments and residential areas. Many neighbourhoods around Sydney, which a few years back were part of the original scrub or bush, are now the centres of flourishing boroughs, with well laid out streets, extensive municipal works, and all the requirements of permanent settlement. Like all other "booms," the suburban "land boom" overstepped due limits and had to correct itself in the usual abrupt economic fashion. Inflated values receded to normal figures, building rates came back to reasonable charges, and suburban rents were lowered; but building operations and the process of expansion went on more or less all the time. The working men's suburbs are the more populous. Some of them, like Balmain and Redfern, have over 20,000 inhabitants, the most populous of all being the former with 23,475. In the next flight come these with upwards of

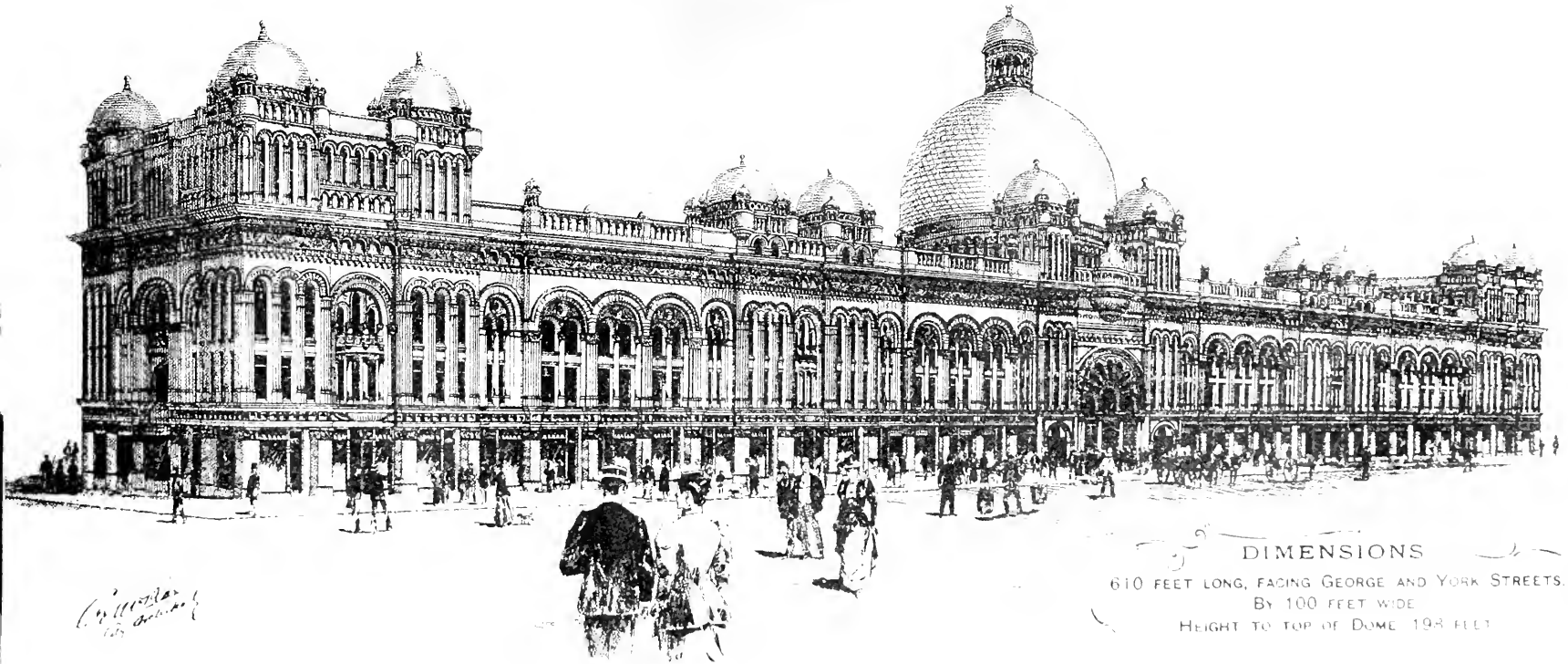
17,000 inhabitants, which includes Paddington, Newtown, North Sydney, the Glebe, and Leichhardt. Marrickville comes next with upwards of 13,000; then Ashfield with 11,000; Petersham and Woollahra with about 10,000 each; Waterloo and Waverley with about 8,000; Alexandra with 7,000; Burwood, Camperdown, and Randwick, with about 6,000 each; Macdonaldtown with 5,000; Rockdale and St. Peter's with about 4,000 each; Darlington, Hunter's Hill, Hurstville, Manly, Ryde, and Willoughby with 3,000; Botany, North Botany, Concord, Canterbury, Enfield, and Kogarah, with 2,000; Drummoyne, Five Dock, and Strathfield with upwards of 1,000 each; and Homebush which still falls below that figure. Owing largely to municipal activity in the older suburbs, the sanitary condition both of the city and suburbs ranks high.

The principal towns of the colony in the order of population are Newcastle with about 13,000 (though Broken Hill figures have reached to nearly 20,000), Parramatta with about 12,000, Goulburn with about 11,000, Bathurst with 9,000, East and West Maitland together with about 10,000, West Maitland alone being returned at over 7,000; Tamworth, Grafton, Wagga Wagga, and Dubbo, with 4,000; Armidale, Bourke, Orange, and Wollongong, with 3,000; besides the mining townships of Plattsburg, Wickham, Lithgow, &c. Of these Newcastle is the oldest, dating in reality from the first coal workings thereabout in the earliest years of the colony. The town and surrounding boroughs had a population of 24,600 last year, while the district included 62,406 people. It is 62 miles from Sydney by sea and 102 miles by rail, and is the centre of the northern coal trade. The port is the the second in importance in New South Wales, and possesses a remarkable breakwater extending from Nobby's Head to the mainland. The city is well laid out, with well paved streets, handsome municipal and railway buildings, an excellent theatre, about ten churches, and an annual rating value of £191,323. A good deal of manufacturing industry goes on in and around Newcastle, including boot, cordial, biscuit, and carriage factories, shipbuilding and fellmongering yards, a brewery, foundries, and engineering establishments. Goulburn is 134 miles south by rail from Sydney, its two cathedrals, churches, colleges, convents, &c., give it the ecclesiastical air of a quiet English town, and the post-office, court-house, and hospital are handsome public buildings. The ratable property is worth £82,222, and the surrounding district is chiefly given up to farming. The town is pleasantly situated. Bathurst is 145 miles west by rail from Sydney, crossing the Blue Mountains *en route*. It is an important and progressive town, with strikingly commodious post and telegraph offices, courthouse, and town hall, a school of arts, hospital, two cathedrals, colleges, and several other churches. The annual value of the ratable property is £67,013, the district is agricultural and pastoral, with nearly 40,000 acres under cultivation, and the town possesses several manufactories. Maitland is 120 miles north of Sydney by rail, on the Hunter River. It has fine streets and handsome buildings, and is pleasantly situated in the heart of rich agricultural country. Tamworth is 282 miles north of Sydney by rail, and 183 from Newcastle. It has ratable property worth £37,500. A fine town hall, several handsome churches, some public halls and a theatre, and an exceptionally fine post and

NEW CITY MARKETS

GEORGE STREET

SYDNEY



DIMENSIONS

610 FEET LONG, FACING GEORGE AND YORK STREETS.

BY 100 FEET WIDE

HEIGHT TO TOP OF DOME 198 FEET

telegraph office. In the neighbourhood are three steam flour mills, a galvanised-iron manufactory, four large coach factories, boot factory, steam saw-mills, and a brewery. The district contains excellent agricultural land, and over 17,000 acres are under tillage. Grafton is distant 528 miles by rail, and 342 by sea, north-east from Sydney. It has ratable property worth £33,866, and is an important seaport on the Clarence. The principal buildings are the court-house, school of arts, and post-office, with banks and insurance offices; an Anglican cathedral in process of building, and several other handsome churches. The town possesses two saw-mills, two engineering establishments, a tannery and gasworks, and is the centre of the sugar industry, the Colonial Sugar Refining Company's mill there being the largest in Australia. Wagga Wagga and Dubbo are both centres of pastoral districts, though of late years agriculture has made marked advances. The rating values are upwards of £32,000 and £48,000 respectively. Armidale is chiefly remarkable as the Cathedral centre of the New England district. It has fine churches and public buildings, a rating value of £32,420, and flourishing agricultural surroundings. Bourke is the pastoral centre of the West—the back country. Orange is a pleasant town on the western road beyond Bathurst, and an agricultural centre. Wollongong is a picturesquely situated town on the south coast, and our third seaport, being the shipping-place of coal and dairy-produce from the southern districts. Broken Hill, 925 miles west from Sydney, is the centre of the largest silver mines in the world; and Parramatta is the old capital of the colony, and at present practically a railway suburb of Sydney at 15 miles distance.

Railways and Tramways.

By R. L. Nash.

It may be that if the railways of this colony had at the outset been designed to cover the mileage they do to-day, they would to some extent have followed different routes. They have been put together piecemeal like the railways of the United Kingdom; but at any rate, there is not the same unnecessary amount of duplication of routes as is to be found in the Old Country; and although they have grown perhaps less with a view to a symmetrical whole than as the progress of settlement suggested, New South Wales is to-day possessed of a very serviceable network converging upon the two great ports of Sydney and Newcastle. The 2,531¼ miles of Government line in operation on the 30th June, 1895, may be classified as under:—

	Miles in operation.	Capital Cost.
Connecting with Sydney:—		
Sydney, Suburban	38¼	£2,967,634
Southern Line to the Victorian Border	375¼	4,904,207
Do do Branches	493¼	3,443,613
Western Line, to Bourke on the River Darling	490¼	5,389,482
Do do Branches	389	3,189,143
South Coast Line	94¼	2,310,412
Connecting with Newcastle:—		
Northern Line, to the Queensland Border	392½	4,973,443
Do do Branches	161½	713,004
Sydney and Newcastle connection	93	2,624,401
Unconnected Northern Branch	63¾	862,162
	2,531¼	31,377,501
Rolling Stock, workshops, &c.		5,233,865
		£36,611,366

Costing on the average £12,396 per mile for construction, and £2,068 for rolling stock, &c., or a total of £14,463 per mile.

These Government Railways are all constructed upon the 4 feet 8½ inches English gauge, and are substantially built. There are, in addition, some private lines. That from Deniliquin to Moama, on the River Murray, is 45 miles, and constructed on the Victorian gauge of 5 feet 3 inches by a Melbourne company, and it feeds the Victorian railway system. The Silverton steam tramways are 35¾ miles in length, with a 3 feet 6 inches gauge, and connect Broken Hill with the South Australian railways. There are, too, two small branches, together 3¾ miles, on the standard gauge, so that, in all, there are 2,615¾ miles of railway in the colony, the capital cost of

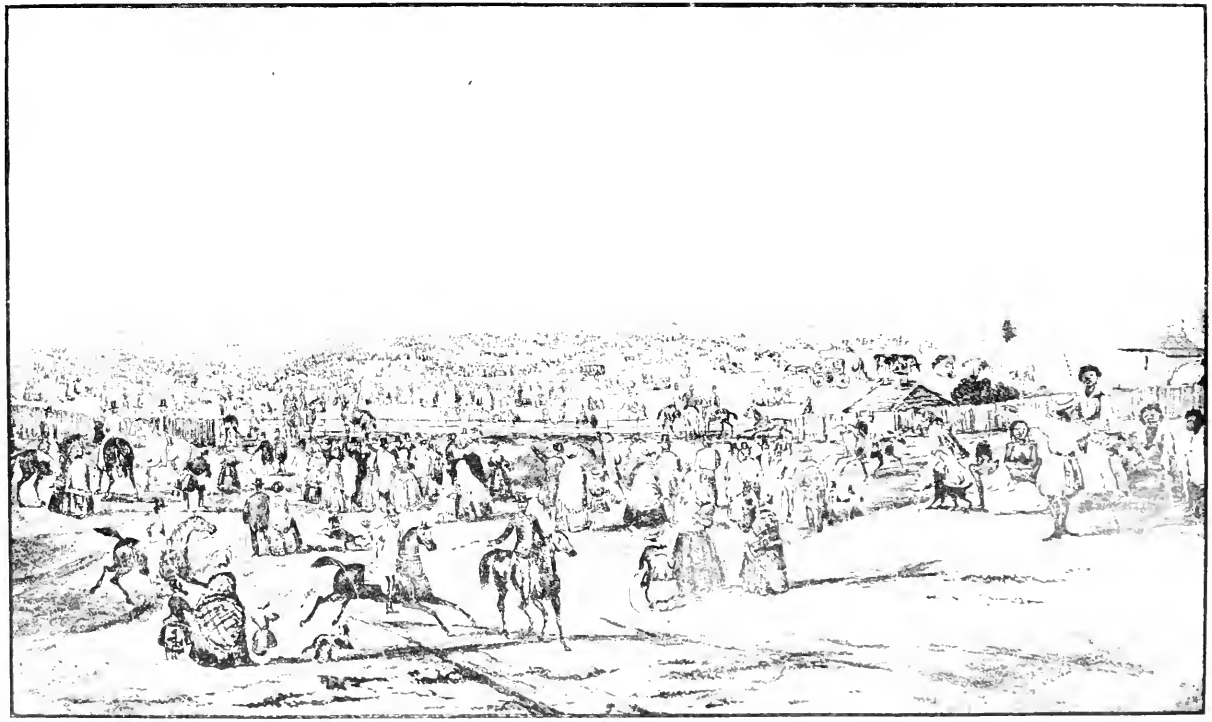
Coast line was finished as far as Nowra, and the branch of the Western line to Forbes was also brought into operation. These are the principal developments of the system; but there are other branches in operation, and in time the isolated Lismore line will have to be connected with the Northern system, though it presents many difficulties and will be a costly work.

Other extensions are in contemplation, but they are all of the "light railway" character, as it is the present object of the Railway Administration to keep down any inflation of the capital account as much as possible. Instead of an average of over £14,000 a mile, the purpose is to construct agricultural and pastoral lines costing from £2,000 to £3,000 per mile only, and of such a character will be the authorised extension of the Northern branch from Narrabri to Moree. There is also the proposed extension from Forbes to Condobolin, along the course of the River Lachlan, and before many years are passed an extension of the Western system across the Darling to Broken Hill will have to be undertaken. This important work, which will place Sydney in direct communication with the South Australian system, should not be carried too far to the northward if it is to intercept the wool and other traffic now flowing southward to Melbourne and Adelaide. In addition to which, it ought to be possible to obtain a substantial participation in the carriage of Broken Hill ore to the coal and of coal to Broken Hill, thus filling the trucks upon both journeys. But these lines upon the Western plains will none of them involve much in the nature of costly construction, with the exception of the crossing of the Darling.

However, it is not the purpose of these pages to sketch out the future of New South Wales extension.

The Appointment of Railway Commissioners.

The rapid opening of new lines prior to 1888, some of them constructed without sufficient regard to the prospects of an early remunerative traffic, an excess of political influence, an unwise effort to keep down working expenses by restricting renewals, and the need of more harmonious and expert control, resulted in an undue waste of resources and a certain amount of deterioration; and it was found that while the capital expenditure had nearly doubled, the net earnings had not increased. Hence, it was determined to secure the best technical knowledge available in the United Kingdom, and to place the entire system under the control of a responsible body of Railway Commissioners, as far removed as possible from political influences. The Government Railways Act of 1888 was duly passed, and Mr. E. M. G. Eddy, whose services to the London and North-western, and Caledonian Railways had been generally and warmly recognised, received the appointment of Chief Commissioner. With him were associated Mr. Charles Oliver and Mr. W. M. Fehon, and these three gentlemen have, during the past seven years, had the control of the completed railways. The responsibility in respect to the construction of new lines still rests with the Parliament, but even in that case a report is required from the Commissioners, and no new work has been authorised upon which they have advised adversely.



THE TURNING OF THE TURF OF THE FIRST AUSTRALIAN RAILWAY, AT SYDNEY, NEW SOUTH WALES, BY THE HON. MRS. KEITH STEWART, DAUGHTER OF HIS EXCELLENCY SIR CHARLES AUGUSTUS FITZ-ROY, GOVERNOR, &c., &c., JULY 3RD, 1850.

(*From a painting at the time by John Rae, Esq.*)

To the energetic reforms initiated by this body is largely due the fact that at the present day the New South Wales railways are the most efficiently maintained, the best managed, and the most profitable of all the State Railway systems of Australasia. Of course, Railway Commissioners, however efficient, cannot create a traffic which is not available, or can only do so by a very slow process, and it may be argued that New South Wales, as the richest colony, should possess the most profitable railways. But that does not follow. The costly nature of the works necessary to reach the wide interior, the extremely heavy gradients on the mountains, the competition of the river and waggon traffic in the direction of Victoria and South Australia, the hunger shown by Victoria for traffic from New South Wales, which is attracted by excessive reductions in through freights to Melbourne, and the considerable concessions granted upon certain descriptions of produce brought from the interior, even now make serious inroads upon the net returns. Beyond these, the past few years have proved anything but prosperous to the colony, and the Commissioners have consequently had to contend against a very remarkable reduction in the first-class passenger traffic. Through it all they have steadily refused to be led into any short-sighted policy of restricting repairs, renewals, and even improvements at the expense of revenue, and the result is that now, in the face of the depression, they have a permanent way, which for rails, ballasting, and maintenance in all respects, a rolling-stock, which for power, suitability and comfort, a system of signalling, which for reliability, will stand comparison with the admirably maintained railways of the Old Country. The Commissioners have aimed at reducing train mileage as far as possible, by increasing the power of the engines and the capacity of the carriages and waggons, and the power of the express engines, weighing 56½ tons, apart from the tender, of the goods Consolidation engines, weighing 62¾ tons, and the capacity of the bogie waggons, which can each deal with a load of 23 tons, are points which, by men like myself who have studied the working of the railways of the United Kingdom and elsewhere, cannot fail to be viewed with admiration. Such rolling-stock can only be worked safely upon a thoroughly reliable permanent way, and then it tells with great advantage. In the United Kingdom there are, I believe, no locomotives possessed of such power as the New South Wales Consolidation Engines.

But the Railway Commissioners have accomplished much more than this. Unlike the other railways of Australia, rates of wages have not been reduced since the financial depression set in. But the aim has been to get the most profitable work out of each employee; and whereas in October, 1888, when the Railway Commissioners took office there were 11,393 hands employed upon 2,152½ miles of railway and tramway, in 1894 there were 1,042 fewer employed, although the lines operated had increased by 406½ miles, so that the employees were reduced from an average of 5·3 per mile in 1888 to 4 per mile in 1894. Yet they adequately dealt with a traffic which had increased in the interval by £583,000 in money value, and by a larger proportion if tonnage and the numbers of passengers were taken into consideration. While doing so, considerably more in the shape of new materials have been put both into the permanent way and rolling-

stock. Savings have been effected in stores, and such a comparison as the following indicates the importance of the attention to details recently bestowed:—

	1888.	1895.
	£	£
LOCOMOTIVE POWER—		
Stores for cleaners ...	4,164	2,877
Oil, tallow, and waste	18,042	8,386
TRAFFIC CHARGES—		
Oiling and greasing	13,617	4,790
Stores for Stations...	37,375	27,334
GENERAL EXPENSES—		
Stores	14,181	6,534
	87,379	49,921

Additional references will be necessary to the various actions of the Railway Commissioners in the course of these remarks; but it is necessary to furnish particulars as to the statistical position, and it will be convenient to take as a comparison the years 1888 and 1894-5.

New South Wales Railways in 1888 and 1894-5.

Let it be borne in mind that in 1888 this colony was participating in the boom period of Australian finance, and the lavish expenditure of the people by which it was accompanied, and that in 1894-5 all unnecessary expenditure is avoided by those who contribute to the railway traffic, and the results indicated below will be better understood:—

CAPITAL ACCOUNT—	1888.	1894-5.		
Capital Cost	£27,722,748	£36,611,366	Increase	32·1 per cent.
Miles in operation	2,114	2,531¼	,,	19·7 ,,
Cost per mile (rolling stock included)	£13,114	£14,463	,,	10·3 ,,
TRAFFIC—				
Passengers—number... ...	15,174,115	19,725,418	,,	30·0 ,,
Goods, &c.—tonnage... ...	3,399,772	4,075,093	,,	19·9 ,,
Train mileage...	6,689,313	7,594,281	,,	13·5 ,,
REVENUE—				
Gross	£2,295,124	£2,878,204	,,	25·4 ,,
Working expenses	1,530,551	1,567,589	,,	2·4 ,,
Net profit...	£764,573	£1,310,615	,,	71·4 ,,
Net revenue per mile... ...	£374	£521	,,	39·3 ,,
Working expenses—per centage to gross revenue ...	66·69	54·46	Decrease	12·23 ,,
Net return on Capital ...	2·85	3·60	Increase	·75 ,,
EARNINGS PER TRAIN MILE—	s. d.	s. d.		s. d.
Gross	6 10¼	7 7	,,	0 8¾
Working expenses	4 7	4 1½	Decrease	0 5½
Net profit	2 3¼	3 5½	Increase	1 2¼
MAINTENANCE AND RENEWALS (Charged to Working Expenses)—				
Relaying paid for—miles ...	20¾	62½	Increase	41¾
Permanent Way:				
Materials	£70,587	£84,009	Increase	£13,422
Wages	312,716	262,857	Decrease	49,859
Rolling Stock:				
Materials	60,249	68,087	Increase	7,838
Wages	165,644	204,371	,,	38,727
Capital work charged ...	nil	21,688	,,	21,688
	£609,196	£641,012	,,	£31,816

POWER of Locomotives and capacity of Rolling Stock.

Rolling Stock.	1888.	1895.	Per cent.
Locomotives—number	428	523	Increase 22·2
Average power (Horse power per engines working at average speed)	658	760	,, 15·5
Aggregate power (Horse power per engines working at average speed)	281,872	396,183	,, 40·5
Passenger stock—number	571	562	Decrease 1·6
Average capacity—passengers... ...	38¼	52¾	Increase 32·9
Aggregate capacity— ,, ...	127,152 sq. ft.	172,352 sq. ft.	,, 35·4
Goods stock—number	8,833	10,557	,, 19·3
Average capacity—tons	6¾	7½	,, 11·1
Aggregate capacity—tons	59,011	78,146	,, 32·4
Comparing 100 of the most powerful engines and 100 carriages in 1888, as against 100 of the most powerful engines and 100 carriages in 1895, the comparison is as follows :—			
100 engines (Horse power when working at their maximum.)	73,864	103,588	Increase 40·3
Average per engine	738½	1,036	,, ,,
100 carriages—capacity	4,643	5,608	,, 20·4
Average per carriage	46½	56	,, ,,

Comparisons such as this need comment. It is apparent that the capital account has grown faster than the traffic, and distinctly faster than the gross revenue. The bulk of this increased expenditure on capital account had been sanctioned in 1888, and there was, therefore, no means of arresting it. The prevailing depression has doubtless restricted the expansion in the gross revenue; but when the comparison is carried further, it is found that, although the gross revenue has increased nearly 7 per cent. less than the capital, the working expenses have increased nearly 30 per cent. less than the capital, as an additional £583,080 has been earned at an increased working cost of only £37,038; and thus £546,042 has been added to the net profit, which has grown by 71½ per cent. It is to this keeping down of the working charges that the increase in the net return upon the capital by ¾ per cent. is attributable in a comparatively adverse year.

How has this been accomplished? Any restriction of renewals, though it might improve the net return for a year or two, would be injurious and in the end costly, and it has already been shown that the addition to the working expenses has, practically all of it, been incurred upon renewals. But this is not all. Materials are much cheaper than they were in 1888, and an extra charge of 19 per cent. for materials put into permanent way in 1894–5 means nearly 50 per cent. in the actual materials used. But those 50 per cent. more materials were put into the permanent way at an actual reduction in the cost of labour of 16 per cent., so that per unit of the staff employed something like 60 per cent. more work was accomplished. This is apparently substantial evidence that renewals and maintenance have not been restricted.

We must, therefore, look elsewhere. In the earning of 25½ per cent. more gross revenue, only 13½ per cent. extra train mileage has been employed. It has already been indicated what has been the saving in the stores departments. Then, too, the general expenses, including

office, audit, telegraph, and other departments, have been reduced, and more work is secured in all departments of the service. The increased power of the rolling stock is also an important consideration. It will be seen from the figures supplied that it does not do merely to count engines and carriages and waggons. On the average, the power per engine has been increased 15½ per cent, and their combined horse power 40½ per cent. In the same way with the passenger carriages, there is no increase in numbers, but there is an addition of over 35 per cent. in the area for seating passengers. The goods waggons, too, have been increased in numbers by 19¼ per cent., but their carrying capacity has been augmented by as much as 32½ per cent.; and these facts must be borne in mind when dealing with the power of these railways to accommodate traffic.

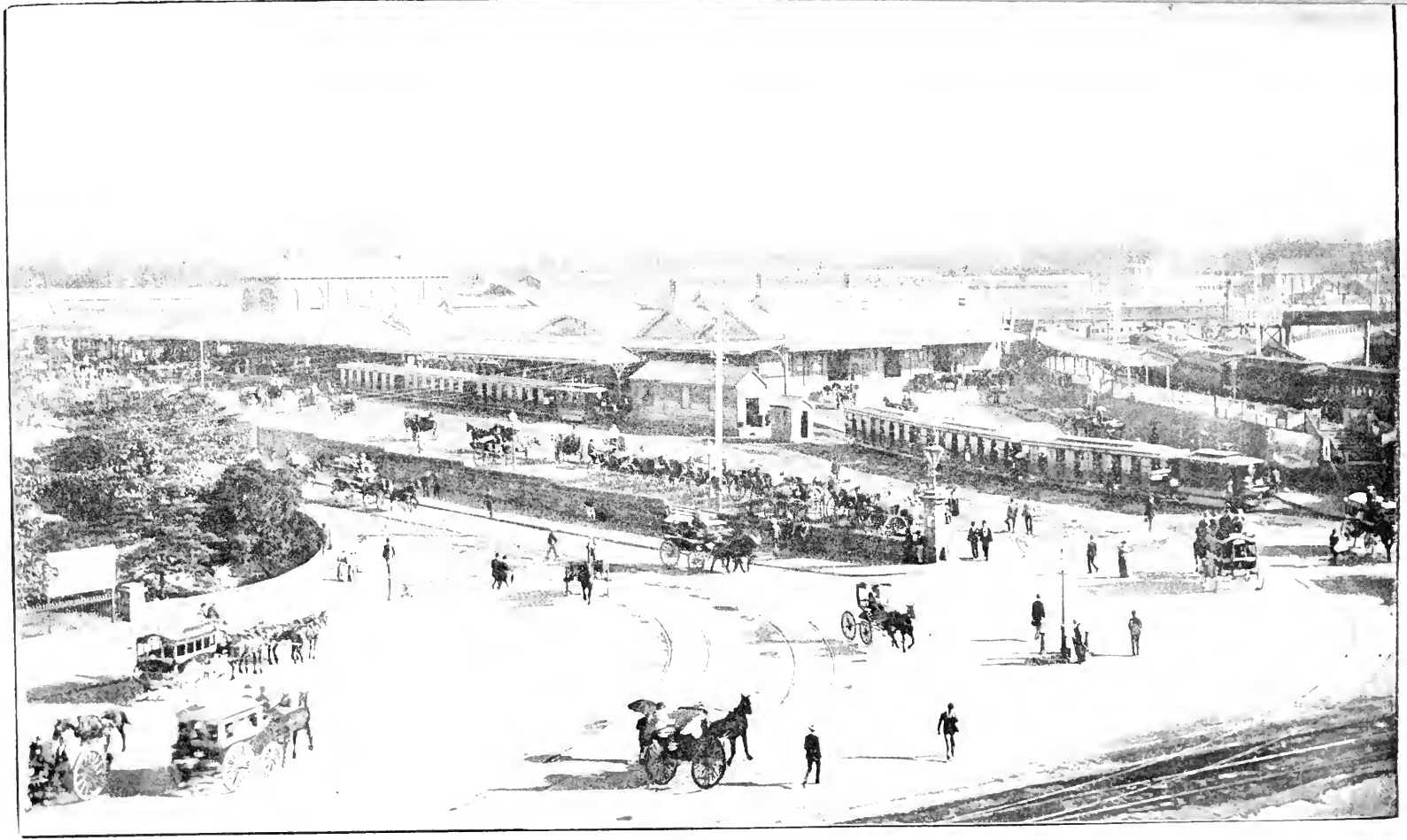
Another consideration is the extent to which the steepest gradients have already been reduced; and the sharpest curves, a number of them on the mountains of only 8 chains radius, have been widened. The evidence taken in connection with the Locksley deviation just sanctioned will show the great importance of this question. The Committee reported:—

Near Locksley, which is situated on the Great Western Railway, between Tarana and Brewongle, at a distance of 15 miles from Bathurst, there are grades of 1 in 33 and 1 in 40 against traffic going westward, and of 1 in 40 against loads conveyed eastward or towards Sydney. These heavy grades materially interfere with an economical and efficient working of the traffic. Train loads which are in excess of what a single goods engine can draw over the grades have to be divided and hauled in sections, or taken over by employing additional engine power. This entails considerable expense and loss of time. If the proposed deviation be carried out, the grades will be improved to 1 in 55 in the case of traffic going westward, and to 1 in 80 in that of trains travelling eastward, by which alteration the number of trucks drawn by the ordinary goods engine over this portion of the Great Western Railway will be very largely increased, and traffic operations will proceed without interruption, and with greater economy. The committee are informed that by the improvement of grades on various portions of the railways the Commissioners have up to the present time effected a saving in working expenses to the estimated extent of £100,000 per annum by an expenditure of £330,000. In the present instance, with an expenditure of £47,500, it is estimated that the saving will be £3,332 a year, or 7 per cent. on the outlay. Taking the traffic of last year as a basis, the Outdoor Traffic Superintendent states that by means of the deviation 750 trains fewer than now will run between Eskbank and Bathurst in the year, and in connection with these 750 trains there will be a saving of 2s. 6d. per train mile in running expenses. The Chief Mechanical Engineer explains that when the Locksley grades are removed the line as far as Dubbo will be practically clear of difficulty.

Altogether, a very large number of the steepest gradients on the most important sections of the trunk lines have been dealt with, and the carrying capacity of the trains in many instances increased 50 per cent. thereby. All these matters have conduced, and will in the future yet further conduce, to the cheapening of operating charges.

The Traffic and its Accommodation.

It must always be borne in mind that, though the control of the New South Wales Railways now centres in the Commissioners, they are still Government property, and are not worked solely with a view to profit. The object that they must be a tangible assistance to the people is still



REDFERN RAILWAY STATION, SYDNEY.

kept more prominently in view than would be the case were they in private hands and the Commissioners were answerable to a body of shareholders, whose principal concern was about their dividends. If New South Wales Railways were worked solely with a view to profits, it is more than probable that first-class passenger return tickets would be based upon higher rates than ¾d. to ⅝d. per mile (about half the average English charge); a parcel weighing 1 cwt. would not be carried 50 miles for 1s. 9d.; a ton of hay would not be carried at considerably under ½d. per mile; nor a ton of grain or flour for less than ⅝d. The up-country farmer is "encouraged," and it is doubtless well that he should be, even at some loss to the railway earnings. Take the traffic in the year 1894–5 as a basis for consideration:—

TRAFFIC in 1894–5.

	Numbers.	Revenue.	Per train mile. (Passengers).
PASSENGERS—			
1st Class	2,484,672	£257,016	20·24d.
,, Season tickets	9,527	44,616	
2nd Class	9,698,770	501,692	36·56
,, Season tickets	259,644	42,825	
HORSES and carriages, cloak-room and parcels, mails, &c	.....	154,688	10·38
		£1,001,108	67·18
GOODS—	Tons.		(Goods).
General	1,175,875	£911,876	54·47d.
Wool	125,095	397,012	23·71
Live stock	167,249	340,173	20·32
Coal and coke	2,515,754	173,593	10·37
Other minerals	91,120	27,637	1·65
Miscellaneous...	.....	4,896	0·29
	4,075,093	£1,855,187	110·81
Sundries	... ...	21,910	0·69d.
		£2,878,204	90·96d.

It is necessary to point out that wool and live stock are both long distance traffic, averaging over 250 miles per ton; that grain, flour, hay, and general goods average about 150 miles per ton; whereas coal is carried an average of less than 20 miles. This will explain some apparent anomalies in the above table. Towards the total earnings, goods, minerals, and live stock contribute 64.5 per cent., or not very far short of two-thirds; and that, as a whole, it is the most profitable traffic may in a measure be judged by the earnings per train mile. The wool traffic is specially profitable while it lasts, though it has all to be brought over the mountains; but the agricultural traffic is carried at exceptionally low rates, and is far from profitable to the railways. There is, too, a special list for the encouragement of local products; and fruit and vegetables, manures, drain-pipes, timber and a considerable number of other goods are thus dealt with. It will be understood, therefore, that the system is hardly worked upon commercial lines, especially as Members of Parliament and others are entitled to free passes over all lines.

The Gradients.

But taking the system as it is, the Commissioners have set themselves the task of ascertaining how the traffic may be worked safely and expeditiously at the lowest cost. They found that in 1888 they had 631 miles of steep gradients, varying from 1 in 30 to 1 in 75. Taking the successive gradients on each of the three trunk lines and the Sydney and Newcastle connection, the following comparison is presented :—

Through mileage.	Line.	Highest elevation.	Total height lifted.
		Feet.	Feet.
102 miles 23 chains...	... Sydney to Newcastle ...	677	2,446
343 ,, 53 ,, ...	... Singleton to Jennings ...	4,471	11,623
247 ,, 40 ,, ...	... Sydney to Wellington ...	3,658	9,188
286 ,, 60 ,, ...	... Sydney to Junee	2,392	9,183

Thus, on the Northern line, in the course of 343 miles, there is, owing to the mountainous nature of the country traversed, a total climb for the engines to accomplish of 11,623 feet; on the Western line there is a total climb of 9,188 feet in 247 miles; and on the Southern line of 9,183 feet in 287 miles, with nearly corresponding descents, and what this means to the cost of working heavy traffic and in maintenance must be something very great. An engine which can haul 750 tons at 18 miles an hour up an incline of 1 in 150, can only deal with 250 tons at half that speed up an incline of 1 in 30, and it can therefore be well understood how strenuous are the efforts of the Commissioners to reduce the steepest gradients where possible. The accompanying diagram showing the gradients on the Western line will indicate the nature of the country traversed.

The Position and Prospects.

In all this there has, perhaps, been rather too much of technicality for a popular guide. But an effort has been made to show what are the difficulties to contend against, and what progress has been made in overcoming them. We must recollect that in stating the New South Wales Railway system has been profitable in the year 1894-5 to the extent of 3·6 per cent upon the capital outlay, the period of depression recently passed through affords insufficient data as to the prospects when trade, and consequently traffic, shall have revived, and the earnings of the people shall have expanded. This tells upon all railways; and upon adequately maintained lines like those under the control of the New South Wales Railway Commissioners, is certain to add to the earning power materially. Beyond which, settlement is steadily extending in the interior, and the development of agriculture, dairying, and mining, as well as of those branches of the pastoral industry represented by frozen and chilled meat shipments, preserved meats, tallow, and so forth, will inevitably, at an early period, add greatly and increasingly to the traffic. Money can now be raised for railway construction at hardly more than 3 per cent. interest, and even upon the present rate of earnings, this means that a profit can be earned over and above the cost of construction. The costly trunk lines through the mountains are already here; and future extensions

Altitude in feet

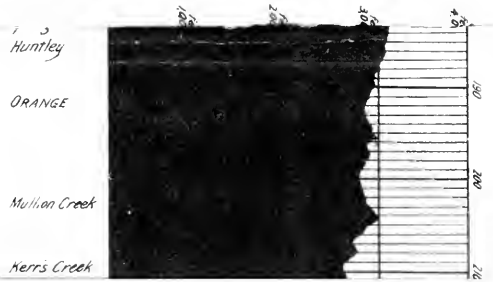
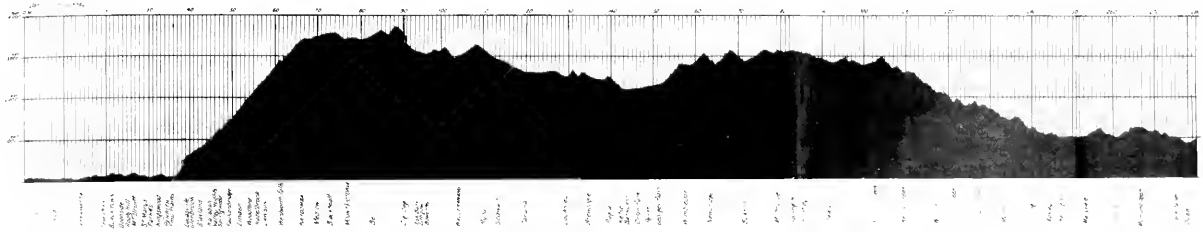


DIAGRAM SHOWING GRADIENTS WESTERN LINE.

N.S.WALES RAILWAYS



through the plains to act as feeders to the parent system, will tend materially to reduce the average cost per mile. There are the "unprofitable lines," which last year earned a net £120,219, while the interest upon their capital was £459,422. But this bald statement is hardly fair as it stands. The bulk of them fed the main arteries of traffic, and contributed towards the earnings of the "profitable" lines; and there does not exist any railway system where there are not isolated sections of which it may be said that they by themselves earn the interest on their capital. Even the action taken to attract long distance traffic to Sydney and Newcastle has in some instances told against the earnings of some of these branches. For instance, grain and agricultural produce is now carried 500 miles for16s. 3d. per ton, as against 25s. 8d. in 1888; coke is carried the same distance at 23s. 1d. per ton, as compared with 46s. 4d. in 1888; and horses and cattle at 186s. 3d. per truck, against 223s. 4d. Such reductions are a great boon to the producer in the interior, and have served their purpose.

The time will come when the question of the duplication of the trunk lines will have to be seriously considered. Since the Railway Commissioners came into office they have quadrupled the first 8½ miles out of Sydney, and increased the double lines from 72 to 154½ miles. But there are still 2,368¼ miles of single line, and on portions of the trunk lines the traffic is very heavy. The easing of the gradients and curves, which will permit of much heavier and longer trains being run, will enable them to defer these costly duplications, by permitting of the carriage of goods in longer trains and at higher speeds; but it is evident that years hence, as traffic grows, this question will become acute. However, that will mean that the traffic has outgrown the present capacity of the trunk lines, and will consequently mean that the cost will be repaid in increased earning power.

But the problems presented in working an important system of railways like those of New South Wales are very numerous, and it is impossible to deal with all of them in a short descriptive article. There happily is the traffic, and a steadily growing traffic. In spite of numerous concessions to producers, that traffic has yielded an addition of £700,032 comparing 1895 with 1885, and £593,069 of those increased earnings have been added to the net revenue; and when prosperous seasons return, it is certain that a large power of expansion, at present latent, will be developed.

The Tramways.

The Sydney and Suburban Tramway lines are likewise under the direction and control of the Railway Commissioners. They are to a large extent street railways worked by steam motors, and it is remarkable that with so many gradients, such sharp curves, and crowded streets there are so few accidents. Two lines, however, are worked upon the cable system and one by electricity. There is also a short tramway at Newcastle included in the service. In all, there are 61 miles in operation, upon which last year 66,352,069 penny fares were collected, the tram mileage being 2,503,161 miles, and the gross earning per tram mile 2s. 3d. A few years back these tramways were not a profitable investment to the government, and in 1888 when

nearly 54,000,000 passenger fares were collected, the net earnings were under 2 per cent. upon a capital cost of £877,244. The position is now materially improved, and though the capital cost has up to the 30th June, 1895, been increased to £1,428,518, they last year earned a net profit of 5d. per tram mile, equal to 3·69 upon the capital. The gross receipts were £282,316, working expenses £230,993, and net profits £51,323.

Some of these tramways are not as yet profitable. The Ocean-street cable line was excessively costly, and last year—the first during which it was operated—it only earned 1·64 per cent. upon its capital. Two of the outlying sections were operated at an absolute loss. Still, as the Sydney lines worked by locomotives earned as much as 4·62 per cent., the deficiency on the other sections was made good, and the average net profit of over 3·58 per cent. may be said to cover the interest upon their cost of construction. They now, in fact, return slightly more than the railways upon their capital.

As already remarked, the majority are worked by steam motors, which draw two, or three, and occasionally four cars, each capable of seating 70 passengers, and that they are extensively patronised and are a great boom to the people is evident from the number of fares collected. They are worked upon the section, or "zone" system, and the great bulk of the fares paid are paid by penny tickets, two being charged for the first section out of Sydney, and generally one for each section afterwards, the average being about a penny a mile for each full section. The tramway conductor is required to ring a bell-register for each penny ticket received, and to tear the ticket in half before the passenger, and though cash is taken, it is discouraged by making the payment in cash heavier than that by ticket. Tramway tickets are to be purchased all over Sydney, and many people will accept them as small change, though not adapted for the purpose as they show wear rapidly.

As in the railways, the great problem in the tramway service has been to keep down working expenses. The lines were always well patronised by the public, but not many years back the cost of working absorbed nearly the whole of the receipts. The Railway Commissioners have, however, succeeded in introducing many economies, and this has in the main conduced to the increase in the earning power. Consideration has recently been given to the question whether the tramways could not be worked more cheaply by electricity. There are certain great advantages in a stationary motive power, and there is the initial cost of introducing a change of this description to be taken into calculation, and it must be conclusively shown that such a change would be to the advantage of the revenue and the public before it is likely to be adopted. But the evidence in favour of electricity is so strong—the power being generated at one central point for distribution over all the lines—that the prospect of the change is steadily growing. The result will be a far more frequent service of lighter trams, one which will suit the convenience of the public better, yet at the same time one less costly to operate. And the cost of working has always been the difficulty in connection with the Sydney Tramways.

GENERAL POST OFFICE, SYDNEY.

Postal and Telegraphic Service.

By S. H. Lambton, Deputy Postmaster-General.

Perhaps in no Branch of the Public Service have facilities been more extended during the last decade than in the Postal and Telegraph Departments, nor the extensions more appreciated by the public. Little over 5 years since the postage on letters to different parts of the world beyond Australasia varied from 1s. 6d. to 6d. the ½ oz. The action of the Australasian Colonies in joining the Universal Postal Union in October, 1891, resulted, amongst other advantages, in securing a uniform rate to all parts of the world, of 2½d. per ½-oz. letter. The passing of an amended Postal Act in 1893 enabled the Department to bring about many long-desired reforms. The principal of these were an Inland Parcels Post and the Postal Note system, which latter system enables persons to remit small sums—the notes being negotiable at any official and many non-official Post Offices. The success which followed the introduction of these measures is evidenced by the fact that during the year 1894 the revenue from the Inland parcels post was over £16,500, the number posted being 315,243; whilst the revenue or poundage from postal notes nearly reached, during the same period, the sum of £3,900.

In addition to the weekly mail service with India, Great Britain, and other parts of the world, carried on with such praise-worthy regularity and efficiency by the P. & O. and Orient Companies at an annual subsidy of £170,000 per annum (£95,000 being paid by the Imperial, and £75,000 by the Australian Post Offices, the latter being apportioned between the Colonies on the basis of population) we have a four-weekly service between Sydney and San Francisco *via* Auckland, carried on by the Union S.S. Company, and maintained, so far as New South Wales is concerned, at almost a nominal cost—our contribution being £4,000 a year, of which we are recouped by postages to the extent of about £2,100. As the result of a Resolution of the Legislative Assembly in June, 1893, a calendar monthly service between Sydney and Vancouver, carried on by Mr. James Huddart, was subsidised for a period of three years to the extent of £10,000 a year. £25,000 a year being contributed by Canada.

This line is, however, looked upon more as a means of promoting commercial intercourse between Australia and the Great Dominion of Canada, than as a necessary mail service.

The average time now occupied by contract on the Suez route, between Sydney and London, is about thirty-four days, the quickest time of transit having been thirty-two days. The average and the quickest time in 1884, were thirty-nine and thirty-four days respectively.

Newspapers printed in the Colony are carried free if posted within seven days of date of publication, and if they do not exceed 10 oz. in weight. Postage is, however, charged at the rate of ½d. per 10 oz. on newspapers addressed to the other Australasian Colonies, and 1d. for 4 oz. to places beyond.

The question of an inland and intercolonial, or at any rate of an inland penny postage, is frequently brought prominently before the public. It is thought by many, that a similar result would accrue from such a reduction to that which followed the introduction of the Rowland Hill penny postage system in 1840, namely, a large increase of revenue. The conditions are, however, widely different. Great Britain with a comparatively small territory had then a population of some 17,000,000, whilst New South Wales with its vast territory to serve with mail communication has at present a population of less than 1,500,000. Given a population of even a third of that of Great Britain in 1840, and it is probable that the Government, fully alive as it is to the great advantages of cheap postage, would no longer withhold this great boon. The question, however, as in the case of other concessions, is one of revenue. With a debit balance in the working of the Department of some £123,000 a year, the matter of giving up of revenue is one which needs serious consideration, and it is proved that every reduction, whether in the postal or telegraph tariff, has resulted in loss, owing, of course, to the comparative smallness of our population.

Several concessions have, however, been made. The 1d. rate granted many years ago to Sydney and its suburbs (but which, as in other cases of reduced rates, produced a loss) has recently been adopted between some of our principal towns and their suburbs, and the postage on wholly printed matter has been reduced to ½d. for the first 2 oz., New South Wales being the only colony in Australia which, up to the present time, has conceded such a reduction as last mentioned.

The following figures will give some idea both of the present work of the Post Office and of its progress during the last decade :—

	1884.	1894.
Number of Post Offices	1,085	1,445
Receiving offices	206	450
Number of miles travelled by mails	6,509,400	8,840,000
Number of letters posted...	39,645,000	62,447,000
Number of newspapers posted	23,400,000	38,000,000
Number of packets posted	2,792,000	12,760,000*
The Postal and Telegraph revenue	£495,868	£760,889

That useful adjunct of the Post Office—the Money Order Branch—continues to progress rapidly, although the postal note system, previously referred to, is found to somewhat interfere with its business, as persons desirous of remitting small sums of £1 and under prefer doing so by postal notes, which, like bank notes, are payable to bearer on demand, whilst money orders are only payable on the actual payee's signature, after being required to give the name of the remitter.

* Excluding parcels which have been already referred to.

The number of money orders issued in 1894 was 431,117, the number in 1884 having been 305,883. The value of these was £1,315,637 in 1894 against £1,068,068 in 1884. The amount of revenue received as commission on money orders was £15,827, against £12,794 in 1884. The number of money order offices on 31st December, 1894, was 615. The number on 31st December, 1884, was 431. Seven new offices were opened during 1895, making the number on 31st December, 1895, 622.

The Government Savings Bank, which is worked in connection with the Money Order Branch, is a most prosperous institution. Interest is only allowed on deposits up to £200 made by any one depositor, and the confidence reposed by the public is strikingly shown by the fact that, although it was determined to reduce the rate of interest from 4 per cent. to 3 per cent. from 1st October, 1894, except in the case of moneys remaining to the credit of depositors for the full period of twelve months from the 1st January each year, the amount of deposits made during the three months following the reduction was £538,702, against £521,465 during the three months preceding such reduction.

The total number of deposits received in 1894 was 294,393; the amount was £2,160,610, and the interest added to depositors' accounts was £120,880. The figures for 1884 were 156,578, £1,033,701 and £43,198 respectively. The number of withdrawals in 1894 was 183,909, and the amount £1,880,854. The withdrawals in 1884 numbered 71,532, and the amount was £969,487.

The balance at credit of depositors on 31st December, 1894, was £3,633,925, and the amount for 1884 was £1,290,931.

The average balance to the credit of each depositor on 31st December, 1894, was £29 11s. 10¼d.; the amount on 31st December, 1884, was £25 2s. 3¾d.

Promptitude and general efficiency are essentials in all public establishments, but nowhere are they so much sought for and expected as in the Electric Telegraph Branch.

This important department of the Post Office has considerably progressed during the last decade, although the large extension of the telephone system to the suburbs of late years has, as was, of course, anticipated, considerably cut into that portion of the telegraph business. The total number of messages in 1894 was 2,035,108, against 1,934,000 in 1884; the revenue accruing to New South Wales in connection therewith was £147,903 in 1894, against £138,599 in 1884. But to the receipts for 1894 must be added the telephone revenue, amounting to £20,298, as the figures for 1884 include the very small sum then received in connection with telephones, a branch of the postal business which has, verily, increased by leaps and bounds during the last few years.

Looking at the immense convenience which the telephone system affords, the only regret is that its use cannot be still more widely extended, or, in other words, that the annual subscription cannot be made so low as to enable the department to bring the estimable boon within the reach of almost every householder. The matter, however, like the question of reduced tariff in other directions, is one of revenue. It has been urged by the advocates of cheap telephones that

in some continental cities the charges are only about half what they are here; but these cities possibly forget that cheap labour and consequent favourable conditions for cheap telephones exist at those places. It is understood, however, that the present Postmaster-General, having given very careful attention to this question, has decided that from the 1st April next some concessions shall be made in the annual sum —sufficient, at any rate, to induce a very large number of subscribers to come in whose means do not enable them at present to do so. Besides the Central Exchange, there are now twelve suburban and five country exchanges. [The regulations in regard to the reduced rates have since been issued, and are very liberal, varying from one third the present rates to one half.—Ed.]

During the year ended 31st December, 1895, no less than 467 new subscribers joined, showing that even the present tariff is by no means prohibitive. The total number of subscribers to the Telephone Exchanges of the Colony in December, 1895, was 2,902.

For the convenience of those who are not connected with the Telephone Exchange, what are termed bureaus have been opened at the head office and at fourteen suburban offices. These provide for persons using the telephone for the purpose of conversation with friends who are telephonically connected on payment of 6d. for every three minutes to places not exceeding 3 miles distant, a higher charge being made for longer distances.

The telegraph and telephone system and management of this Colony are admitted by travellers and other competent persons, to be equal to anything of the kind to be found elsewhere.

The total length of the telegraph lines (not including telephones), on 31st December, 1894, was 28,085 miles 2 chains, and the total cost to that date was £831,470. The total length in 1884 was 18,681 miles, and the cost £601,459.

The number of telegraph offices open on 31st December, 1894, was 813, and the number in 1884 was 394. The number opened during 1895 was 15, making the total number at 31st December, 1895, 828.

In view of the insular position of Australia, it is necessary to maintain an efficient means of communication, by sub-marine cable, with the outer world. To secure this has, for the past 20 years or more, been a subject to which great consideration has been given, and has necessarily resulted in a large expenditure. To the enterprise of the Eastern Extension Telegraph Company are we mainly indebted for the success which has attended the exertions made. When we recollect the difficulties and failures which followed the earlier attempts, some thirty-five years since, to lay sub-marine cables, across the Atlantic for instance, we cannot but wonder, in glancing at a map of the world, showing the existing network of cables, at the achievements of science and enterprise in this direction.

Australia was first connected by a single cable, laid in 1872, between Port Darwin and the Island of Java, by the Eastern Extension Company. In 1879 a duplicate cable was laid, the company having contracted to lay this cable and maintain it for a period of 20 years, in consideration of an annual subsidy of £32,400, to which all the Australian colonies (except Queensland) and, also, Tasmania, contribute on the basis of population. These cables would, however, have

been of little use but for the enterprise of the South Australian Government in constructing a land line from Adelaide to Port Darwin, a distance of 1,973 miles, at a cost of over half a million. Later on a third cable was laid by the Eastern Extension Company from Roebuck Bay, Western Australia, to Java.

The tariff for these cables was found so high (in the case of New South Wales being 9s. 4d. per ordinary word, and 2s. 8d. per word for press messages), that at a Conference of Postmasters-General, held in Adelaide in 1890, negotiations were opened up with the company with a view to substantial reductions. These negotiations resulted in an agreement being arrived at at a Conference held at Sydney in March, 1891, for a reduction of the cable rate to 4s. per ordinary word and 1s. 10d. for press messages, the agreement providing that the company would share a half of any loss of revenue consequent on the reduction, the contributing Colonies bearing the other half on the basis of population, and South Australia herself and the other Colonies agreeing, on the same basis, to make up the South Australian territorial revenue to the same amount as previously.

The reduced rates came into operation on the 1st May, 1891, but the financial results therefrom proved disastrous. During the first year New South Wales had to pay under the guarantee a sum of no less than £11,000, in addition, of course, to its share of the subsidy, which is about £13,000 per annum. A short Conference was accordingly held at Melbourne in August, 1892, to consider the position, and it was thereupon decided to raise the rate on ordinary messages to 4s. 9d. a word, and although even the higher rate produced a loss, this has gradually lessened, and the year ended March last resulted in no liability under the guarantee.

New Zealand and Tasmania are connected with Australia by submarine cables, landing at Sydney and Melbourne respectively. In connection with the first cable to New Zealand—laid in 1876—a subsidy of £7,500 per annum was paid by New Zealand and £2,500 by New South Wales for ten years. This agreement terminated in 1886, after which the subsidy ceased.

A duplicate cable was laid by the company from the terminal point in Sydney—La Perouse—to the New Zealand terminus at Nelson in 1890.

As in the case of the European tariff, that to New Zealand was considered high, and was reduced in 1893 from 6s. to 2s. 6d. per 10 words, the company agreeing to bear one-third of the loss, New Zealand one-third, and the other contributing Colonies one-third, on the population basis.

The Tasmanian cable is subsidised under agreement with Victoria to the extent of £4,200 a year, the other Colonies sharing on the population basis.

A cable was laid by a French Company in 1893 from Bundaberg, a port in Queensland, to New Caledonia, in connection with which this Colony guarantees £2,000 a year and Queensland a like sum.

The foregoing is a brief statement of the means by which Australasia is kept in touch by submarine cable with the rest of the world.

Low as the rates are thought to be to and from Australasia, it is considered by many persons that the time has arrived for still further cheapening them, and there is, moreover, a strong desire in many

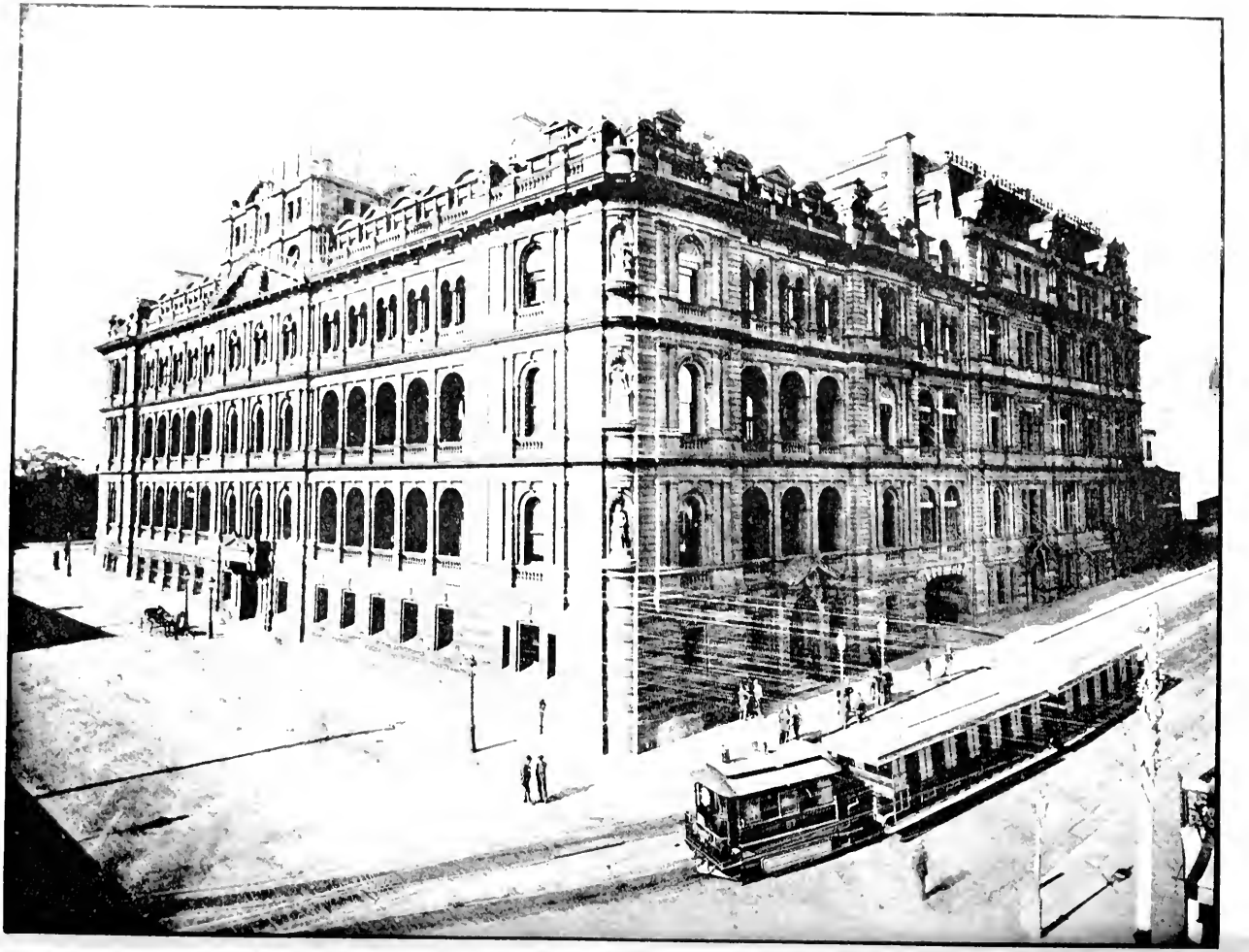
quarters for a cable across the Pacific Ocean to Canada, which will enable Australian messages to pass solely through British territory. At a Conference held at Ottawa in 1894 it was decided, with a view to ascertain the cost, to invite tenders for laying a cable by various specified routes between Australia and Vancouver. Several offers were received in response, and the most satisfactory appears to have been from a company or firm to lay the cable and maintain it for 3 years at a cost of £1,500,000, and it is considered by many who strongly advocate this competing line, that a cable tariff of 2s. a word—after allowing for the increased business following such a large reduction—would be a payable one. At 2s. a word Pacific cable tariff would mean a through rate from New South Wales to Great Britain of about 3s. 2d. against 4s. 11d. now charged, and about 2s. 6d. a word to Canada and the United States, against sums varying from 5s. 11d. to 7s. 7d. as now charged. The present position of the matter is that the Secretary of State for the Colonies having recently proposed that a Commission of two approved delegates from Australasia, two from Canada, and two from Great Britain shall meet in London and discuss the whole question in all its bearings, a short Conference at which all the Australasian Colonies were represented was held at Sydney in January. It was decided that the Agents-General for New South Wales and Victoria should be nominated for appointment to represent Australasia on the Commission, with instructions to confer on all important points with the Agents-General of the other Colonies. Resolutions were also passed indicating the route, and the basis on which the cost of the work should be shared.

The total number of persons employed on 31st December, 1895, in the various branches of the Post and Telegraph Department, excluding mail contractors, was 5,063, and the average annual salary was nearly £87 per annum.

Of the 5,063 persons employed (exclusive of mail contractors) on 31st December, 1895, there were:

317 principal officers and clerks.	46 line repairers.
189 mail guards and sorters.	432 official post and telegraph masters.
262 letter carriers.	1,046 non-official postmasters.
207 junior letter carriers.	502 receiving office keepers.
110 mail boys.	605 operators.
546 telegraph messengers.	350 assistants in post offices.
95 switch attendants.	356 other employes.

An illustration is appended of the capacious and handsome building forming the head office of the Post Office and Telegraph Department.



Public Works, including Roads and Bridges.

J. W. Hollman, Department of Public Works, Sydney.

In the opening up and settlement of a new country such as Australia, it will be readily seen that the construction of roads, bridges, and like necessary works for the use and benefit of the people generally, forms a very important feature. As the country is gradually taken up and settlement proceeds, the want of proper means of communication for the purpose of enabling the settlers to reach markets for their produce, and for social intercourse, is very strongly felt, and as the settlers are not usually in a position to help themselves, it being necessary that their whole time and available capital should be devoted to their holdings, they naturally look to the central Government to supply their wants in this respect. Indeed it is a generally recognised principle that the construction of roads, except in the case of towns where there is municipal government, and where they are required for purely private purposes, is a national undertaking, and, therefore, the duty is one properly devolving upon the Government. In the early stages of settlement cleared tracks and roads of the most primitive character are sufficient to meet requirements, but as the population grows and traffic increases, it becomes necessary to improve them by draining, proper grading, metalling the surface, and providing bridges where required. Then, in the course of time, when towns spring up in various centres, buildings must be provided for the transaction of public business, such as Post-offices, Lands Offices, Court Houses, Police Buildings, &c., and as the towns grow they require works for water supply purposes, and for sewerage, and in these matters they look to the central Government to assist them.

All works of this character come under the designation of "Public Works," and the object of this article is to give some idea of what has been done in New South Wales in the way of constructing public works for the development of the Colony. The railways, which in Australia are constructed by the Government, are perhaps the first in importance amongst public works, but as they are dealt with in a separate article there is no need to touch upon them here.

In the early days of the Colony, and indeed up to the time of responsible Government, all matters in connection with road construction, as well as other public works, were carried out under the direction of officers in the Imperial Service, generally belonging to the Royal Engineers, and many of the best roads in the Colony bear testimony to their skill. Although much good work was done by the early road-engineers, the real engineering history of the colony dates from the formation of the Public Works Department in 1856, shortly after

the inauguration of responsible Government in the Colony. Since that time the Government have been actively engaged in improving the roads already in existence, and opening new means of communication to meet the demands of the increasing population. As an illustration of what has been done, it may be pointed out that since the year 1857, the large sum of £16,546,160, has been expended on road and bridge works alone. To give anything like an adequate statement of the immense amount of road work that has been carried out would be impossible in the limits of a short article like this, and reference can, therefore, only be made to some of the most important of them.

The Great Dividing Range which runs almost parallel with the coast, with the spurs running out from its eastern and western slopes, gives rise to formidable obstacles which have to be surmounted in order to establish communication between the coastal districts and interior. One of the earliest works of this nature which was undertaken was the Western Road running over the Blue Mountains to Bathurst. The difficulties of passing over the mountain range were very great, but they were eventually overcome, and the road was opened to Bathurst in 1815, convict labour being employed in its construction. This road with some slight alterations from the route originally selected, is still maintained as the main trunk road running westward into the interior. As a main road proper it now extends to Warren, a distance of 342 miles. The other main roads are the Main Southern Road from Sydney to Albury, 365 miles; which is part of the highway between the two capitals of Sydney and Melbourne, and passes through some of the most important pastoral and agricultural centres of the Colony, such as Goulburn, Wagga Wagga, Albury, &c.; and the Main North Road running from Sydney through the Hawkesbury and Wollombi districts, and giving access to the rich and fertile districts of the Hunter River and Liverpool Plains, and thence to the north and north-western parts of the Colony. A large amount of money has been expended on these main arteries, and as roads they would do credit to much older and more populous countries. They are macadamised for nearly the whole of their lengths, and are fully bridged, so that communication is always open. The southern table-land of the Colony has been tapped at various points from the coast. A road from Eden, Twofold Bay, gives access to the Monaro district, and passing through Cooma and Kiandra (which is the highest town in the Colony, being 4,640 feet above sea-level) leads to Tumut and Gundagai, where it strikes the Southern railway system. One of the first roads to be constructed, however, in this direction was that from Clyde River (Nelligen) ascending the tableland to Braidwood, the centre of an important mining and agricultural district. It is about 17 miles long, the mountain pass in side cuttings being 3 miles long at a gradient of 1 in 12. This road abounds, as do all these coast roads, in great natural beauties. From Moruya, situate about 85 miles north of Eden, there is another road giving access to Braidwood, *viâ* Araluen, formerly the seat of a large gold industry. North of this is the fertile district of Shoalhaven, the chief road from the centre of which (Nowra) runs over the Cambewarra Range, crossing the Kangaroo Valley, and ascending the Barrengarry Mountain to the

HAMPDEN BRIDGE, WAGGA WAGGA.

tableland at Moss Vale, where it reaches the Main Southern Road and the Great Southern Railway. The work on this road was of the heaviest character, the mountain passes being some 8 miles in length, and it traverses a fertile country which not much more than twenty years ago a horseman could hardly cross with safety in wet weather. North of this there is also a good mail-coach road from Kiama to Moss Vale, and at the northern end of the Illawarra district the most important road of communication is that from the Great Southern Railway at Campbelltown, *viâ* Appin, one of the oldest farming districts in the Colony, and the Bulli Pass. This pass, which was constructed in 1867, is remarkable for its great natural attractions and wonderful vegetation, and is consequently largely resorted to by tourists, and those in search of the beautiful in nature. The grades of this pass are somewhat severe, being as sharp as 1 in 7½ in places. There is also a road from Sydney along the coast to these southern districts called the South Coast Road, which is trafficable by vehicles from the metropolis to as far south as Twofold Bay. All the rivers intervening are either bridged or provided with suitable ferry accommodation to carry over heavy loads.

Northward from Sydney one of the roads of most importance is perhaps the North Coast Road, which starts at Hexham on the Hunter River, and passing through Strond, Taree, Manning River, Port Macquarie, Kempsey, Macleay River, Bellingen, Grafton, and Lismore, is available for traffic to Murwillumbah on the Queensland Border. It is possible, therefore, to travel by road along the coast right from the Victorian to the Queensland Borders, a distance of about 800 miles.

As in the case of the Southern tableland, the Northern tableland of the Colony, which, roughly speaking, extends from a little below Tamworth to the Queensland Border, is connected with the coast at various intervals. From Ballina, on the Richmond River, a road which crosses the Clarence River at Tabulam, and passes through one of the richest sub-tropical portions of the Colony, connects with Tenterfield. As in the case of most of the roads running from the coast, inland, very heavy work had to be carried out on the mountain passes, the cuttings at Sandylands on this road being especially severe. The formation of the road from Grafton, an important shipping place on the Clarence River, to Glen Innes, was commenced about 1863. This road, which is commonly known as the Newton Boyd, is one of the largest works of its kind undertaken by the Public Works Department. It consists generally of a series of long heavy mountain cuttings, one of the bluffs being so severe that the expedient of tunnelling on a common road had to be resorted to. This road was followed subsequently by similar roads from Grafton to Armidale, Bellinger to Armidale, which taps the Don Dorrigo Scrub, a district of most wonderful fertility, and from Kempsey, on the Macleay River, to Armidale, the work on the latter being particularly heavy, but the grades have been made comparatively even and easy throughout. Armidale, the centre of the important New England district, is, therefore, connected by excellent roads with the coast at three places, viz., Grafton, Bellinger, and Kempsey. Mention should also be made of the road from Port Macquarie to the New England district, one of the earliest connecting roads made with this district. In former

days, Port Macquarie was a shipping place of considerable importance, as most of the wool and produce from New England went there, but the construction of the Great Northern Railway from Newcastle, and the opening up of other shipping places on the coast, has robbed it of most of its trade, and the extensive stores and buildings which were formerly used are now falling into decay.

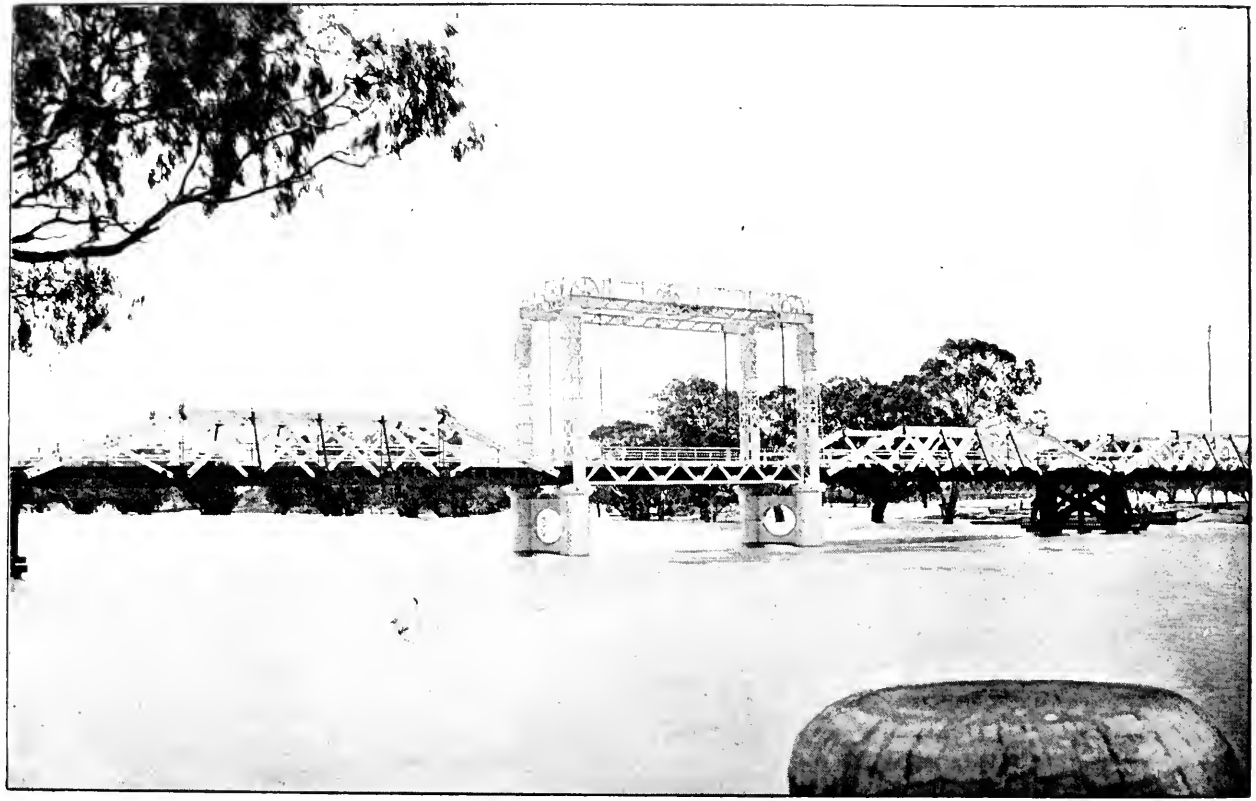
The roads as main highways for traffic from Sydney have to a great extent been superseded by the railways, but for a large part of the Colony they are still the sole means of communication, and as feeders to the railway system they play a very important part.

In the interior a vast amount of work has been done in providing branch roads to the main arteries; roads between townships, and for access to the railway system; and routes for stock purposes. On many of these latter, in the dry parts of the far interior, a large sum has been expended in providing tanks and wells for supplying water to travelling stock, and during the past few years artesian bores have been put down for the same purpose in some of the driest regions with signal success.

Owing to the nature of the soil, and the absence of suitable stone, the cost of road construction in some of the inland parts of the Colony is exceedingly high, so much so that where there is any large amount of traffic it is absolutely cheaper to construct light railways, which, in some instances, has been done, and will no doubt be continued on a much more extensive scale in future years.

The bridges are constructed in a very substantial manner, timber being used wherever possible. The Colony is fortunate in having an almost unlimited supply of hardwood eminently suitable for bridge work and structures of a like character. The ironbark which is mostly used for the purpose has a tensile strength of about one-third that of wrought-iron, whilst its durability may be gauged from the fact that some bridges 50 years old are still carrying traffic, whilst numbers of others, totally unprotected from the weather, have been built over 30 years. Of course the wearing portions such as the deck planking have from time to time been renewed, but the original main members are still doing duty. A photograph accompanying this article illustrates one of the largest timber bridges yet constructed, which has just been completed over the Murrumbidgee at Wagga Wagga, at a cost of £13,200, to replace a wooden structure built 34 years ago. It consists of three 110-feet truss spans with 315 feet of timber approach spans, the floor space per span being 3,165 feet. Apart from timber bridges, some very fine structures of steel, iron, or composite iron and timber have been erected where the importance of the traffic warrants the expense. Space will not permit of reference being made to them at length, but a brief mention of the most important will, perhaps, be of interest.

The Parramatta Bridge over the river of that name, near Sydney, opened in 1881, consists of five 150-feet independent wrought-iron lattice girders, and a swing-span with two 60-feet clear openings. The piers are constructed of wrought-iron cylinders, and the abutments are of sandstone masonry. The Iron Cove Bridge, over one of the arms of Sydney Harbour, was opened for traffic in 1882. It is of the same general design as the Parramatta Bridge, but without a



BRIDGE OVER DARLING RIVER, AT WENTWORTH.

swing-span. The total cost of these two bridges complete was £110,000. The Lane Cove Bridge, also near Sydney, was opened in 1885, consists of five 60-feet spans, with a swing-span pivoted on one abutment and having one 60-feet clear opening. The cost of this bridge and approaches was £42,700. The bridge over the Shoalhaven River at Nowra, the centre of the Shoalhaven district, a very fine iron structure, with eight truss spans, cost about £39,000, and was opened about 14 years ago. At Manilla, an important district in the north-west part of the Colony, an iron lattice girder bridge of five spans has been erected over the Namoi River, the cost being £34,185. Bridges of this type, but smaller, have also been constructed over the same river at Gunnedah, at Yellow Bank, and at Bingera. At Tacmas, an important crossing of the Murrumbidgee River near Yass, a bridge of the continuous girder type, 462 feet long, with cast-iron cylinders and masonry abutments, was opened for traffic in 1888. At Buckley's Crossing of the Snowy River, in the Monaro district, there is also another bridge of this class. At Cowra, a handsome bridge has been constructed over the Lachlan River at a cost of £26,540; the design being composite steel and timber trusses on cylinder piers, and the total length 1,040 feet.

Bridges have been constructed over the Murray and Darling Rivers at various points, and to provide for the river traffic a design has been adopted which, while it permits of navigation at all states of the river, does not offer any obstruction in flood time as would be the case with bridges having a swing-span. The design which has been used is a steel lift bridge placed 5 feet clear of the maximum flood. Bridges of this kind have been erected at Wentworth (an illustration of which accompanies this article), and at Brewarrina, Bourke, Wilcannia, Tocumwal, and Mulwala.

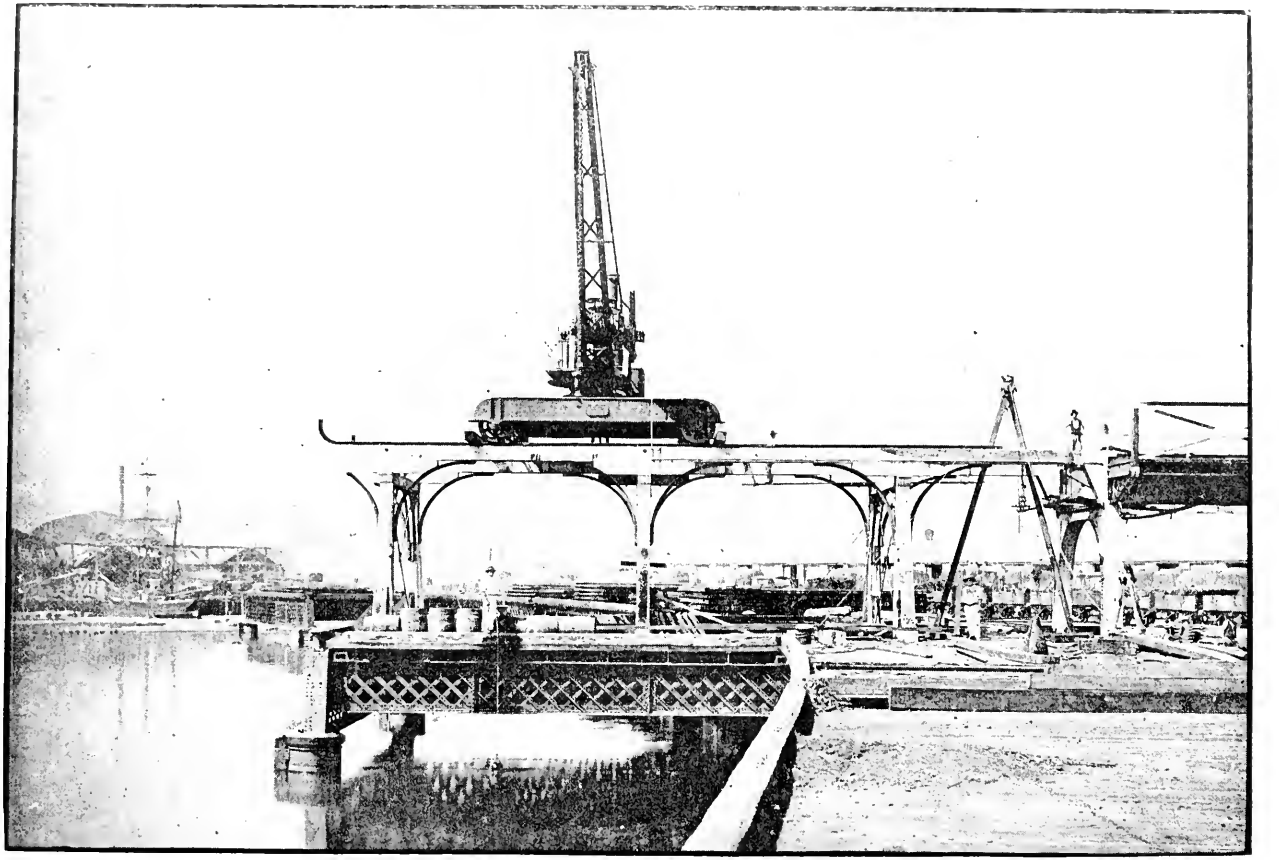
The whole of these works are carried out and maintained by the Public Works Department direct, which has a most efficient staff of engineers stationed at various parts of the country who are controlled and directed from the administrative office in Sydney. The mileage of roads at present, directly or indirectly, under the charge of this Department, that is exclusive of the roads in towns under municipal control, is 36,070, of which 11,979 miles are simply bush tracks, and 24,091 miles are cleared, formed, or metalled roads. There are 3,659 bridges in the Colony having a total length of over 50 miles, and 27,603 culverts on small bridges with a total length of nearly 79 miles. For ferry purposes in connection with roads the Government maintains 98 punts and 2 steam launches, 1 horse boat, and 187 other boats. Most of the northern rivers are very wide, for instance at Grafton, on the Clarence, where there is a steam ferry service; the distance across is 32 chains, or nearly half-a-mile.

Although the maintenance of communication by means of roads and bridges is no doubt of first importance to a large part of the Colony, the keeping open of the navigation of the rivers is of equal importance to those districts where the settlers depend upon the waterways rather than upon roads. As is well known, the interior of Australia, considering the extent of the territory, is singularly deficient in permanently navigable rivers. There are, however, several streams flowing eastward into the Pacific Ocean at various intervals along the coast line,

the most important of which lie north of Sydney, viz.: the Hunter, the Manning, the Hastings, the Macleay, the Clarence, the Richmond, and the Tweed. These serve important agricultural districts, with a considerable population, some of the very richest land in the Colony being comprised within these river areas. It therefore becomes necessary that the navigation should be kept open and improved, and the Government is obliged to keep a large dredging plant for the purpose. Much of this work is necessitated by the frequent floods to which these rivers are subject, causing them to silt up. The plant employed comprises 8 sand pump dredges, 14 ladder dredges, 19 grab dredges, 24 tugs, and 76 silt punts, the capital value of the whole being £467,600. A great deal of dredging work is also performed in Sydney and Newcastle harbours, both for the purpose of deepening, and in connection with the reclamation of land. During the past few years sand pump dredges of the Dutch and Von Schmidt type have been adopted with very great success, enabling much more work to be done at a greatly reduced cost. During the year 1892 one of these vessels, working at Newcastle, lifted and put ashore 534,600 tons of sand at a cost of 1·484d. per ton, which compares most favourably with the cost of similar work in Europe.

One of the great drawbacks to the navigation of the coastal rivers is the difficulty experienced with the entrances, owing to the shifting and dangerous nature of the bars. The only permanent remedy for this is the carrying out of costly works, which the extent of the trade does not in many instances warrant, at present at any rate. At the entrances to the Clarence and the Richmond, two of the most important rivers, improvement works are now in course of being carried out in accordance with schemes proposed by the late Sir John Coode, the eminent hydraulic engineer, who was commissioned by the Government a few years ago to visit the Colony for the purpose. These works are of a very extensive character, as will be gathered from the fact that the estimated cost in the case of the Richmond River is £326,000. The works at the entrance to the river were commenced in June, 1889, and comprise the formation of a fixed navigable channel from the bar, through the unstable portion of the entrance to permanent deep water in the river, and the construction of breakwaters for the purpose of creating a permanent and safe entrance. Already a very satisfactory improvement has resulted from the works so far carried out, and there is little doubt of the ultimate entire success of the scheme. At the Clarence Heads the scheme is of a somewhat similar character. Works are also in progress for forming a permanent channel at the Tweed entrance.

Newcastle, which is situated at the entrance to the Hunter River, and is the chief coal-shipping port of Australasia, furnishes a remarkable example of what can be effected by judicious engineering skill. Little more than twenty years ago it was a port shunned by foreign-going ships as dangerous to enter, and without accommodation when entered; it is now second only to Port Jackson in all its nautical requirements. Vessels laden with 4,000 tons of coal, at a draught of 23 feet, can safely cross the bar, and the facilities for coal shipment are such that 6,000,000 tons of coal can be shipped annually. Direct shipments of wool are now made to England, and merchandise is



STEAM-CRANE, DARLING HARBOUR.

directly shipped in return. Steamers of over 1,000 tons burthen ply from Sydney to Morpeth, the head of navigation, 30 miles from Newcastle. Still further improvements are about to be undertaken with the object of permanently deepening the channel at the bar, and thus permit of vessels of the largest tonnage to leave the port fully laden.

At Trial Bay, a few miles to the north of Smoky Cape, a harbour of refuge is in course of construction by means of convict labour. Apart from the nature of the works itself, it is of considerable interest as an object lesson in prison administration. When the Colonial Government decided, in 1875, to construct this harbour of refuge, the opportunity was taken by the then Comptroller-General of Prisons, Mr. Harold Maclean, and the Engineer-in-Chief for Harbours and Rivers, Mr. E. O. Moriarty, men of most humanitarian ideas, to recommend the establishment of a Public Works Prison for the purpose, where long-sentence prisoners could be provided with employment under healthy conditions, which would train them to earn a living on their release, and also give them the opportunity of earning the means to start advantageously in their future career. The proposal was adopted by the Government, and buildings were erected at a cost of nearly £80,000. The work has been for some years in operation and has been perfectly successful, the breakwater having been extended 520 feet, at a cost of £43,919 18s. 5d. The treatment accorded to the prisoners is of the most liberal kind. They are paid wages of 6d., 1s., and 1s. 6d. per diem according to behaviour and the time they have been on the works, and are given an amount of liberty probably unparalleled in any other establishment of the kind. The prison buildings are situated in a large reserve where the prisoners are allowed to spend their leisure time in healthy recreation such as cricket, fishing, swimming, &c. They do not wear the regulation convict uniform, and are permitted to grow their beards; in fact, beyond the presence of an occasional warder, there is very little about the works to remind the observer of their penal character. The prisoners are allowed to associate together for mess and other purposes, and they can spend a certain portion of their earnings in tobacco and other small luxuries. Every encouragement is given them to acquire habits of self control and industry, and to fit them to become, when their term has expired, decent law-abiding members of the community. The wise and humane intentions of the Government in establishing the prison on these lines are much to be commended, and it is therefore satisfactory to know that it has been found successful.

At Sydney Harbour, owing to its magnificent natural facilities, very little has been required to provide for shipping beyond the construction of wharfs at which ships can lie to discharge and load cargoes. Although much work of this kind has been left to private enterprise, some of the most important wharfs have been constructed by the Government, which now yield a very considerable revenue. Amongst them are the wharfs at the Circular Quay, formerly known as Sydney Cove, on the shores of which the first settlement was made and the foundation laid of the City of Sydney. Here, within a stone's throw of the centre of the town, lie the magnificent mail steamers of the Peninsular and Oriental, the Orient, the Messageries Maritimes, and other lines.

Ample facilities exist in Sydney for docking large vessels and repairing the ships of war on the station. At Cockatoo, one of the islands in the harbour, is situated the Government docking establishment and works. It consists of two large graving docks, one of which, the Sutherland Dock, completed a few years ago at a cost of nearly £280,000, is one of the largest single docks in the world, and is capable of receiving vessels drawing 32 feet of water.

At Wollongong and Kiama harbours have been constructed for the convenience of the shipping engaged in the southern coal trade, and Government wharfs are to be found at all the chief centres of population along the rivers of the Colony and at all ports with a trade of any importance.

The works which have been referred to in the preceding paragraphs, although of vital interest to the Colony as a whole, perhaps more particularly concern the residents in the country districts. Amongst the most important of the public works of the Colony, however, so far as magnitude of cost is concerned, and as affecting the health and comfort of a large number of the inhabitants, are those which have been constructed for the Water Supply and Sewerage of the City of Sydney. To take first the water supply. The works now in operation are quite of recent construction. For many years the supply was in the hands of the City Corporation, and was obtained from the sandy swamps lying between the city and Botany. This, however, proving quite inadequate to the demands of the increasing population, the matter was taken in hand by the Government, and after careful consideration of various projects, a scheme was adopted known as the "Nepean scheme." The source of supply is the Upper Nepean, Cordeaux, and the Cataract Rivers, which rise in the mountain country running parallel to the coast; the catchment area being 354 square miles entirely in sandstone country. The water is intercepted at a height of 637 feet above sea-level, and flows through a series of conduits which are partly tunnel, partly open canal, and in places wrought-iron aqueducts, to the Prospect Reservoir. This reservoir has a capacity of nearly 11,000 million gallons, and when full covers an area of close upon 2 square miles. The water after leaving this reservoir, is conducted by an open canal $4\frac{3}{4}$ miles in length, to the pipe head basin, and thence by wrought-iron pipes, 6 feet in diameter, to the Potts Hill Reservoir which has a capacity of 100 million gallons. From thence the water is conveyed by pipes to the various reservoirs for distribution. The supply to some of the higher portions of Sydney and suburbs requires to be pumped, but the greater part of the supply is by gravitation. The works were completed about the end of 1887, and have been in every way successful. The water is of first class quality, and the supply is sufficient to meet the requirements of a very much larger population than is at present dependent upon it. The works are administered by a Board formed for the purpose in 1888, composed of four members elected by the ratepayers, and three nominated by the Government, which has an intimate concern in the matter as the capital invested represents part of the public debt of the Colony. The Board's operations have given every satisfaction; the service is a splendid one, and the cost to the ratepayers comparatively low; in fact in this matter Sydney stands out in

striking contrast to some of the cities of the old world. The last report of the Board shows that during 1894 the average consumption of water was 34·23 gallons per estimated head of population per diem, the average daily supply being 13,739,000 gallons, and the estimated population supplied being 401,380. The revenue received was £161,167, which, after providing for working expenses amounting to £39,274, enabled the Board to provide interest at the rate of 3·54 per cent. on a capital of £3,440,614. The cheapness of the Sydney water supply is very clearly brought out by a table prepared by the Board showing the water rates and charges of some of the principal cities of Australia, England, and America. The assessment for a house of £50 annual rental in Sydney would be, as shown by that table, £1 5s. In Adelaide the same house would be charged £2 10s.; in Belfast (Ireland) £2 1s. 8d.; Dublin, £1 9s. 4d.; Bradford (England) £3 5s.; Liverpool, £2 16s. 3d.; Manchester, £2 10s.; Dundee (Scotland) £2 14s. 2d.; Edinburgh, £1 11s. 3d.; while under the London Companies it would be about £2 10s. In Boston (U.S.A.) the charge is low, viz., £1 0s. 10d., but in Montreal (Canada) it is as high as £4 8s. 6d.

Mention should also be made of the works which the Government have carried out for places outside Sydney Almost every town of any size in the Colony now has its water supply. The scheme for the towns embraced in what is called the Hunter River District, viz., Newcastle and suburbs, East and West Maitland, and Morpeth, is a very extensive one, and is managed by a Board constituted on the lines of the Metropolitan Board. In the case of other towns the works have been constructed by the Government, and then handed over for administration to the local municipalities, who enter into an agreement to repay the cost in a certain number of years. The benefits which these towns derive from a constant water supply, situated as many of them are, in the dry interior, cannot be over-estimated.

The Sydney sewerage system, in its present complete form, is of comparatively recent date, the works having been only commenced in 1880, and although so far as the city and immediate suburbs are concerned, it has now been in operation for some years, the works for the outlying suburbs, although well advanced, have not yet been completed. Briefly described, the works consist of a main northern outfall sewer which collects the sewage of the portion of Sydney and suburbs which naturally drain into Port Jackson, and discharges into the Pacific Ocean at a point about 5 miles to the south of Sydney Heads. The sewage of the southern district is collected into a separate system and conveyed to a sewage farm on the shores of Botany Bay. The scheme also comprises a system for the western suburbs, which also discharges on to the sewage farm at Botany. In addition to the extensive reticulation works in connection with the main scheme, numerous stormwater drains have been constructed where foul and insanitary creeks formerly existed. The amount expended on these works up to the end of 1894 was £1,745,120, the revenue received by the Water and Sewerage Board, by which they are administered, was £93,134, the net interest on capital after paying working expenses being 3·72 per cent. The effect which the construction of these works has had upon the health of Sydney has been most marked. In 1875 measles and scarlet fever proved so destructive to life that a Royal

Commission was appointed to suggest remedial measures, and indeed it was as the outcome of their recommendations that the present system was adopted. The result of the steps taken has been that in the city proper, the death-rate, which in 1875 reached 31·65 per 1,000, has rapidly fallen till, in 1894, it stood at 17·07 per 1,000. The suburban rates are even more instructive than those for the city. From 1872 to 1885 the death-rate gradually rose till it reached 24·47 per 1,000. In that year the southern outfall sewer was brought into operation, followed by the northern outfall, and the reticulation of the eastern and southern suburbs has been since gradually extended. The statistics show that, although there has been since 1885 a more rapid proportional increase in the population than at any previous period, the death-rate has steadily fallen till it has reached 13·14 per 1,000.

In the matter of public buildings the people of the Colony, and especially the capital, have every reason to be proud. Probably no city for its age contains such a large number of stately buildings, showing fewer lapses from good taste, as Sydney. Building stone of a first rate quality—a fine sandstone—abounds in the neighbourhood, and as the better class of buildings have been fortunately built of this stone, the streets and public buildings present a more monumental appearance than would otherwise have been obtained. The principal Government offices in Sydney, notably the Colonial Secretary's and Public Works Office (an illustration of which is given), and the Lands Office are very handsome edifices well worthy of the beautiful city in which they are situated. The General Post Office, not very long completed, will challenge comparison with any building of the kind elsewhere. It contains a façade 363 feet long, of remarkable dignity, and a lofty clock tower. Government House, which was erected half a century ago, is a fine building of cut stone in the perpendicular Gothic style, charmingly situated on the shores of the harbour. The Sydney University, in the same style of architecture, though erected at a later date, contains a Great Hall that, for architectural features and charm of design, vies with the better known ones of Oxford and Cambridge. The Parliament Houses, Courts of Justice, and the Royal Mint are very old buildings originally intended for other and more modest purposes, and must, in course of time, be superseded by more elaborate structures. In every township of any importance throughout the country, commodious Court Houses, Lockups, Police Quarters, Post-offices, and Public Schools have been erected, and, in certain centres, extensive Gaols.

The Colony possess two very large and important Hospitals for the Insane, namely, at Callan Park and Gladesville, the former having cost upwards of £300,000 to construct—the latter is surrounded by noted gardens. A third hospital of an extensive character is now being erected at Kenmore, near Goulburn. In addition, there are others at Parramatta and Rydalmere, and one at Newcastle for incurables and idiots.

The total expenditure on new buildings since Responsible Government was instituted in the Colony, exclusive of that on Public Schools, amounts to over £8,000,000.

From the particulars which have been given a fair idea will, doubtless, have been gathered of the work which has been done by the

Government of New South Wales. It may appear somewhat striking to a person unacquainted with the Colony that much is done by the central Government which, in other countries, is left to local authorities; but the reason for this is apparent. The population of the interior is so scattered, and so small in comparison with the immense area—more than half as large again as France by the way—that it is impossible for the people themselves to carry out what local works are required, except in the townships. All of these of any size have become incorporated and carry out their own municipal works, in which, in the early years of their existence, they are assisted by grants from the Government. It has been the policy of the central authorities, who desire to see the principle of local government extended as much as possible, to encourage this spirit of "self help"; but from the very circumstances of the case, it must be many years before the people of the Colony can be in such a position as to be independent of the Government in the matter of public works, and it is, therefore, satisfactory to know that such excellent work has been done in the past, and that, all things considered, the system at present in operation is a good one, intelligently and efficiently carried out.

Our Social Conditions.

By Frank J. Donohue.

Although it is the custom to think and speak of the mother-colony as being rather more than one hundred years old, dating from the arrival of Governor Phillip in 1788, it is much more accurate for the purposes of the observer of the growth of our social state to reckon from at least fifty years later. The year 1837 saw the departure of Sir Richard Bourke, whose administration as Governor may be said to have prepared the way for Australian social conditions as we now know them. But the population of the continent at that time only numbered about 100,000, and it was not until Bourke's term that Mitchell's exploratory expedition made known the advantages for settlement of what is now the Colony of Victoria. But the historian of the future will probably prefer to reckon, and with more justice, from the year 1850, regarding all that went before as an experiment on different lines altogether. Then was ushered in the era of the modern population, separate colonies, the gold discovery, and responsible government. The population began to increase by leaps and bounds, and the spirit actuating the community altered itself almost as completely as though a new experiment in colonisation had been launched. The gold fever brought us a new race—young, energetic, and full of the ambition of life and the desire to make the most of its brilliant chances. We received the incalculable benefit of a full stream of that adventurous pioneer spirit of which Kipling has written in stirring verses, with the advantage that the new-comers found a field ripe for settlement as well as for adventure, and for the assimilation of those liberalising and popular ideals of politics and social relations which have given the Australia of to-day that breezy healthfulness which is the characteristic note of the institutions we now enjoy.

This is not the place to sketch the history of the growth of these institutions; but the steps by which they advanced may be briefly indicated. The year before the date named saw the cessation of transportation and the removal of that shadow on the colony's future. The gold discovery came in 1851—in Wentworth's well-worn phrase, precipitating the colony into a nation. From the twilight of an obscure antipodean settlement, the colony emerged into the day, and riveted the attention of the world as a theatre of boundless possibilities. The people who came were of the type that turns possibilities into certainties, and one of the first results of the extraordinary influx was shown in the determination to make the country politically fit to live in. For years the community had been struggling feebly towards self-government and the privileges of free citizens. The stages had been gradual but slow. Now the object was attained almost in a

moment, and within five years of the time the stream of the new population set in, responsible government was conceded in its present full measure—though not without the temper of the past expressing itself in a whimsical proposal to create a peerage with hereditary titles and legislative privileges. The scheme was strangely out of touch with the new spirit. It developed a mood of antagonism that carried the new movement, perhaps, even further than it might otherwise have gone; and a few years saw the introduction of the principle of manhood suffrage, the throwing open of the public lands to settlement before survey, the abolition of State aid to religion, the establishment of a popular system of education, and the base-course laid for the progress of subsequent legislation. The population, which for the whole continent numbered less than 150,000 in 1844, stood at 197,168 for New South Wales after the separation of Victoria in 1851, rose to 357,978 by 1861, and more than doubled itself in the course of the next twenty years, while the census of 1891 showed a total of 1,165,300.

In considering the conditions under which our population lives, the first fact to strike the observer's attention is the decided preference shown for town life. The characteristic is common to most countries; but to people at a distance the circumstance is the more noticeable by reason of an impression that the life of the colonies is largely a life of "the bush," the sheep-run, or the gold-field, or at least of the open air. The average intending colonist does not usually correct this impression until he arrives in New South Wales, while many of the critics who write about us never seem to trouble about the facts of the case at all. In the section in this volume dealing with the towns of New South Wales, something is said on this point; and here we may content ourselves with observing that out of the whole population of the colony 691,956 are town-dwellers. It might be better if the case were otherwise, and, indeed, a disposition has set in of late years to devote more energy to the direct development of natural resources. But the prosperous conditions of existence in the colony, and the rapid advances in the command of the comforts and arts of life have had a great deal to do with the inclination of the population to collect in towns. When the country was new and just beginning to show its possibilities there was a tendency to take up vast tracts of country for the breeding of sheep, or to enter upon the active work of alluvial mining. Those who went out to open up the country risked their lives at first in flood and drought, and at the hands of the aborigines; but that stage passed away, the social conditions solidified themselves, and people settled down to enjoy the fruits of their prosperity. A large population collected in Sydney, as well as in the more important inland centres, surrounding itself with the comforts and elegancies of life. Taste began to assert itself; the University and schools of art and public libraries came into being; the desires and aspirations of leisure began to make themselves felt; and the wants of the population made employment. Wages, the attractions of towns, the facilities for the education of children, soon drew the people away from the country and settled them around the larger centres.

Under normal conditions the life lived in New South Wales in these circumstances commands a high degree of comfort. The average of personal expenditure on food and drink alone was higher last year,

although we suffered from the consequences of the depression, than in any other country in the world. Outside Australia the inhabitants of the United Kingdom headed the list at a little over £14 sterling per annum per head, while France showed a little over £12, Germany nearly £11, and Italy not much more than £6. In New South Wales the rate stood at £16 6s. per year, or 10·7d. per day. Something has to be said, of course, for the difference in prices of provisions here and in the older countries; but if some articles are dearer, others, like meat, are cheaper, and in this way the discrepancy has a tendency to adjust itself. If the expenditure on mere luxuries can be taken as an index to the comfortable conditions under which our population lives, it may be mentioned that about one-fifth of the whole expenditure on food is paid away for wines, spirits, or beer; but even these figures do not represent the standard of expenditure before the wave of depression passed over the colony. Three years ago the daily outlay, for instance, was returned as nearly one-sixth more, or over 12d. per day per head; but even as things are to-day it is something to be able to point to the fact that a population of a little over 1,000,000 souls spends upwards of £20,000,000 sterling annually on food and drink alone. To the working-classes of Europe meat and tea are luxuries, and often unattainable. In New South Wales more meat is used than in any other part of the world, and twice as much tea, except as regards Russia. Our people spend more money on tobacco per head than any other country except the United States, Turkey, Holland, and Brazil, and more on intoxicants than any other country. On clothing we spend at the rate per individual of 3½d. per day, which is a fairly high average when it is recollected that only 40 per cent. of the population are to be reckoned as adult males. Last year the total cost of living for the population of the colony amounted to something under £47,000,000 sterling. This sum includes not only cost of food and clothing, but rent, furniture, miscellaneous household expenses, religion, amusements, literature, medical and personal attendance, and so on. The average expenditure per head was, therefore, £37 14s. 1d. per year, representing, of course, not the cost of living for each adult male, but the outlay equally divided among all the units in the community. What this means will be understood when it is compared with the average outlay in other countries. In the United Kingdom, for example, where the conditions of life are so prosperous as compared with other European countries, the average, according to Mulhall, is as low as £29 14s. 9d. For France the rate is about £24, Germany £20, and the United States £32. While the Englishman has to work 127 days in the year to earn the cost of the food he consumes, the Frenchman 132, the German 148, and the Italian 153, the worker in New South Wales has met that portion of his responsibility after working only 119 days. And this is not because he eats less than the others. Quite the contrary is the case. The average Briton makes it his boast that he can challenge the average unit of any other country in respect of a generous food supply; but the figures show that the brawn-and-muscle fed in New South Wales absorbs nourishment sufficient to produce more than one-third more working energy than the average dietary scale in the United Kingdom. Thus, where the one consumes 278 lb. of meat in the year, the other is content with

109 lb; where the Briton is content with 19 lb. of butter and cheese, his blood relation in New South Wales expects and receives 24 lb.; 78 oz. of tea are contrasted with 143 oz.; 75 lb. of sugar with 91 lb.; while the consumption of grain foods is about equal, standing at 378 lb. and 380 lb. respectively. Even in the United States, where the conditions of life are said to be so easy, the meat consumption is only 150 lb.; grain foods, 370 lb.; potatoes, 170 lb., as against 205 lb. in New South Wales; sugar, 53 lb.; and butter and cheese, 20 lb.; while the annual consumption of meat per head in France is only 77 lb.; in Germany, 64 lb.; and in Italy, 26 lb. These figures convey a fair approximate idea of the material conditions under which our people live, as compared with those of other countries. They eat and drink and spend more, work less for the necessaries of existence, have a larger share of food luxuries, and in a general way get more out of life than the masses of any other country in the world. And the calculations that show this, it should be remembered, are based on observations made not during a period of abnormal inflation, or even of average prosperity, but at a time when the colony was feeling the effect of an unexampled depression.

There are no striking extremes of wealth and poverty in New South Wales. Some large fortunes have been made, and against the solid background of average comfort indicated by the facts just given there is the usual poverty common to all large communities. But we know nothing of the poor as a distinct class, and it has never been necessary to adopt anything in the colony to correspond with the English Poor Laws. Much of the relief given to the sick and necessitous poor is paid for by voluntary subscription, but the State has generously endowed hospitals and asylums to the same end, spending annually in this way something like £300,000. The system of State children's relief is under the control of a board, which supervises the industrial schools and reformatories as well as the scheme by which State children are boarded out in private homes. The spirit in which this charitable enterprise is administered has the excellent social effect of withdrawing the young from those associations which would otherwise recruit the ranks of pauperism and crime. But the conditions of life are so favourable that, generally speaking, it is only the very young, the aged, or the infirm who require to be assisted by the State. Under normal conditions the opportunities for employment are ample. There are 12·3 per cent. of the population owning property to the value of £100 and over, against 7 per cent. in the United Kingdom. Two years ago the private property in New South Wales was equal to £336 per head, the total value being upwards of £400,000,000 sterling, while the actual sum divided per year as earnings was upwards of £66,000,000. These figures compare favourably on a population basis with those of any other part of the world.

So much, then, for the material side of our social conditions. It is only to be expected that, as wealth and leisure increased, there would come a taste for the graces and intellectual luxuries of life, and that as the pioneer effort of the early stages of colonisation began to bear fruit the population would find time for an interest in something else besides the mere struggle to live. That we have arrived at that stage is perhaps attested by the fact that we spend over two and a half

millions sterling annually on such matters as literature and art and the drama, on private education as apart from the huge State expenditure for this purpose, on public amusements, charities, and religion. So far as the question of public education is concerned, it may be said here that it is the object of the State to ensure that every child in the land shall enjoy the advantage of sound primary instruction, and anything above that standard is, as a general thing, paid for by those who want it. Religion has no assistance from the State. But literature and art are subsidised by the establishment of free libraries, a National Art Gallery, and a school of instruction, the expenditure on which is not reckoned in the amount above quoted as spent by the people themselves.

The interests of sport have always received active sympathy from all classes. Beginning in the schools, the love of sport in its various forms is carried through life, and through all classes. The Australian race seems to have fully inherited the Anglo-Saxon characteristics in this respect; and perhaps for the future of the race it is well that this should be so. During many months of the year our climate is likely to prove relaxing, if not enervating, if active habits of life are not formed to counteract it. In the country the value of the agricultural, pastoral, and mining life led there supplies this in a sufficient degree; but in the towns and cities a tacit attempt is always going on to engraft English habits of food, dress, and ordinary life on not always suitable Australian circumstances. We eat the same meals and wear the same clothes, as far as possible, as our cousins in England do under far different conditions, and up to the present, in New South Wales at all events, very little progress towards adaptation in these respects has been made in the sense illustrated by British residents at Calcutta, or the West Indies, or Hongkong. But what we want in adaptation is made up for to a large extent by our active habits of outdoor sport. Our races at Randwick are a national institution. Our cricketers are as well known at Lords', or The Oval, as they are on the Sydney Association Ground. Our rowers, like Trickett, Rush, Laycock, Stanbury, Beach, and Searle, have won fame at home and abroad as the world's champions. A bicycle tournament crowds the grounds with tens of thousands of spectators, and we have lately seen a world's champion go from our shores leaving a leaf or two of his laurels behind him. Our people spend a million sterling on art and amusement, and a goodly proportion of this is represented by the outlay on sport. The moralist may find in this characteristic of ours a bad sign for the future, and of course it is not entirely a good thing to find Young Australia enthusiastic to the highest point of his buoyant capacity on the subject of some form or other of sport, while he remains comparatively indifferent to the attempt to form a literature or cultivate the interests of art, and to the higher political interests of the country in the public life of which its free institutions invite him to take part. But everything comes in its place and time, and for the present the chief concern is to preserve the type of the original founders of the colony, and to secure the permanence of an active and vigorous race not likely to succumb to the enervating influence either of prosperous conditions or a semi-tropical climate. We have the examples of other colonising races before us as a guide, and a

warning of what is to be avoided. The Dutch not quite three centuries ago founded a colony at Batavia, which flourished and enriched itself beyond anticipation for a time. But the records of the settlement show how bad habits and an indolent life gradually enfeebled the dominant race and prepared the way for the condition of decay now found there. The Spaniard in South America, and the Portuguese at Goa and Macao, established a brilliant record in the sixteenth century; but the staple and fibre of the race decayed, and no one reading the history of their past would recognise a trace of the old spirit in their degenerate descendants. In Australia we are protected against the danger of a mixed population, and the struggle against primitive conditions has been too earnest in the past to leave much time for decay. The danger will come, if ever, now that the pioneer work is done and the people are settling down to the enjoyment of those established conditions which the labours of the pioneers have made for them. It will be for the active outdoor habits and athletic pursuits of Australians to preserve the men and women of the future from degenerating into the type of indolent creole or fibreless *mestizo* which now remains as the only surviving testimony to the colonising activity of other nations in other times. The moral force required to leaven the growing civilisation and conditions of life in these communities, far removed as we are from the influences of old-world culture, are a love of music and art and an appreciation of literature. The signs of this are encouraging, as we have seen, and it is well that a community which has witnessed so much material progress has not neglected the finer graces of civilisation. To do so is a peril of young commonwealths, but we cannot always be young, and communities age as much by progress and development as by the tale of years.

A glance at the resources on which the superstructure of these social conditions has been built up will supply satisfactory evidences as to their stability. We have passed through two or three exceptionally bad years, and for the moment the reproductive power of these resources has been severely taxed. But they have more than stood the strain which, beginning with the Baring scare, has left few parts of the world entirely untouched. We have learnt to correct some of our extravagances of living, and to recognise that the phenomenal prosperity witnessed in New South Wales is not above the incidence of those ordinary mischances which wait on prosperity everywhere. We have a Public Debt, roundly speaking, of some sixty millions, and we pay interest at the rate of about two millions and a quarter a year. Our population spends upwards of forty-six millions annually on the daily wants of life. But against this we have public works to the value of eighty-five millions, the railway system being worth about forty millions of that sum. Last year our State services cost us about eight and a half millions, while our gross revenue stood at nine and a half millions. We have sold and unsold public lands of which the proportion still unpaid for amounts to nearly twice the total of our Public Debt; and from public works, rents, and fees alone we draw about two and three-quarter millions per year, being about half a million more than our annual interest charge. The resources behind these figures are the pastoral, agricultural, and

mining industries. These the reader will find properly treated in their respective places in this volume. Our millions of sheep and cattle themselves produce an enormous return to the colony. The wool clip of 1892 was sold for over ten millions sterling, and had the price kept up to what it was nine years before the return would have been nearer fifteen millions. A difference of a half-penny or a farthing per lb. means a difference of thousands to the wool-grower and to the colony, as the recent slight rise satisfactorily evidenced. The developments of our frozen meat and dairy produce trade are still in the future, but they indicate a field for the expansion of the pastoral industry. The agricultural industry is mainly directed at present towards the supplying of our own wants, but the prospective field may be judged of from the fact that out of 196,000,000 acres within the colony's boundaries only 5,000,000 are set down as quite unfit for cultivation. Irrigation and water conservation will lay these vast areas under tribute as time goes on. In 1894 the dairy cattle alone were worth two and a half millions to the colony, and the value of the returns for the year reached nearly two millions. The mining industry has already returned the colony upwards of one hundred millions sterling, and in 1894 the return was a little under five millions. These facts are mentioned here to show that the favourable conditions under which the population of New South Wales lives are stable and progressive, and not the result of accidental and passing circumstances.

Literature and Art.

By Frank Hutchinson.

Literature.

It is just a generation since Mr. G. B. Barton (himself no unworthy worker in the local literary field), in a book published "by authority" on this subject, lamented the slow growth of letters in this community, and the little promise of the creation here of what he called a "national literature." The complaint was doubtless a just one at the time, and as natural—inevitable, indeed, under the conditions of so young a country; and the question to be considered here is how far may the succeeding thirty years be said to have removed it.

The chief names then on the roll of our literary worthies were, in prose, Deniehy and Dalley; in poetry, though at somewhat wider interval, Harpur and Kendall. They are the chief names still. No writer amongst us in either field has ever matched in range or brilliancy the former two, nor in truth to nature and real poetic power the latter. Of Daniel Henry Deniehy, once the eloquent, the witty, the erudite, it has been said that "with few advantages in his favour he contrived to make himself master of almost the whole field of European literature, to obtain a thorough insight into the various developments of art, and to qualify himself for the most marked displays of talent, both as a politician and a man of letters." Yet the literary fame of this "Admirable Crichton" is now almost purely traditional. With the exception of a few essays and sketches, journalistic waifs and strays, and a number of admirable private letters, he left little behind him to justify the judgment of his contemporaries, and though that little be enough, the end was swift and sad as that of the unhappiest "child of genius"—and there have been many such endings—before him. If his lifelong friend, and, one might almost say, fellow-meteor in politics and letters, William Bede Dalley, was more fortunate both in his private and public relations, he has perhaps been even less so in regard to his literary fate. To the present writer, who had the privilege of his close friendship for many happy years, he once confided how for an assured literary fame he would willingly exchange all his political or other distinctions. Alas! for that pious wish. His literary fame is already little more than the merest memory—probably to many of the present generation not even that. The great charm of his writings, as of his speeches, lay in their exquisite ease and grace—their abounding wit and humour, the one as bright and sparkling as the other was tender and true—unrivalled powers of ridicule and sarcasm, tempered by the gentlest and most genial of natures. No

loving hand has yet gathered together the fragments that remain of that rich feast, scattered through many of the papers and periodicals of his time—none perhaps now ever will. A project started shortly after his death for some such monument to his memory appears to have been abandoned, and the literary remains of perhaps the two brightest intellects the country ever knew seem likely to be doomed to rest together in that common grave where lie so many more such treasures—the deep sea of journalism, which so seldom gives up its dead.

A happier fate has attended the two poets. Excellent posthumous editions of both Harpur's and Kendall's poems, selected by careful hands, have been published, and remain, as we said, so far as any efforts of the local muse are concerned, unmatched. Possibly in some quarters that may not be held very high praise. The local poet, like the proverbial prophet, is apt to have little honor in his own country, and outside criticism is often careless, or ignorant, or worse. Thus it has been objected to Australian poetry generally that it is lacking in the true poet's first faculty—the lyrical. "Australia," once remarked a somewhat supercilious literary visitor, "may have had a poet or two"—and we have reason to know that he referred specially to one of these two—"but she has no songs." The antipodean curse of Australia's scentless flowers and songless birds extends, it seems, according to this authority, to her bards. They may be brilliant of colour as the flaming waratah or the flashing parroquet, but, like them too, they have sweetness neither of scent nor sound, for they cannot sing. Whatever truth there may be in this as regards Charles Harpur, whose somewhat unkempt muse, it must be confessed, had often more depth of meaning in her than music, it is certainly the stupidest of literary libels in the case of Henry Kendall, who as poet was emphatically sweet singer or nothing. Nor can it be said that the graciously accorded possible "poet or two" is much a reproach to a young country, the story of whose short life is surely marvellous enough without adding the discovery of a rich mine of poetic wealth to its other wonders. On the contrary, we are not sure whether, under all the circumstances, the allowance is not even liberal. How many great poets does even the old country, with its long bead-roll of "mighty poets gone before" produce in a century? and Australia is little more than a century old. America is the nearest case in point, though, of course, with a vastly larger field for poetic growths; yet with sweet singers and poets innumerable, of great poets, poets of the first rank, America has produced not one. Here, with little or no past to inspire, save such a past as all poetry and all prose might willingly let die; with a rough and ready present—not without its poetical side indeed, but as against its practical prosaic opposite, a very small side—with only for "Pierian spring," the mystery of a half-known, long-silent land, the wild beauty of a yet semi-savage Nature, or such glimpses of a better day as only the strongest poetic vision may catch through the haze, often the thick fog, of much sordid surrounding, the wonder surely is, less that Australia should have had only a "poet or two," than that she should have had a poet at all. However, she has had much more than that. Australian poets have much multiplied in the land since the two we have named first discovered, like the old explorers her

physical, her poetic capabilities, and there is the further notable fact that, though this paper is limited strictly to the literature of New South Wales, it may yet include most of the Australian poetry at all worthy of the name, of the period. If the mantle of Kendall, or even of Harpur, can hardly be said to have yet fallen on any quite worthy shoulders—and it certainly cannot—it is at least not due to any lack of plucky local aspirants. The names of Holdsworth and Heney, of Farrell and Daley, and later of Paterson and Lawson, may well be added to the list at any rate of our minor poets—and minor poets, it may be noted, appear to be about as much as the gods just now are vouchsafing in this way to mankind anywhere.

But if the four chief names mentioned must still be said to stand first on our literary roll, that does not mean, of course, that in regard to literature generally the country itself has been standing still. On the contrary, there has been, specially of late years, a marked, even rapid, advance along the whole line—a further honor, perhaps, to those lost leaders who so gallantly in darker days (if they were darker) showed the way. It would be absurd, indeed, to count as literature all the late local production in this sort. Only a very liberal construction of the term, we are afraid, could be made to cover much of it. But the effort has been there, if not altogether the accomplishment, and so far, if only like the poet's

> Plants bred in darkness, striving upwards to the light,

shows the right tendency. Here may be mentioned, perhaps, Sir Henry Parkes's "Fifty Years in the Making of Australian History," certainly the veteran's best literary performance, his famous "poems" not excepted, whatever may be thought of it as authentic history. The mother colony, however, has always been strong in history. The works of her historians—Collins, Lang, Flanagan, Bennett, &c.—form no inconsiderable part, either as to quantity or quality, of her literature, and the great work—the "History of New South Wales from the Records"—some years since undertaken by the Government, promises very worthily to crown the series. Two volumes by Mr. G. B. Barton and the late Mr. Britten respectively—it is only fair to the first-named writer to say, of very unequal merit—have already been published; but the work is now in abeyance, pending the completion of the compilation of the records, themselves in course of publication from time to time under the editorship of Mr. F. M. Bladen. Then, there has certainly been some little literary revival in the newspaper press. We do not know, indeed, that the leading columns are more literary than they were—rather, perhaps, the other way—but the short story, the essay, the sketch, seem to find more room there, and more attention appears to be given to reviews or notices of the best new books and current literature. At the same time, it must be said that the advance has been much more conspicuous in one direction than in another—in the consumption of literature than in its production. This, of course, is not surprising, the one being so much easier a process than the other, and may be set down perhaps as one of the excellent results of our State education system, which at least teaches everyone to read. It is to the State, too, that the people are mainly indebted for the means of indulging this new taste or faculty. When Mr. Barton wrote,

there was not a free public library in the land. To-day, besides the main institution in Sydney, rapidly becoming a noble one, there is scarcely a country or suburban town of any consequence which does not boast one, while the same writer's estimate of other libraries, the circulation of foreign periodicals, and the importation of books is exceeded very many times over. It is only of the locally-produced book or periodical that there is still to be told the old story of no advance or uniform failure. The colonial book still requires in author or publisher, perhaps both, the recklessness of the spendthrift or the courage of a forlorn hope, and it is the melancholy fact that of the many magazines and reviews which Sydney has produced in her time, there has survived not one. She has been rather a prolific mother in that sense, but, like the members of a "rickety" family, her unfortunate offspring have all gone the same way.

> Their graves are green;
> They may be seen.

Yet many of them seemed sturdy, promising youngsters enough; the latest, *The Centennial*, not the least so, which yet, after a brief but brave struggle against invincible destiny, shared the family fate. It hardly accounts for this strange fatality to say that there is not here, for magazine purposes, sufficient local talent, though possibly it may help to do so to add that there is not here sufficient appreciation of the talent, simply because it is local. Be that as it may, it remains that the one resource for the local literary man here is in daily or weekly journalism, and it is fair to say that in most cases, or where there is real ability or capacity for useful work, a very effective resource it is. But of course there are forms of literary ability for which journalism, especially daily journalism, affords little or no scope. The daily paper, with its heat and hurry, its little regard for manner and all for matter, may indeed be rather the enemy of literature, especially in its higher forms, but the weekly might do much for it, and some of our weekly journals —notably the *Bulletin*, thereby covering a multitude of sins—have already done yeoman's service for local literature by thus encouraging and developing local talent. It was there that such rising writers as Louis Becke and Ernest Favenc, who, we are glad to see, are fast making their mark in a wider field, as well as our latest and best bards of the bush, Messrs. Paterson and Lawson, graduated, and it was in the columns of a Sydney weekly, if we remember rightly, that Australia's best novelist, also a New South Welshman, the author of "Robbery under Arms," Rolf Boldrewood, made his first bid for the fame, if not fortune, which has since come to him. Still it must be said that the literature which has only, or mainly, to look to journalism as its support or outlet, can have small chance of becoming in any true sense national. We must wait, no doubt, for the day of larger things, for the larger literature. Federation may bring us it, with all the other promised good; time assuredly will, for we are of the best literary lineage the world knows, or ever knew, and "blood will tell." With time, too, the local literary field must inevitably widen, and it is not to be supposed that our magnificent educational institutions, our University with its large staff of learned professors (less often heard of now in this connection than when their numbers were far fewer), our crowded and ever-crowding

colleges and high schools, will forever remain afflicted with the curse of literary sterility. Meanwhile it is something to have to say, as it fairly may be said, of the Mother of the Australias, that in the day of small things, in every department of literature, she not only well holds her own with the other colonies, but in the highest branches of all—in history, poetry, fiction—like her own mother country, "in arms, in arts, in song," stands easily first and alone.

Art.

If the pursuit of literature in a young country is attended with many disadvantages, much more so, it might be thought, must be that of art. Yet of the twin sisters in a strange land it can hardly be said that here art has fared the worse. Rather, very much the better, one might be inclined to say, since she has at least a local habitation and a name, to say nothing of other patronage, afforded her by the State, and moreover—including here music and the drama—may appeal more directly to the sympathies of the public. And very well upon the whole, even taking the word "art" in its strictest sense, has that appeal been responded to. If this paper were a history of, or an essay upon, art, much might be said of its first faint beginnings in this (then) "country of rude dwellers;" of here and there some solitary artist struggling vainly for existence, or preaching vainly his gospel of art in the midst of an unbelieving generation; of here and there some cultured connoisseur, or (more probably) collector of pictures for pride or profit's sake, throwing open his private gallery to the public, and consciously or unconsciously helping to cultivate in the community something of an art spirit. But it is not; its more modest purpose is simply to state briefly the position of art amongst us to-day, and what appear to be its prospects or its possibilities.

First, then, art has provided for her in Sydney a very convenient temple of her own, in the National Art Gallery in the Domain. If not outwardly a very magnificent shrine,—perhaps in this connection "mean" would be the better word—it holds richest treasures, and the worshippers are always many. By common consent it is the best of all Australian art galleries, reflecting the utmost credit on the management, especially the late director, the late Mr. E. M. Montefiore, and the present one, Mr. Du Faur, who have been the most capable and indefatigable workers in its interests from the first. Here are to be found many admirable specimens of the several British and Continental schools of painting, with some fine statuary and other works of art, while a special court is set apart for pictures by Australian artists. These last are selected by the Trustees at the annual exhibitions of the societies, of which, at present, there are two—the Art Society and the Society of Artists—and it may be that in days to come this division of the National Art Gallery will form its most valuable or interesting feature, as showing the various stages in the art-growth of what, it is hoped, may yet be known to fame as the Australian school.

These field-days or weeks of the societies are, of course, the great art events of the year, and we wish we could say always redounded as much to the profit as they generally do to the credit of the artists. But while the patronage of the State is strictly limited (the Trustees cannot exceed

a certain sum), the patronage of the public to any appreciable extent has not yet come. In any case, especially in these depressed times, art patrons are few, and when found there is still sometimes the prejudice which, irrespective of merit, prefers the foreign article to the local, or perhaps refuses the latter at any price.

But that this prejudice is passing every succeeding art exhibition seems to tell. There can be no question of the increasing public interest in these shows, and doubtless with the coming of better times a better day will dawn also for the artist. One thing may certainly be said—that if he has need, as he assuredly has, for much genuine enthusiasm for his art, there is ample proof that he has it and to spare. Nothing less could have enabled our artists, during the last few years, to accomplish so much excellent work under such unfavourable conditions. And the conscientiousness of their work is equal to their own courage. It would be easy to give the names of individual local artists who, in their respective lines, have little to fear from comparison with the best of their old-world compeers, as well as of some who, greatly daring, have challenged and won recognition at high art's very head-quarters. But we prefer to treat them here as a whole, and say simply that no body of harder or honester workers than the artists of New South Wales, reaping less adequate pecuniary return, probably exists anywhere. True, the "potboiler" is not altogether unknown to them, any more than to their literary brethren. But man cannot live by enthusiasm alone, any more than he can by bread, yet some modicum of the latter at least he must have, if only to help him to keep up the other. A visit, however, to the Australian Court, or to any of the exhibitions, furnishes abundant evidence at once of the enthusiasm and conscientiousness of our artists, and of their capacity to catch and transfer to canvas much of the true spirit of a nature as new almost to art as, till but the other day, so to say, art was to her. Here, too, may be seen, faithfully depicted, types of the life and character of a time passed, or fast passing, away, which, if not of any particular loveliness in themselves, have yet their historic or other interest, and here, too, the counterfeit presentments of some of this young nation's leaders, the great men who, according to their own account, made or saved the country, as to some of whom at least it may be an interesting question with Art Gallery visitors of the future, whether they were not as much counterfeit as their presentments.

State aid to art, however, is not limited here to the National Art Gallery or the periodical purchase of a few pictures. There is also a subsidy of £500 a year to the Art Society for the conduct of instruction classes, with which, by the way, another state institution, the Technical College, in its art classes is more than suspected of competing. It is objected in the one case by the students, that the instruction given is not commensurate with the cost, and in both, perhaps, not altogether unfairly, by the taxpayer, that high art education is not the proper business of the State. One is reminded here of the Irishman's famous definition of the fine arts—"Music, paintin', and the ladies"—and substituting here for the "ladies" the poets, it is asked why the poet and the musician, who, like the painter and the sculptor, must be made as well as born, and are certainly not less necessary, should not have equal advantages. Moreover, there is the general objection

that those advantages, though paid for by the many, are enjoyed mainly by the few, and they for the most part people well able to afford them. But without going into that vexed question, it is clear that the present system of divided control of art education is very defective, and far from giving the best results either to the pupils or the public. They manage this matter much better in Victoria, where the control is entirely in the hands of the Government, and the classes are conducted in direct connection with the National Art Gallery. There is also the excellent institution of travelling art scholarships, whereby the exceptional talent of the country is enabled to complete its education in the great art centres of the old world. True, the genius thus assisted to wing its flight to fairer fields of art may seldom return; but even so, that is not altogether a dead loss, since one of the conditions of the assistance is the supply to the Colony of a picture or statue, original and copied, while there must always be the satisfaction of having served the cause of art. It will not be the least of this country's many obligations to the present Government should it carry out its declared intention of shortly introducing a similar system here.

As to the possibilities of art in this country, they are, of course, from the purely artistic point of view, simply limitless. As we said, nature is new in this young land, and must have a thousand yet undiscovered charms and mysteries for the discerning eyes which lovingly study her. Why, we know a mountain in this country, Mount Imlay, the mere study of whose fleeting frowns and smiles, lights and shadows, might last an artist a lifetime. There are atmospheric effects to be caught here that no Turner ever dared, or that only the poet who sang of "the light that never was on sea or land," ever dreamt of. Then there are the infinite diversities of country and climate, consequently of scenery and surroundings, life and occupation, therefore of character, of which the pages of this book so fully tell—all or most of them new to art, fresh as from a creator to the artist's hand. But in truth the possibilities of art in this country, as in any, are only to be limited by the capabilities of the artists, and in the present case, even if we had the capacity, which we certainly have not, that is far too delicate a question to be gone into here. It can only be hoped that, if destined never to be more nearly matched than they appear to be at present, at any rate they may never be less. There can be no reason to suppose, however, that in the general march of the Australias to nationhood Art here will not share, albeit she may keep somewhat in the rear. With her, as with the minstrel of old, the way may be long and the wind may be cold, but she has at least within her the spirit of youth and daring, and ever ahead, beckoning her onward,

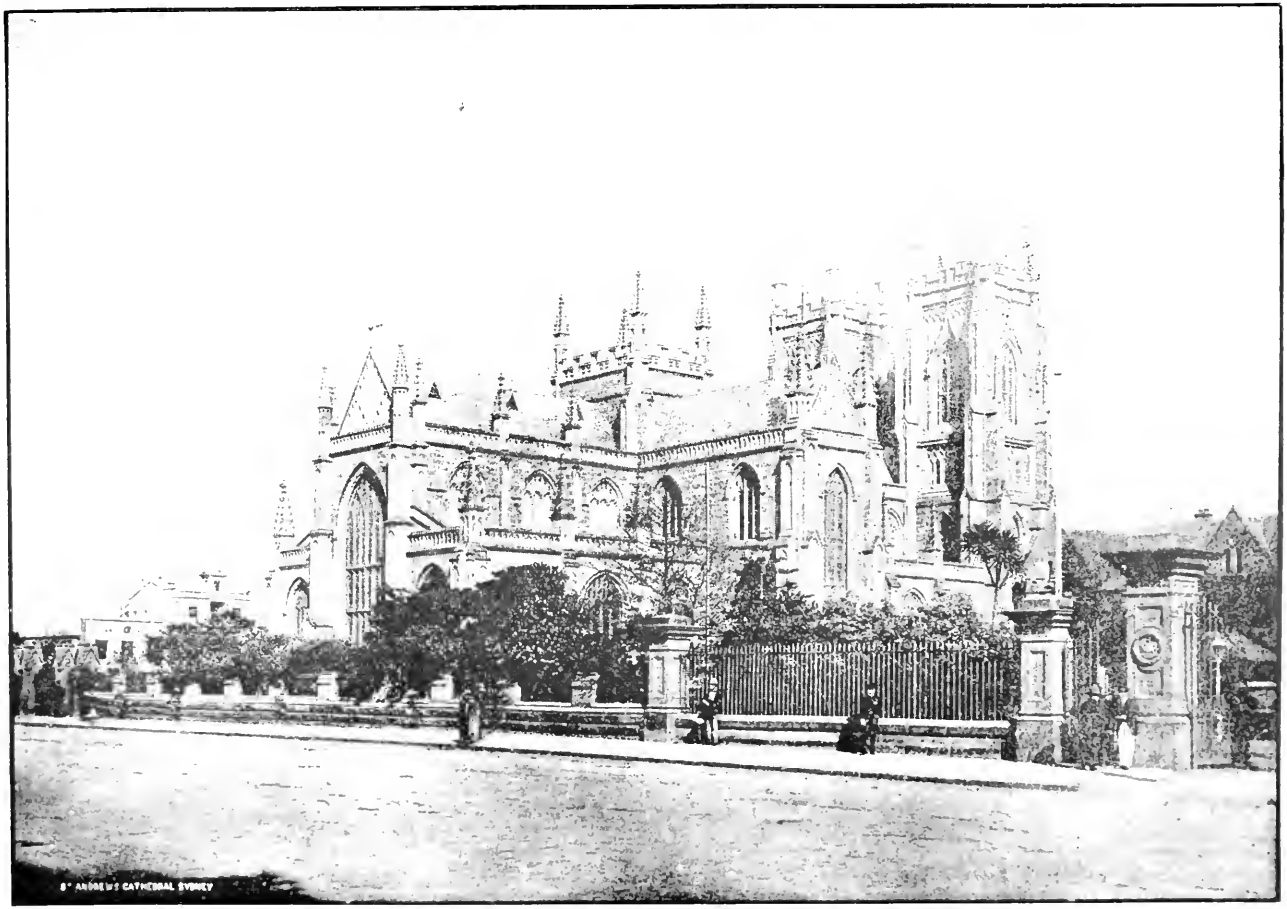
> Hope on the mountains,
> Beautiful as morn.

Religious Institutions.

By Frank J. Donohue.

Owing to the series of peculiar circumstances influencing and forming social conditions in the colonies, there is perhaps no country in the world, not even excepting the United States, where a wider popular sentiment of religious freedom exists with an equal absence of inherited prejudice. Every church and creed is at liberty to pursue its work with an utter absence of restriction, and at the same time without any unduly favourable countenance or assistance on the part of the State. Such a thing as a State church is unknown, and with the exception of a small grant to a few ministers under certain special circumstances, to be noted in their place, each denomination is entirely self-supporting and dependent on the voluntary contributions of its members. The consequence of this is that the activity, the enterprise, the successes and failures of each body, are its own ; and to this cause perhaps, more than any other, is attributable the healthy and self-reliant spirit which characterises church energy for the most part in all the colonies. In a community which has grown up like ours, it is not to be expected that the same conditions would exist as may be found in an English cathedral town or a flourishing Nonconformist centre. With us it is no uncommon sight in a small town to find half-a-dozen churches of different denominations within almost a stone's throw of each other, the members of which are in hourly contact during the week as they go about their respective businesses, and unconsciously learning from each other the lesson that good citizenship and personal character are independent of creed. We have already seen how the gold-fields and other attractions of the colonies drew immigrants by thousands from all classes and from all parts. Naturally, they brought their prejudices with them, and it would not be quite correct to say that these died out all at once. But the process of elimination went surely on, and as the younger generations grew up together prejudice became weaker, so that by this time any attempt to excite ill-feeling on that ground would be more likely to provoke amusement than resentment. The way had been gradually prepared for this state of things, as a rapid retrospect of the development of our religious institutions will show.

Although there is no State church in New South Wales, the Church of England takes a leading place both by numbers and influence. For a time in the early days it was really the State Church, and the circumstance has not been without its later advantages. But of course the very earliest beginnings were in keeping with the surrounding modest circumstances of the settlement. The first ships brought out with them a chaplain in the person of Richard Johnson, a Cambridge



ST. ANDREW'S CATHEDRAL, SYDNEY.

graduate. For a while he pursued his duties as best he might, the first church-building we hear about being set up by him in 1793. Service was first performed in that wattle-and-plaster structure on August 25th in that year, but Mr. Johnson subsequently became a Moravian Methodist, and left the colony after about fourteen years' stay. Next came a man whose name is even better known—Samuel Marsden, son of a Yorkshire blacksmith, and for many years subsequently a magistrate and senior chaplain of the colony. He arrived in 1794, and lived long enough to see Responsible Government established in the country which he had known in such an humble stage. The father of the present Dean Cowper came out under his auspices in 1809. Fifteen years later Mr. Thomas Hobbes Scott, who had been secretary to Mr. Bigge's Commission, was appointed archdeacon of the colony at a salary of £2,000 per annum, and at the same time the Church and Schools Corporation was instituted by letters patent. This instrument practically constituted the Church of England the State Church, with rich endowments. One-seventh of the lands of the whole continent, following the Canadian precedent, was set aside for its maintenance, and until this great asset became of value the denomination was allowed to draw upon the Government funds by way of advance. The privilege appears to have been freely used. The amount spent on Church of England expenses in 1828, for instance, when the population was less than 37,000 and the adherents of the Church about half that number, is set down at £22,000. When Sir Richard Bourke arrived the objections to this outlay were brought under his notice, and in 1833 that Governor in a despatch to Lord Stanley laid down certain lines of administration, in the spirit if not in the exact letter of which the question has been viewed ever since. He dwelt on the duty of the State to encourage religion in the interests of public order, and urged that the Churches should be assisted from State funds in proportion to the numbers of their adherents. He, therefore, recommended that instead of confining the payments to the Church of England arrangements of a similar character should be made with the Roman Catholic Church and Presbyterian bodies, as the next in numbers, and provision left to meet the case of any other denominations afterwards making a claim. The suggestion was adopted and continued in force until State aid was abolished altogether—about a generation later. Meanwhile, the affairs of the leading denomination continued to flourish. The Governor laid the foundation stone of St. Andrew's Cathedral in 1837. The first Australian bishop (Dr. Broughton) was consecrated in 1834, and Dr. Perry and Dr. Tyrrell took the episcopal charge of Melbourne and Newcastle respectively in 1847. Bishop Selwyn of Auckland and Bishop Short of Adelaide belong to the same year, while Dr. Nixon of Tasmania dates back to 1842. Perth and Lyttleton were constituted diocese in 1850, Brisbane in 1859, and since that year the record of modern growth has been a full one.

The Roman Catholic record begins with the chaplain of the French expedition under La Pérouse, who was buried at Botany Bay while the First Fleet lay at anchor in Port Jackson. But the first clergymen of that denomination who actually followed the duties of their calling were the Reverends Harold, O'Neil, and Dixon, transported for complicity in

the Irish political troubles of 1798. The first public service was held by permission of the Governor in 1803, and the first ecclesiastically-authorised clergyman, Archpriest O'Flynn, arrived in 1817, was sent back as having no official authorisation; but two accredited and salaried chaplains were then sent to take his place. Such men as Therry, Conolly, Ullathorne (late Bishop of Birmingham, who recently wrote an interesting book of early Australian reminiscences), and McEncroe followed, and in 1835 Dr. Polding arrived as Vicar-Apostolic. Seven years later he was appointed Archbishop of Sydney, and his assumption of the title called forth from Dr. Broughton a public protest on behalf of himself and his successors and of the Archbishop of Canterbury, in which any act of episcopal authority on the part of any one claiming to derive a right from the Bishop of Rome was formally dissented from. St. Mary's Cathedral was consecrated in 1836, eight years later the see of Adelaide was constituted, Hobart in 1842, Perth in 1845, Melbourne in 1848, Brisbane in 1859, and Dunedin in 1869. The changes made in the administration of church funds in 1835 largely assisted the work and expansion of this denomination. Churches and schools were built as opportunity offered, and the work of the organisation was carried out with energy. The insignificant beginnings were lost sight of as time went on, and when the stream of immigration began to set in this and other bodies began to augment in numbers in such a way as to bring them more nearly in line with the leading denomination.

The Presbyterian Church was the most active of these. It owes to the zealous advocacy of Dr. Lang, whose services in the cause of religious freedom and equality benefited all the denominations, most of its early success and organisation. The first Presbyterian church building erected in the colony was opened by James Mein, at Portland Head, Hawkesbury, in 1809. Twelve immigrant Scotch families, who had brought their affection for the kirk with them, subscribed the necessary funds independently of State aid. John Dunmore Lang did not arrive until 1823, and at that time most of the work of organisation yet remained to be done. But by the following year he had made such an impression that Governor Brisbane was called on to lay the foundation stone of the first Scots' Church in Sydney, which still stands on Church Hill as an interesting memorial of its first minister and of the early days of the city. For many years the record of Dr. Lang's career was the history of his denomination. He was largely instrumental in bringing about the state of public feeling which led to Bourke's despatch. In every part of the settled districts he made his presence familiar and his energetic influence felt, from Hobart Town, in Tasmania, to the little community at Moreton Bay that pioneered the present capital of Queensland. He made several voyages to Scotland at a time when an expedition of that kind was by no means the pleasure excursion it now is, bringing out with him immigrants and clergymen of his own faith. Among the former were the sixty colonists known as the "Scotch mechanics," whose labours left their traces for long afterwards on the growing city. He founded the Scots' College and schools for primary teaching, always looking into the future and preparing for the developments which his acute intelligence foresaw were to come. Between 1847 and 1849 six of his ships brought out thousands of his countrymen, whom he

settled at Port Phillip and Moreton Bay. In the books which he wrote, historical and otherwise, he has left us graphic accounts of the progress of his own denomination, its local divisions in 1842, and the General Union which brought it together again in 1865. An active colleague of his early days was the Rev. J. McGarvie, who arrived in 1826, while the first Victorian minister, the Rev. J. Forbes, went to Port Phillip in 1838. From Sydney as a centre the evangelising operations of the body went on actively in the New Hebrides, where the names of Paton and Steel made themselves in a sense household words.

The Wesleyan Church dates from 1812, when there is a record of the first class-meeting. The first minister was the Rev. Samuel Leigh, who arrived three years later, and the first chapel was opened at Parramatta, in Macquarie-street, in 1821. Among other well-known names were those of John Williams, who is recorded as having preached an anniversary sermon in 1822; Ralph Mansfield, who went to Hobart Town in 1823; Schofield, who came to Sydney in 1835; and J. B. Waterhouse, who came as General Superintendent of Wesleyan Missions in the South Seas in 1838. The Centenary Chapel in York-street, the local centre of the denomination, dates from 1840, and the Rev. W. B. Boyce—another honored name in the annals of the denomination—arrived in 1846. These facts and dates may be looked upon as indicating the historical outlines of Wesleyan progress.

The story of Congregationalism begins with the pastorate of Mr. Cover in 1798, though the first settled pastor, the Rev. Mr. Jarrett, did not arrive until 1834. The first chapel in Pitt-street, then and since the centre of the denominational life and organisation, had been opened in the previous year. The year 1839 saw the arrival in Tasmania of one who became later on a well-known figure in this colony and a forcible writer on public questions, in the person of the Rev. John West. The present Pitt-street Congregational Church was built as it now stands in 1846. The first Baptist Chapel in Sydney was opened in 1835 by the Rev. Wm. Saunders, who arrived the year before. The Jewish Synagogue was first built in York-street, in 1844, the Rev. M. Rintel being rabbi, and the present handsome edifice in Elizabeth-street was opened by the Rev. A. B. Davis in 1878. Besides the denominations given, other bodies held services from the earliest days, but without any elaborate attempt at organisation on the larger scale.

Turning now to the present position and evidences of denominational activity in New South Wales, we find both attested by the signs of progress and vitality that on all sides meet the eye. It has been said that the Australian temperament is not on the whole remarkable for susceptibility to religious influences, but like most other generalisations the statement is a little vague. If it means that the growing generations do not exhibit much inclination to take up the work of the ministry in the different Churches, the statement has probably more than a grain of truth in it. The fact is that the work of the Churches does not offer many inducements to Young Australia. It supposes, to begin with, a certain amount of training,—more now, it should be said, and as the years go on, than in the past. The same

amount of study and preparation would fit young men for professional or commercial life, where the emoluments are so much greater and the prospect of comfortable domestic life is more assured. The average stipends of clergymen hardly guarantee this, and since the payment is contingent on public interest or good will, or the personal popularity of the minister, the element of uncertainty and dependence about it is not alluring to the self-helpful young Australian. And then, if the critic finds the general temperament lacking in religious enthusiasm, a question is invited as to how far that enthusiasm finds itself encouraged. Have the Churches since they were thrown on their own resources by the withdrawal of State aid developed sufficient attractive power of their own to make their influence personally felt? It has been said that the education of the average Australian clergyman as compared with his fellows in other places left something to be desired, that services lack attractiveness, and that church organisation is wanting in that element of effectiveness which is necessary to make it part of the life of the people. How far their assertions are true may be judged to some extent by the progress and present position of the various denominations. Certainly, the colonies labour under the disadvantage of being comparatively new. Bourget, in remarking upon this subject in the United States, has something to say about the modernness of it all,—its buildings, its traditions, its methods, and its associations. His remarks apply to us. We have no venerable buildings, no church life of centuries to look back upon, no associations with an historic or personal past to kindle an interest and a sentiment. Religion in the colonies, like the institutions and the towns and cities themselves, is new and modern. It has its history and its traditions still to make. These pioneer conditions which made the colony what it is are productive of a material and practical spirit, and it would hardly consort with the fitness of things to expect that the personal effort and public activity which have had so much to do to make the country fit to live in, would have left much time for the cultivation of a temperament over-favourable to the encouragement of the religious or literary or artistic mood. This consideration must be borne in mind in connection with our present subject; and yet, after making every allowance, it is by no means certain that the Colony of New South Wales has been behindhand in the development of religious institutions.

The detailed figures of this subject are best shown in the census returns of 1891, though later figures are of course available. From that source we learn that for the year named, while the total population of the Colony was returned at 1,123,954, the number of persons not specifically included in one or other of the religious bodies was made up from returns under various headings as about 30,000, while about 14,000 others either objected to state their religious belief or failed to define it. Putting the whole at under 50,000, it will be seen that the return does not show such a mixed condition of things as would be reasonably probable, considering the various and widespread sources of population, and the necessary difference between religious organisations in Australian communities and elsewhere. Twenty years ago or more Mr. Anthony Trollope, in the book he wrote about the Colonies, had a sentence to the effect that he felt bound to record his opinion that

religious teaching and the exercise of religious worship were held as essential to civilisation and general well-being by the people of Australia. That writer was hardly the best authority on Australian matters in a general way; but the figures given may be taken as bearing out his opinions in this instance. "The people," he further said, "are fond of building churches, and of having them in their villages," and here he was again accurate in his observation. The question of church attendance, of course, is another question. The mere filling up an entry in a census form may show the nominal position of the Churches; but it does not throw any definite light on the estimation in which religion is practically held. In 1892 we find that 357,781 persons were returned as attending the services of their respective denominations, being in the proportion of 30·3 per cent. of those returned as nominal church adherents in the previous year's census. Twenty-four years ago, with a population of 502,861, the church attendance was 172,320, or about 34 per cent. With a little more than twice the population, therefore, the falling off has been something like 4 per cent.; which means that, proportionately speaking, about 14,000 persons less than in 1871 are in the habit of attending the church services of their respective denominations. It is noteworthy that the only body in which the attendance is up to 100 per cent. of nominal membership is the Salvation Army. The Wesleyan Methodists come next in proportion with 57 per cent.; then come the Congregational body with 48, the Baptists and "other Wesleyans" with 43 each, the Roman Catholic with 38, the Presbyterian with 28, and the Church of England with 16, all in round figures. This way of looking at the subject may serve to indicate the respective influence of each denomination on its own adherents; but it is not absolutely conclusive in itself until the actual numbers of each denomination are given. These show a church attendance of members of the Roman Catholic Church of 112,474; Church of England, 83,639; Wesleyan Methodist, 51,415; Salvation Army, 45,765, the number of enrolled members being 10,312; Presbyterian, 32,215; Congregationalist, 12,025; other Methodists, 10,020; Baptist, 5,903; and other denominations, 4,325. It should be mentioned that these figures, however, only relate to adult attendances, and the returns from Sunday schools show that the total figures for church attendance would reach 476,000 if these were included. There are some other considerations to be reckoned with before arriving at final conclusions on these figures. One is that the population in many districts of the Colony is so scattered that attendance at church services is in some cases extremely difficult, and in others impossible. Another point is that the average in New South Wales is much higher than in England, where these adverse conditions do not exist. The supply of clergymen and the number of church buildings must also be included in the calculation. The former shows a general average of 1,031 persons to each clergyman, and the latter something like 4,885 churches, or school buildings so used, for the whole denominational population, providing seating accommodation for 448,492 persons.

The figures of the different denominations have fluctuated with the growth of population as time went on. By the census returns it would appear that about fourteen persons in every twenty belong to one or other of the Protestant bodies (about ten in twenty being of the

Church of England), while five in twenty are of the Roman Catholic faith, and 302 persons were classified as unsectarian Christians. But these proportions have not always ruled. The Roman Catholic returns show a falling-off in proportion to the growing population of 2·74 per cent. Without quoting the actual figures of the returns too closely it may be said that during the thirty years before the census the Church of England increased with the population during the second decade and decreased during the third; the Roman Catholic Church fell away during both periods; the Presbyterians increased in both; the Methodist bodies increased, as also did the Congregationalists and Hebrews. At the same time, of course, the figures of each have been steadily going up with the population. Since 1861 the Protestant bodies have been augmented by 557,740, the Roman Catholic numbers by 187,971, the Hebrew by 3,725, and 11,589 for other persuasions. Taking the whole population figures of the colony it is calculated that 44·75 per cent are members of the Church of England or other Protestant Episcopalian Churches, 25·53 are Roman Catholics, 9·73 are Presbyterians, 7·79 are Wesleyan Methodists, 8·14 belong to other Protestant bodies; 0·97 being Buddhists, Confucians, or Mahommedans, mainly of the Chinese or Hindoo races, 0·49 being Jews, the remnant being indefinitely specified. The proportion of the sexes shows a marked preponderance of males over females under the heading of each denomination, amounting in the cases of the two largest denominations to about 36,000 and 12,000 respectively. The relative positions of the different denominations to-day can be best seen by a glance at the comparative facts and figures.

The Church of England in New South Wales consists of a Bishop Metropolitan, the five Bishops of Bathurst, Goulburn, Newcastle, Grafton and Armidale, and Riverina, with 327 regularly ordained clergymen registered for the celebration of marriages, 159 laymen licensed to conduct services, and a total number of nominal adherents amounting to 502,980. The Church of England is still the largest and wealthiest of the denominations, possessing 625 churches and holding service besides in 832 school buildings and private dwellings. The number of clergymen is smaller in proportion to the adherents than in any other large denomination, the proportion being a minister for every 1,510, but if the proportion to church attendance is taken it stands at a clergyman for every 256 adherents. The church-holding capacity of the denomination is 126,830, and the adult attendance is one-third less. The head of the denomination is the Metropolitan, the Right Rev. Dr. Saumarez Smith, whose position carries with it the Primacy of Australia and Tasmania. Five of the principal towns of the colony are also the sees of bishops, who have their cathedrals at the towns from which the dioceses are named in four instances and at Wilcannia for the diocese of Riverina.

The Roman Catholic Church has 444 churches and 718 school or other buildings used for Divine Service. There are 313 fully ordained clergymen and about 1,600 members of religious orders engaged in teaching or works of charity. The proportion of adherents in the returns to clergymen stands at 973, and the total stands at 286,895. The church accommodation provides 76,663 sittings, and standing room for 114,008 persons besides. At the head of the denomination

is his Eminence Cardinal Moran, who is also Apostolic Delegate for Australia. He is assisted by a coadjutor bishop, and six suffragans have cathedrals at Goulburn, Bathurst, Maitland, Grafton, Armidale, and Wilcannia.

The Presbyterian Church is divided into three main sections, the Presbyterian Church of New South Wales, the Presbyterian Church of Eastern Australia, and the Free Presbyterian Church. There are also the Church of Scotland and the United Presbyterian Church. Altogether the denomination has 250 churches, and there are 185 public buildings used occasionally for worship. The total number of ministers is 166, of whom 154 belong to the first-named branch, nine to the second, and one to the third, while two others are unattached. The church buildings accommodate 61,305 sittings, and the adult attendance is about half. The Moderator is elected yearly.

The various branches of the Methodist body include the Wesleyan Methodists and Primitive Methodists as its main bodies, but there are other smaller divisions. In 1895 a movement for amalgamation made considerable headway, the Lieutenant-Governor of South Australia visiting Sydney to advocate the union. Altogether, the denomination numbers 110,112 members, of whom 87,516 belong to the first-named division, which has 133 ministers, or one to 658 adherents. It has eight districts, with 401 churches and 518 other preaching stations. There are 490 local preachers, the church membership is about 9,631, and the attendance of adults at Divine Service is over 50,000. The Primitive, United, and other Methodist bodies, including the New Connection, number about 22,500 adherents, with 37 ministers and 91 churches, with 21 other buildings offering seating accommodation for 16,718. The attendance stands at over 10,000, and the President of Conference is elected yearly.

The Congregational Church has 24,089 adherents, and 65 ministers, with an average of 371 adherents to each. There are 64 churches and 56 other buildings used for worship, with sittings for 20,390 persons, with an average adult attendance of about half.

The Baptist Church includes the Baptist Union, numbering 12,314 adherents and 27 pastors, or one to 257, and other subdivisions, which include the Particular and Adventist Baptists. Altogether there are 32 pastors, 41 churches, and 61 other buildings, with sitting accommodation for 10,875, and a regular adult attendance of about half.

The Salvation Army has 11 officers licensed to celebrate marriages, and 208 buildings are used for service, with a Sunday attendance computed at 45,765.

The Lutherans number 7,950, with five ministers; the Bible Christians 2,336, with nine ministers, and the Church of Christ enrols 2,042 members, with five ministers. The Unitarian body has one minister, and 1,329 adherents. There are eight other ministers of Christian sects, with 2,773 adherents, and 5,184 Hebrews, with three rabbis. The Buddhists, chiefly Chinese or Hindoos, number 10,110, while about 6,000 are agnostics or free-thinkers, about 3,000 profess to have no religion, about 5,000 claim to belong to no denomination, and about 11,000 refused to give any information on the subject at the last census. Denominations numbering under 500 adherents

include Christian Israelites, Moravians, New Church, Catholic Apostolic Church, Calvinists, Quakers, Christadelphians, and Latter-day Saints.

The only form in which State aid to religion can be said to exist is in the shape of pensions in lieu of salary to clergymen in receipt of State aid before the passing of its abolition act in 1862. In 1863 the amount so paid was £32,372; in 1892 it was £8,043. Of this, the Church of England received £4,529; the Roman Catholic Church, £2,121; the Presbyterian Church, £643; and the Wesleyan Methodist Church, £750.

THE UNIVERSITY, SYDNEY.

Education.

By R. N. Morris, LL.D., Department of Public Instruction.

One of the dangers which beset young communities is that of pursuing the path of material progress to the neglect of the cultivation of those intellectual and moral qualities which, after all, must be regarded as forming the foundation of social safety and national greatness. Everything in a new country makes demand on physical energy; the very exigencies of existence imperatively require that men shall work with their hands to win subsistence from the soil. The disastrous results of inattention to physical wants are immediate and fatal, and so cannot be postponed; whereas the evil consequences of failure to supply mental needs are not so clearly seen, neither are they so soon or so keenly felt. Almost necessarily, therefore, everything that concerns the immaterial man has to await a more convenient season. But too often that which was at first necessity afterwards becomes habit. The flush of material success and the inflow of wealth, with its seduction to wish for more, is liable to make the pursuit of riches the main object in the life, not only of the individual, but also of the nation. Moreover, the country having managed to get along without intellectual culture, such culture comes to be looked upon as not being indispensable, and so is neglected; and, when a large majority of any community becomes imbued, even though unconsciously, with this sentiment, public opinion lends its support to the idea; and, in such circumstances, society is unconscious of its own deficiencies.

The colonies of Australia, though not wholly escaping the usual consequences incident to the early stages of national life in a new country, were, however, never liable to the full measure of their force, inasmuch as the first colonists included a certain number of men of scholarship, culture, and refinement, who brought with them the traditions of British civilisation, and who felt, on behalf of their children, the need of educational advantages. This feeling from time to time received fresh impulse as new arrivals came to these shores from the old home across the sea.

During the first thirty years of the existence of this Colony education was left entirely in the hands of private individuals, the Government taking no part whatever in the matter.

The first State recognition of the necessity for general education took the form of a subsidy to the various religious bodies, in proportion to the amounts raised by them for educational purposes. The money was given to assist in maintaining schools which were wholly under ecclesiastical control. When this system was begun is not certain, but the probable date is about 1820. It may be said generally that the state of education from 1820 to 1848 was anything but satisfactory.

In 1831 Sir Richard Bourke drew the attention of the Legislative Council to the importance of providing more ample and efficient means

for the education of the youth of the Colony. From year to year, though with little immediate effect, he continued to press the matter on the notice of the Council, and in 1836 he recommended the introduction of the Irish National system, founded a few years before by Lord Stanley. Bourke's successor, Sir George Gipps, followed the same line of policy as his predecessor, but without avail. In 1843 Dr. Lang made a fruitless attempt to introduce a comprehensive system. In the following year Robert Lowe succeeded in obtaining the appointment of a Select Committee to inquire and report. As a result of the work of this committee Mr. Robinson moved that the Irish National system should be adopted. After various amendments and much discussion, in which Mr. Cowper, Mr. Windeyer, Mr. Lowe, and Mr. Wentworth figured prominently, it was decided to introduce the Irish system, but still to recognise and assist Denominational Schools. It was not, however, till 1848, four years later, that anything practical was done, when on the 4th of January the first National Board was appointed consisting of Mr. J. H. Plunkett, Mr. W. Macleay, and Dr. Nicholson. At the same time Messrs. Riddell, G. Allen, Callaghan, and T. Barker were appointed a Board "for the temporal regulation and inspection of Denominational Schools."

This system, while it proved to be a great advance on the previous method, or, rather, lack of method, nevertheless on the score of expense, and by reason of its divided jurisdiction, was not so complete a success as its promoters could have wished; so, after many attempts, at length in 1866 an Act was passed by Mr. (now Sir H.) Parkes, which abolished the two old Boards, and provided for the formation of a new body, to be called the Council of Education, which should disburse all funds paid by the State for educational purposes, and should have the power to make regulations having the force of law unless disallowed by a resolution of both Houses of Parliament. By this Act the Council was authorised to grant aid to such Denominational Schools as met certain conditions, and were willing to submit to inspection by the Council's officers, and follow the course of secular instruction laid down by the Act and regulations. The scheme was, however, so devised as to give a preference to Public Schools as compared with those of a sectarian character.

Any ordinary reader must be struck with surprise at the great delay which occurred before any thoroughly efficient system was adopted; but the truth is, that the reform of our educational system was really a prolonged struggle, a large section of the community clinging pertinaciously to the idea that all schools should be ecclesiastically controlled.

The Council of Education did excellent work during the fourteen years of its existence, and laid the country under great obligations; but there was a conviction gaining strength among thoughtful citizens that as the State had by manhood suffrage handed over complete political control to the great body of the people, for her own safety she must see to it that all should be fitted to give an intelligent vote; and that to save constituencies from mere schemers, charlatans, visionaries, and demagogues, she must place within the reach of all voters that which would, as far as possible, enable them to read and think for themselves. So, in 1880, further legislation, again under the direction of Sir H. Parkes, was effected, which abolished the Council, with-

drew all aid from Denominational Schools, greatly reduced the fees payable by pupils, made education compulsory, and created a Government Department charged with the duty of carrying out the provisions of the Public Instruction Act.

Up to the year 1880 the teachers were paid partly by fixed salary and partly by the fees of the pupils, the fee payable being one shilling a week per child, with a stated reduction where more than one child attended from the same family; people who wanted a school had to furnish some portion of the cost of erecting a building, and, in the case of Denominational Schools, the whole cost. Under the present Act buildings are put up and kept in repair entirely by the expenditure of public money; the teacher is paid wholly by the Department, and the fees, now reduced to threepence a week, are paid into the consolidated revenue. All children between the ages of 6 and 14 must attend at least seventy days in each half year, unless they are otherwise receiving instruction, live more than 2 miles from the nearest school, are prevented by some cause which the Minister deems sufficient, or hold a certificate stating that they are educated up to a fixed standard. The instruction is secular, but this is defined so as to include lessons on moral subjects and the bare facts of Scripture history, the text-books being the Scripture lessons of the Irish National Board, Old and New Testament, Numbers I and II.

Classification of Primary Schools.

Public Schools are divided into ten classes, according to the attendance. The

First	comprises all schools whose quarterly average does not fall below				600
Second	,,	,,	,,	,,	400
Third	,,	,,	,,	,,	300
Fourth	,,	,,	,,	,,	200
Fifth	,,	,,	,,	,,	100
Sixth	,,	,,	,,	,,	50
Seventh	,,	,,	,,	,,	40
Eighth	,,	,,	,,	,,	30
Ninth	,,	,,	,,	,,	20

Any Public School which fails to maintain an average of 20 is reduced to the rank of tenth class.

In localities where the average will probably not reach 20, schools are established called Provisional. In these, if the average is 18, the school ranks as first-class Provisional; if between 18 and 15 as second-class, if between 15 and 12 as third-class. Any of these Provisional Schools may be declared Public Schools if the average for a quarter rises to 20 or more.

Still smaller groups of children are provided for by Half-time Schools, and House-to-house teachers. It must be difficult, as will readily be seen, for any children to escape being enclosed in an educational drag net so comprehensive as that just described.

Public Schools of the first, second, or third class are divided into three departments: one for boys, presided over by the head master, who is aided by a staff of assistants and pupil teachers; one for girls, with a head mistress and staff; one for infants, with an infant mistress and staff. A fourth-class school has two departments, one for boys and girls and one for infants. In the case of schools divided into departments, the head master has a general supervision, but does

not interfere with the internal management of the girls' or infants' department, the mistress being held responsible for the organisation, discipline, and instruction in her own department.

Fifth and sixth-class schools are taught by a head teacher and staff. All schools below sixth are managed by one teacher.

Superior Public Schools.

The Minister may declare any Public School a Superior Public School if the inspector certifies that there are not fewer than twenty pupils therein who have been educated up to the standard of a fourth class, which has completed its fourth quarter of enrolment. In those schools extra lessons are given in Latin, Euclid, and Algebra to boys, and in French to girls. Originally, pupils in the highest class paid an extra fee of 7s. a month; but in 1884 this was abolished, and all pupils now pay the usual fee of threepence a week.

Appointment to Schools.

In order to be eligible for the chief positions in schools of the various classes, the teachers must hold the several grades set out in the following table :—

For I Class School	I A
For II ,, ...	I B
For III or IV Class School	II A
For V or VI ,, ,, ...	II B
For VII ,, ,, ...	III A
For VIII ,, ,, ...	III B
For IX ,, ,, ...	III C

For X or Provisional no classification is necessary.

Classification of Teachers.

From the above table it will be inferred that the rank of teachers is divided into three classes, comprising in all seven grades. All promotions in status from class to class are made as the result of a twofold test, a test as to attainments applied by means of a written examination and a practical test by an inspector, who estimates the candidate's ability to teach, organise, and discipline a school. A certain fixed standard must be reached both in attainments and also in skill before promotion is granted. Promotion from grade to grade may be secured without examination as the result of five years' reports of the inspector, all equal to the standard required for the higher grade. This is called promotion by good service.

Pupil-teachers.

Beneath the rank of teachers comes that of pupil-teachers. They are required to serve at least four years in this position. At the end of each year they have to submit to examination, and, if their attainments and skill warrant it, a step is gained, so that in the fourth year of service, if they have passed all their yearly examinations, they occupy the position of first-class pupil-teachers. More than one failure to pass the same examination renders a pupil-teacher liable to be removed from the Service.

Training Schools.

All first-class pupil-teachers who have passed all their examinations at the first attempt are allowed to compete for scholarships, which

entitle the holders to admission into the Training Schools. Of these there are two, one for females and one for males. There are fifteen full scholarships to each Training School, and the winners of these are trained and supported wholly at the Government expense. In addition, ten half scholarships are awarded, and in the case of these the Department bears half the expense. Others who pass the examination but do gain scholarships may enter the Training Schools at their own expense provided there is room, but they cannot sit for a classification at the end of the course, nor gain any official advantage over those who do not enter the Training School. The period of training is one year, and at the end of that time trainees are examined and classified as third or second class teachers according to the manner in which they acquit themselves. Those first-class pupil-teachers who fail to gain scholarships remain as ex-pupil-teachers, and occupy various subordinate positions until they acquire the requisite skill, knowledge, and length of service to enable them to secure promotion by examination. It may here be remarked that students are encouraged to attend University lectures and to work for a degree wherever such a course is at all practicable. Special facilities for this are given to those students who possess unusual ability and industry.

Instruction and Attainments of Pupil-teachers.

Each pupil-teacher receives instruction for at least one hour on each school day from the head master of the school in which he is engaged. The subjects are:—Reading, writing, arithmetic, grammar, geography, history, drawing, music, school management; and for males, Latin, geometry, and algebra; and for females, French and needlework. Each year they are expected to show an increasing proficiency in these subjects, and also an improvement in practical skill.

Attainments of Teachers.

Candidates for a third-class certificate are examined in reading, writing, arithmetic (including vulgar and decimal fractions, proportion, practice, simple and compound interest), grammar (including the use of words, Saxon and Latin derivation, and composition), geography (European and Australian), history (outlines of English and Australian), school management, drawing (blackboard and freehand), rudiments of vocal music; and for females elementary domestic economy. Candidates for second-class must pass in reading, writing, arithmetic (the full course), mensuration (elementry), art of teaching, grammar, English literature, geography, drawing (model and geometrical), music, history (English and Australian), and (for females) sanitary science. Also in one of the following: I, Latin, II, French; III, euclid (three books with deductions), with algebra (to quadratic equations, including surds); IV, Any two of the following: Experimental physics (Balfour Stewart); chemistry, inorganic (Roscoe); geology (Geikie's Class Book); botany (Oliver's Elementary Lessons); physiology (Huxley's Elementary Lessons). For a first-class certificate candidates must pass a more difficult examination in the subjects enumerated for second class, and among the alternative groups we find trigonometry, Greek, German, and hygiene, introduced. University graduates of not more than five years' standing are exempted from examination in alternative subjects.

Number of Schools.

In 1880, when the present Act came into force, the number of State Schools in existence was 1,265; in 1890 this number had risen to 2,423; and at the end of 1894 the total was 2,503, providing accommodation for 231,370 pupils.

Number of Teachers.

In 1885 there were 3,528 teachers of all ranks, in 1895 it was 4,453.

Number of Pupils.

In 1880 the gross enrolment was 101,534; in 1885 it was 180,929, and in 1894 the total reached 234,392.

Emoluments of Teachers.

Teachers are paid according to the class of the school in which they work; but in order to secure appointment to the various positions they must possess the requisite rank; thus salary depends directly on the average attendance of pupils, but indirectly on the teacher's classification. The pay received by teachers in charge of schools, provided they hold the proper classification, is shown in the following table. In addition to the salary here set down, residences are provided for all teachers who are married. The teacher of a

I	Class	Public	School	receives...	£380	VIII	Class	Public	School	receives... 148
II	,,	,,	,,	...	319	IX	,,	,,	,,	... 125
III	,,	,,	,,	...	239	X	,,	,,	,,	... 103
IV	,,	,,	,,	...	228	I	,,	Provisional	,,	... 91
V	,,	,,	,,	...	217	II	,,	,,	,,	... 80
VI	,,	,,	,,	...	205	III	,,	,,	,,	... 68
VII	,,	,,	,,	...	171					

Mistresses are paid according to the following scale:—

	Girls' Department.	Infants' Department.
In a I Class School	£285 ...	£194
,, II ,, ...	239 ...	182
,, III ,, ...	194 ...	171
,, IV ,, ...	182 ...	160

	Males.	Females.
Pupil Teachers of the I Class receive	£68 ...	£46
,, ,, II ,, ,, ...	57 ...	34
,, ,, III ,, ,, ...	46 ...	29
,, ,, IV ,, ,, ...	40 ...	23

Course of Secular Instruction.

For Infants' Department.

(Course, 2 years).

Reading—To the end of I Reader of Australian Series.
Writing on slates from copies and dictation.
Arithmetic—To multiplication by 7.
Object Lesson on familiar things.
Form—To plane figures.
Colour—To shades and tints.
Singing—Simple melodies by ear.
Scripture narratives and moral lessons.
Drawing—To parallels.
Drill—Elementary.

For Primary, or Boys' or Girls' Department.

First Class.—Course, 1½ year.

Similar to an Infants' Department.

Second Class.—Course, 1 year.

Further advance in subjects of the First Class.

Third Class.—Course, 2 years.

Reading—III and IV Books Australian Series or I. N. B.
Writing—Three hands in books.
Dictation from reading books.
Arithmetic—To simple and compound proportion.
Object Lessons—General things and elementary science.
Music—Part singing and theory to time signatures.
Scripture—Old and New Testament, No. I Irish N. B.
Drawing—Geometrical figures and common objects.
Drill—School and elementary military.
Grammar—To rules of syntax, elementary composition.
Geography—General in outline.
History—General outline of English and Australian.
Needlework—Plain.

Fourth Class.—Course, 1 year.

Increased proficiency in Third Class subjects, with the addition of Euclid, Book I, to Prop. XII, and mensuration of surfaces.

Fifth Class (highest).—Course, 1 year.

Reading, Grammar, Geography, History, Science } As for University Junior Examination.
Arithmetic—Full course.
Geometry—Books I and II, with exercises.
Algebra—Hamblin Smith to C. XIII.
Mensuration—Regular surfaces and solids.
Latin (for boys)—Via Latina, to p. 53.
French (for girls)—Macmillan, I Year.
Cooking (for girls)—Plain.
Music—Major and minor modes, inversion.
Scripture—I. N. B. Old and New Testaments, Nos. I and II.
Needlework (for girls).
Drill—Ordinary (for girls), military (for boys).

The standard for a third class is given somewhat fully, as most country pupils and many town ones go no further than this class. A glance at the table will make it clear that they leave school fairly prepared mentally for such duties as the great majority of men are called upon to perform, and with an excellent foundation for subsequent self-improvement. The standard for a fifth class shows what further equipment is offered to those who are able and willing to remain longer at school.

Inspection.

To see that pupils get the full benefit of the training placed within their reach by the prudence and generosity of the State, an able staff of inspectors is maintained, whose duty it is to visit every school once a year at least, in order to examine the children in all subjects of study, and to furnish a report in detail of the proficiency of the pupils and of everything that concerns the efficient working of the school. It is expected that short visits will be made at other times whenever opportunity is afforded. At the end of the year each inspector supplies to the Minister a general report on the condition of the schools under his supervision, and on the state of education in his district.

Attainments of Pupils.

At the inspector's examination every pupil securing 50 per cent. of full marks in any subject is regarded as having passed. All below 50 per cent. are set down as failures. The following table gives the percentage of pupils examined in all Public Schools who passed, that is, who gained 50 per cent. or more of the maximum number of marks, for the years 1893 and 1894:—

	Per cent., 1893.	Per cent., 1894.
Reading	82	83
Writing	83	83
Dictation	75	77
Arithmetic	72	71
Grammar	72	73
Geography	76	76
History, English	73	70
,, Australian	75	73
Scripture	76	76
Object Lesson	78	78
Drawing	76	76
Music	77	77
French	72	70
Euclid	77	77
Algebra	72	72
Mensuration	63	65
Latin	71	73
Trigonometry	100	82
Needlework	87	88
Drill	78	81
Science	82	80

These columns disclose the remarkable evenness with which the work is done, not only from year to year, but among the various subjects of study.

The efficiency of the education imparted in Public Schools is gauged in another way. From all parts of the Colony pupils go up for the Senior and Junior University examinations. The numbers who have passed these examinations from 1890 to 1894 are: Junior, 1,654; and senior, 36.

Discipline in Public Schools.

A marked feature in Public Schools is the excellence of the discipline. This is the more important, and indeed the more remarkable, inasmuch as a large number of the pupils come from homes where the home training is bad and home authority very weak; nevertheless it is not very long before these children, in a good school, fall into the orderly conduct, respectful demeanour, and submission to authority which they find to

be the ruling habit of the school. This state of things is not due to an excessive appeal to physical force, though, of course, it is known that unusual delinquency may necessitate corporal punishment. The Department has made stringent rules with regard to the subject of corporal punishment, restricting its use to extreme cases; no merely intellectual failure is regarded as a proper reason for using the cane; and, while there are no doubt some liberal interpretations of the phrase "extreme cases," yet it may be affirmed that in the great majority of schools discipline is maintained by the personal influence of the teacher rather than by terror of the rod, the desire to secure and retain his approval having much more weight than the knowledge that he has the power to inflict physical pain.

Public High Schools.

In 1883 High Schools for boys and for girls were established in Goulburn, Bathurst, Maitland, and Sydney. After a few years both the Goulburn schools, and the Boys' School at Bathurst, were closed through lack of support. The others are still in operation. The fees payable in these schools were originally two, now raised to three guineas per quarter, the total enrolment in 1894 was 611. The curriculum embraces all the subjects of a secondary school, completing the training begun in the Public Schools, and preparing pupils for a University course. The High Schools are subjected every year to a careful examination by the Departmental Inspectors, and the reports of these officers show that good work is being done.

Technical Education.

In 1878, the sum of £2,000 was voted by Parliament for the promotion of technical education, and in the same year the trustees of the Australian Museum began the formation of a Technological Museum. In 1883 a Board of Technical Education was appointed, which continued in existence till 1889, when the Technical Education Branch was placed directly under the control of the Department of Public Instruction, and the Board was abolished. Very fine buildings for the Technical College and Technological Museum have since been erected at Ultimo. Museums and Technical Schools exist also in Goulburn, Bathurst, Newcastle, and West Maitland, and classes have been formed in connection with a number of Public Schools. The amount spent in 1894 on the maintenance of these institutions was £21,000.

The mere statement of the names of the various Departments will show over how wide a field the instruction is spread: Department of

Agriculture.
Training in Sheep and Wool.
Chemistry and Metallurgy.
Pharmacy.
Mineralogy, Geology, and Mining.
Mechanical Engineering.
Electrical do
Applied Physics.
Mathematics.
Sanitary Engineering.
Architecture.
Art.
Industrial and Decorative Art.
Domestic Economy and Cookery.
Lithography.
Dressmaking.
Manual Training.

The number of students attending the various classes in 1894 was 6,543.

Other institutions supported by the State, and more or less connected with education:

The Free Public Library.
Municipal Free Libraries.
The Australian Museum.
The National Art Gallery.
Institution for the Deaf and Dumb and the Blind.
Parramatta Industrial School (for girls).
Nautical School-ship "Sobraon" (for boys).

The boys sent on board the "Sobraon" are those whose parents habitually neglect them, or who have been guilty of small offences against the law. They are subject to nautical training and discipline, and receive regular instruction in the same manner as pupils attending Public Schools. The system of treatment has proved itself a most pronounced success, a very small percentage of boys taking to evil ways after their discharge from the ship.

Institutions partly supported by the State:—

Schools of Arts.

In nearly all towns of New South Wales Schools of Arts have been established. They receive assistance from the public treasury in proportion to the support accorded to them by private individuals.

Sydney Grammar School.

This school was established in 1857. It is managed by a Board of trustees, but a portion of the cost is borne by the State. In 1894 the subsidy amounted to £2,299, the number of pupils enrolled was 466, so that the contribution of the Government averaged six guineas per annum per boy. The school is not examined by any Government officer, so that there is no direct way of judging of the merits of the general instruction. Those pupils, however, who proceed from the school to the University, as a rule, do well, and some take very high places among the competitors for educational honours.

University of Sydney.

The University was founded by an Act of Parliament passed by Mr. W. C. Wentworth, in 1850, providing for the appointment of a Senate, which should have power to engage professors in arts and to confer degrees, after examination, in arts, medicine, and law.

A piece of land known as Grose Farm, comprising about 130 acres, was given to the Senate in 1855, to serve as a site for the University and for affiliated colleges. Noble buildings have been erected to furnish accommodation for the University proper. The endowment was originally £5,000 a year. In 1894 it amounted to £14,800. Some large sums of money have been bestowed on the University by private persons, notably the late Mr. Challis, whose gift amounted to £268,000. The annual expenditure in 1894 was £33,539.

Numerous scholarships, bursaries, and exhibitions (public and private) have been founded for the encouragement of talented boys, and for the support during an academic course of boys whose means are limited, but whose ability is beyond the average.

In 1852 actual operations were begun with 24 under-graduates, and 3 teachers. In 1894, there were 462 under-graduates, and 17 teachers. The examinations for degrees are as severe as those of any University in the world, and indeed many are less exacting than ours.

By Royal charter in 1858, it is granted that all degrees given by the Sydney University shall as to rank, precedence, privilege, and prestige, hold their face value in all parts of the Empire.

The Senate now has power to teach, examine, and confer degrees in arts, medicine, law, science, and engineering. Other branches of University work consist in the junior and senior public examinations similar to the Oxford and Cambridge local examinations, Civil Service examinations, matriculation examinations for those who purpose, without seeking a University degree, entering the profession of the law, and the system of extension lectures.

Affiliated Colleges.

Within the University area there are three affiliated colleges—Church of England, Roman Catholic, and Presbyterian.

The Wesleyans and Congregationalists have theological colleges, but they are not affiliated to the University, and do not receive any Government support. Prince Alfred Hospital is built within the University enclosure, and is utilised for the instruction of medical students.

Private Colleges and Schools.

Besides the institutions carried on wholly or partially by public funds, a large number exist for imparting primary and secondary education which are entirely independent of State aid. These may be divided into denominational and undenominational.

Denominational Colleges and Schools.

Of these, the Roman Catholics have 285 schools, taught by 1,453 teachers, and having an enrolment in 1894 of 27,165 pupils. The Church of England has 62 schools, with 246 teachers, and 2,682 pupils. Other denominations have 10 schools, 64 teachers, and 543 pupils. There are, of course, no means of ascertaining accurately the efficiency of these schools, as neither teachers nor pupils are subject to any kind of examination by persons holding a responsible independent position. So far as can be judged by University examinations, and by general observation, it would appear that many of them are doing good work.

Undenominational Schools.

There are numerous private schools of this character scattered through the Colony, principally in the more populous centres. In 1894 there were 506 in operation, having a staff of 1,203 teachers, and 12,000 pupils. These schools are devoted mainly to secondary education. The remarks made above touching the efficiency of Denominational Schools are also applicable to those now under discussion.

Cost of Education.

The gross expenditure on State Schools for 1891–2–3–4 was—

1891	£769,565
1892	768,393
1893	715,219
1894	661,055

This gives an average for the four years of £728,558. This sum reduced to an average per head of the average annual enrolment of pupils for the four years amounts to about £2 10s. (two pounds ten shillings); that is, the average cost per child enrolled for the four years ending December, 1894, was £2 10s. per annum.

The total amount spent by the Department of Public Instruction in 1894 was £661,000. This sum is independent of Government expenditure on institutions not immediately controlled by the department last named.

It is not possible to give the exact figures representing the private expenditure for the same object; but it is thought safe to affirm that the entire annual cost to New South Wales of its educational system, both public and private, is not less than £1,200,000. This means, reckoning money as being worth 4 per cent., that the increase arising from £30,000,000 is handed over every year for the purposes of education.

The Manufacturing Interest.

By Frank J. Donohue.

The employment of a people depends always in the first instance on whatever may happen to be the natural outlet for its energies, and on its own preferences. The settlers who went west in the United States grew wheat, just as in Australia we grow wool. On the Californian seaboard the population took to mining, and our people having learnt the way followed them in the search for gold. When conditions are favourable, as they are in England, and as they have grown to be in the United States, the era of manufactures comes in,—but not, as a general thing until from one cause and another, whether the increase and spread of population or the decline of other means of employment, the attention of work-seekers and capital-investors is forced in that direction. We can hardly be said to have advanced very far to that stage yet, but the evidences are present that it is beginning for us, and that New South Wales will offer a tempting field for the pioneer manufacturer on a large scale as time goes on. The fiscal policy of the country has been, with few intermissions, one of consistent free-trade. Now and then a politician of prominence has come forward with a theory that in order to establish manufactures we must follow the example of the United States and adopt a protective policy. Sir James Martin eloquently advocated this nearly thirty years ago. He drew a picture of the country given up to sheep-runs, employing a few shepherds and station-hands, or working its mines for exportation from Sydney; of which port, he said, it was the aim of the exporters and commercial classes to make a bastard kind of antipodean Venice. He introduced a protective tariff, as Sir Patrick Jennings and Sir George Dibbs did after him; but the feeling of the country was against the policy, and the year 1896 again sees the Colony under a free-trade tariff. It is not the intention to discuss here the question as to which of the two policies is best for the Colony. The subject has been debated to weariness, and the electors have recorded their decision. The development of a country's industries, after all, depends not on tariffs or politicians but on the preferences of labour and capital and the natural law of supply and demand.

But the manufacturing interests have not been idle. The latest returns available show that last year (1894) there were 42,751 persons in the Colony actually employed in one branch or other of manufacture, the principal occupations utilising their services being the preparation of clothing and textile fabrics, food and drink, metal works and machinery, building materials, and pastoral raw material. Most of the works in connection with these interests have been established near the metropolis, where the conditions favour industrial enterprise; the

aggregated population more readily furnishing the workers, while there is a plentiful and near supply of coal, with easy facilities of communication from that centre. In its possession of coal the Colony holds the greatest natural aid to manufacture, while our metals, wool, timber, and other products offer abundant material. The great obstacle is found in the high rate of wages obtainable by the workers in other pursuits, and while these continue to absorb the bulk of the available industrial population it will be always a difficult matter to set our manufactures going on a scale adequate to our resources.

The industry offering the greatest amount of population to the people in 1894 was that devoted to the manufacture of clothing and the working-up of textile fabrics. In this direction it might be thought that the staple industry of the country would insure the growth of a flourishing and permanent industry. The conditions of pasturage on a large portion of the country, especially in the salt-bush districts, make it more satisfactory to raise clothing wool than the combing variety, and as a matter of fact, the colonies supply the manufacturing nations elsewhere with more than half of what they use in their local factories. And yet the factories established here from time to time do not seem to have depended entirely on cloth-making for their continuance, and the industry has not been a success. This is partly accounted for by the circumstance that in no woollen mill is the machinery of the best and most effective kind. Two years ago we had in these mills plant worth £23,200, and machinery of 145 horse-power, the clothing factories employing plant worth £4,473. The forty-four boot and shoe factories in the Colony employ more than half the total number of hands occupied in this general branch of industry, the section next in number handling clothing, and the rest including furriers, hat and cap manufacturers, and oilskin, woollen cloth, shirt, and underclothing makers. The leather used in the boot trade is largely a local product, and the plant employed is worth £36,500, with machinery of 217 horse-power. 1894 saw an output of over 2,500,000 pairs of boots, and 461,000 yards of woollen cloth and tweed. The workers in food products find occupation in the largest proportion in sugar mills and refineries, which employ 1,614 persons, with a capital value of working plant worth over £600,000. The flour-mills come next, employing about 700 hands, with machinery and plant worth £244,365, while the Colony's breweries employ 744 persons, and possess machinery and plant to the value of £122,000, with an annual output of about 10,000,000 gallons. There is a growing industry in connection with the making of butter and cheese, in which about 1,000 persons are employed, while the factories have machinery and plant to the value of over £50,000. Besides these there are other industries, but they can hardly be treated for our present purpose under the heading of this section. The manufacture of sugar is, as may be seen by the figures quoted, an important industry, and its record shows it to be a progressive one. The work is falling gradually, but surely, into the hands of large establishments. In 1882 seventy mills worked by steam and sixteen by cattle manufactured 270,000 cwt. of sugar and 560,000 gallons of molasses, while in 1890–1, the year showing the largest yield, thirty-one steam and two cattle mills manufactured 530,660 cwt. of sugar and 1,074,080 gallons of molasses, while the number of hands

increased in the same time from 1,039 to 1,621. Last year there were two refineries, melting 756,200 cwt., possessing machinery of 650 horse-power, and employing 449 hands. Most of the sugar industry is worked by the Colonial Sugar Refining Company, which owns mills on the Richmond, Clarence, and Tweed Rivers. The flour-mills keep pace with the local requirements of grain-growers, the eighty-three establishments at work making a little under 120,000 tons of flour, the output in 1893 being 142,000 tons. In metal working and machinery the most active branches are the smelting, engineering, and railway carriage works. The first-named employed 1,516 hands in 1891, though the number was as high as 2,354 two years before, the falling-off being one of the consequences of the depression in silver. There was in that year plant in the Colony to the value of somewhat under 300,000, with about 1,700 horse-power, and twenty-three establishments. The railway workshops gave employment to 2,739 hands, the highest figure being reached in 1890–1 at slightly over 1,000. The plant in 1892 was valued at over £125,000, with a horse-power of 1,040. The engineering works employed 1,920 men last year, the value of machinery being quoted two years before at £186,074. Besides these, upwards of 800 men are employed in iron works and foundries, and the industries of boiler and agricultural implement making, wire works, plumbing, and galvanized ironworks, blacksmith and coppersmith work, tinware, &c., are actively carried on in a smaller way. In the matter of machinery making and engineering, it should be said that the employment figures show a gradual falling-off of late years, which becomes somewhat considerable when comparison is made with the returns of ten years back; while smelting, wire working, and railway-carriage building has increased largely during the decade. In the manufacture of building materials the saw-mill industry takes first place. Last year 3,257 hands were engaged in 299 mills, having plant to the value of about £292,000, and of 5,101 horse-power. In that year 173,088,000 feet of timber of 1 inch thickness were sawn. In 1892 the output was about 50,000,000 feet more, with 4,573 hands at work, but only 288 mills. Next comes brickmaking; but here the slackness in the building trade in consequence of the depression made a noticeable falling-off in the figures of the year as compared with others. In 1886–7, for example, the number of bricks made reached just under 244,000,000, the output of 330 brickworks, employing nearly 3,000 men. Last year the number made was only about 92,000,000, and only 165 works were in operation, employing 1,243 men. Next in order came the various industries of joinery, pottery, asphalt, lime-works, cement, paint, monumental masonry, &c., all of which afford employment, with those named, to upwards of 5,000 persons, though two years ago the number so employed reached nearly 8,000. In the preparation of pastoral raw material, forming the next branch of industry, there were upwards of 4,000 men employed last year in wool-washing, tanning, and boiling-down. In 1892 the number of persons so employed was a little under 2,000. That year produced over 1,000,000 cwt. of tallow, of which we exported four-fifths, and 1,616 hands were engaged in the work; while some £30,000 worth of tanning plant is in operation. In coach and waggon building the extent of the operations may be judged from the fact that they employ

1,224 men, while saddlery and harness-making occupies 324, the working plant of each being about £37,000 and £53,000 respectively. In the business of shipbuilding we employ about 1,300 hands, the Sutherland Docks at Sydney being one of the largest single graving docks in the world. The value of machinery and plant employed approaches half a million sterling. The furniture-making trades employ about 800 hands, though here again the numbers have fallen considerably in recent years. The plant in operation is worth about £15,000. The printing and bookbinding trades employ about 4,000 hands, and the gasworks about 1,500, in fifty-seven establishments, with plant worth over £800,000. The soap and candle factories of the Colony employ about 470 hands, producing 4,750,000 lb. candles last year and about 204,000 cwt. soap, and using £60,000 worth of plant. The manufacture of tobacco is a promising industry in the Colony, where the soil and climate largely favour the growth of the tobacco plant, and where the population annually spends large sums in its consumption. These facts might well invite the attention of growers of special knowledge in other places. With us the cultivation of tobacco has almost entirely fallen into the hands of Chinese. In 1894 we consumed a little short of 3,000,000 lb. weight. Of this nearly 2,000,000 lb. were made up in the local factories from about 500,000 lb. of imported American leaf and the balance of local growth. In 1894 we had in the Colony 600 hands employed, with machinery and plant worth £51,600 and of 191 horse-power. Seven years ago the number of hands was 562, and the value of plant upwards of £83,000, and we worked about 300,000 lb. more of native leaf. Last year the output was 1,732,496 lb. tobacco, 5,117 lb. cigars, and 114,971 lb. cigarettes, to the value of £314,671. Seven years ago the figures were, comparatively speaking, much higher, and the value of the local manufacture in 1887 was set down at £350,000.

These particulars show the present position of the manufacturing outlook in New South Wales. Looked at in the light of the standard of comparison afforded by other manufacturing countries, they are not convincing enough to establish the Colony in that category; but regarded in the view of our own local circumstances, the enormous yield of wealth from easily-worked natural resources, the slow growth of population until within the last forty years, and the brief record represented by the period between the great influx of population in the "golden fifties" and the present, they cannot be estimated as otherwise than encouraging. Nor can the actual figures for the past year be taken as presenting a fair ground for estimate. As we have seen, these returns represented the effects of a depression which has not been confined to the Australasian Colonies, and in many cases the figures of a few years previously represent a much higher degree of manufacturing activity than those of last year. The locking-up of capital has a tendency to restrict manufacture and throw the population back on primary production, and as it happens that the facilities for this are exceptionally easy in New South Wales no active pressure is at work to drive labour into other channels. Local capital finds an outlet in mining enterprise sufficient for its present requirements, so that no special inducement to promote manufactories is held out from that side. A country which has produced over £100,000,000 worth of

mineral wealth in something like fifty years, and which raises £9,000,000 or £10,000,000 a year from the sale of its wool clip, is too rich in natural wealth for the population to crowd itself into factories. For the present, and in comparison with the yield from these resources, the population is too small to work larger manufactures, though it should be said that even under present conditions the number of the population engaged in manufactories has more than trebled itself since 1860, and about one-sixth of the whole is dependent on that interest. Forty years is not a long time in which to build up large manufactures in the face of the competing attractions for labour and capital, and what has been done offers fair promise for the future.

That promise is strongly emphasised when we come to consider the advantages New South Wales offers as a manufacturing country in its wealth of raw material, in the demands of the growing Australasian population, and in the prospects for export. With a larger working population, and a more liberal employment of capital by manufacturing experts, there can be no doubt that these are such as to ensure exceptional success. In considering the advantages favourable to manufacture the inquirer is naturally attracted first by the subject of coal, and in our inexhaustible supplies of this, it is needless to say, the Colony is singularly fortunate. The coal formation is found over a large area of the Colony, while nothing even remotely approaching our coal, either in quality or quantity, is to be found in any other of the Australian Colonies. This fact alone seems to mark the mother Colony out as the natural centre of Australian manufactures when the right time comes. Although we have already raised coal to the value of £29,500,000, the mining operations are still in their infancy. It is calculated that our coal measures extend over about 24,000 miles of territory; and after allowing one-third loss in working, the Government Geologist computes that, going down only 4,000 feet, and excluding seams of less than 30 inches, the supply of coal unworked amounts to over 78,000,000,000 tons. Then, as to the quality of our coal, it has been proved to compare favourably in the production of heat with the best foreign coal. The mean specific gravity of some samples of British coal tested for comparison was found to be 1·279, while the mean of New South Wales coal was 1·346, with less sulphur. The proportion of carbon in British coal was found to be 80·40, while our own gave about 76·47, our northern and southern coal showing 79·28 and 79·40 respectively. For the purposes of the manufacturer who seeks a field for investment these facts have considerable practical significance, as well as the circumstance that the proportion of hydrogen, nitrogen, and oxygen in our coal is much the same as that in English coal, while its steam-producing power is, in coal from the Northern collieries, nearly equal to English, while that from the south and west is a little below the standard thus set up. The fact that our coal has a slightly larger percentage of ash has an influence on locally manufactured coke, which has 6 per cent. more than the imported; but certain improvements in apparatus which have been adopted by some of the collieries suggest a hope which the comparative figures of the years 1893 and 1894 seem to bear out; for while in the former year we imported upwards of 61,000 tons of coke, in the latter we imported less than 48,000. Nor was this difference due to a decreasing demand, owing to the

depression or any other cause; for while in 1893 we manufactured 17,858 tons of coke, worth £20,000, in 1894 we made 34,458 tons, worth £33,000. It is assumed to be only a matter of time when locally-manufactured coke will take command of the market, thus materially reducing the cost to manufacturers.

As regards the Colony's natural advantages for the development of a flourishing iron industry the same hopeful tale is to be told. The deposits of iron-bearing ores in their richest forms are widespread through the Colony, being almost always found in the near neighbourhood of limestone and coal. No other Australasian Colony can compare with New South Wales in this respect, and taking our coal and iron together it is evident that nature sufficiently indicates what the industrial and manufacturing future of the mother Colony must be. The principal forms in which our iron occurs are magnetite, brown hematite or goethite, limonite, and bog-iron, with chrome iron in less quantities. The promise of these ores is specially attractive to the ironworker. Our magnetite has been found to yield 72 per cent. of available metallic iron, but of course this is exceptionally high; but at Brown's Creek, near Bathurst, and at Wallerawang, samples have been found yielding from 40·89 to 56·85 per cent. of metallic iron, and the Wallerawang ore is specially commended by experts as being extremely well adapted for reduction in the blast furnace. Brown hematite ores have been found in the mountain ranges and at Mittagong, Picton, Berrima, Lithgow Valley, Wallerawang, Rylstone, and Mudgee districts, and near Port Stephens, the analyses showing a percentage of from 42·69 to 64·48 of metallic iron, the proportion in most cases being over 55 per cent. Hematite from Maitland has been found to show 60·83 per cent., and samples from Mount Pleasant, near Wollongong, gave 54·28 per cent. The neighbourhoods of Lithgow, Eskbank, Bowenfels, the Hunter River, and Bulli, carry limonite rich in metal and averaging over 50 per cent. of iron, while the Mittagong bog-iron yields about 45 per cent. We have already extensive works at Eskbank, originally built for the manufacture of pig-iron, though that has been for the time being abandoned. At Mittagong gas-pipes have been made from iron smelted from the ore and taken thence to the mould without the intermediate processes of converting it into pig-iron. The Fitzroy works have also discontinued this manufacture, though samples of its output were of sufficiently good quality to gain a first award at the recent London Mining Exhibition. The stranger may naturally ask why, with these exceptional natural facilities, we have not already a flourishing iron industry in New South Wales; and attribute the fact to a lack of demand for iron and its products. A very cursory examination of the figures available on the subject will be sufficient to show that is very far indeed from being the real state of the case. During the past four years the Australian colonies, which New South Wales in the future must supply, imported over £26,000,000 sterling worth of iron and iron manufactures, and of this trade New South Wales itself was a customer to the extent of over £10,000,000 sterling. We have imported as much as £3,500,000 worth in one year, while all the colonies together in that year bought over £8,000,000 worth of iron goods abroad. Had we during those four years made up our own raw material into the finished article, this

Colony's wants alone would have absorbed 190,000 tons of pig-iron, while the group of colonies would have required 180,000 tons. It cannot be said that our resources are unequal to this demand, for in 1891 the Government Geologist officially reported that the districts of Mittagong, Wallerawang, and Rylstone had then in sight nearly 13,000,000 tons of ore, estimated to yield 5,853,000 tons of metallic iron. It seems unnecessary to add anything to these facts to illustrate the possibilities of the iron-trade in the Colony.

From what has been said it will be seen that the Colony holds out a tempting invitation to capitalists and workmen willing to embark their capital and labour in manufacturing enterprises in New South Wales. The quality of our coal, as well as our enormous supplies, and the metal-bearing richness of our iron ores, with their widespread distribution within the Colony, are facts which speak for themselves. If we compare the iron-carrying average of these ores with the 30 per cent. of the English clay bands, the advantage in our favour will be apparent; and then we have our lines of railway, ensuring rapid communication between the mines and the metropolis, and our shipping facilities, to bring us into touch with the other colonies and the new markets of the Far East. English experts have already visited the Colony to inquire into its possibilities, and sooner or later we may expect something like an adequate attempt to establish the iron manufacturing industry on a proper scale in New South Wales. Expansion is also invited by our wool production, and the extensive sugar-works of the Colony claim attention, to say nothing of the other avenues open to manufacturing enterprise indicated in their places, like the tobacco industry, and only waiting for favourable conditions of population and capital to make the mother Colony the manufacturing centre of Australasia.

Federation.

By Edward Dowling.

The most important national movement Australians have ever engaged in is that for securing the early union of the Australasian Colonies. During the first half of the century the colonists had many public demonstrations to endeavour to secure from the Imperial Government the benefits of representative institutions, independent judicial authorities, freedom of the press, cessation of transportation, opening of the public lands, and other desired reforms; but it is evident that the interests affected by the present federation movement are far greater than those involved in any previous agitation. Although in the early days of New South Wales the Colonial Office in London was opposed to some of the aims of the colonists, the Home authorities are now found desiring that the self-governing dependencies in Australasia should become federated as soon as possible.

Considering that the vast majority of Australians are also in favour of the early consummation of the union, it is remarkable that its advocacy has not made much headway except during the past few years. This past apathy can only be accounted for by the friction principally engendered amongst residents in the various Colonies through their taking into consideration only provincial interests, and so wholly ignoring the compensating benefits accruing under a proper form of Federal Government.

A competent authority on the working of civil government, Sir R. C. Baker, President of the Legislative Council of South Australia, in a recent public address, enumerates the following advantages that would accrue from federation, besides the great boon of intercolonial freetrade :—"There would be gains in economy and efficiency in defence; in the status and powers of the Colonies; in naturalisation; in the power to exclude undesirable aliens; in economy and efficiency of postal and telegraphic services; in quarantine; in marine; in the control of the currency; in banking laws; in copyright, trade marks, and patents; in having uniform marriage and divorce laws; in providing for facilities for recovering debts and claims; in regard to the influx of criminals; in the power to make treaties with other countries; in the regulation of the rivers; in the consolidation of our debt; and in regard to our railways."

The peoples of the Australasian Colonies required to be specially educated regarding the form and working of a Federal Constitution, as, unlike the residents in Upper and Lower Canada, they have not had a neighbouring Confederacy to familiarise them for nearly a century with the benefits to be derived from a united political system. The

various Colonies of the Australasian group, however, have become closely allied to each other through the circumstances of their isolated geographical position, common speech, and similar institutions, so that they are better prepared for union than the Provinces of Ontario and Quebec, whose people when federating had to contend against different languages, customs, and currency.

The idea of Australian federation is as old as the fact of Australian subdivision. The territory of New South Wales once comprised everything east of the 129th meridian of longitude, including the whole present extent of Queensland, Victoria, Tasmania, and South Australia. Out of this enormous territory, the province of South Australia, which had never yet been permanently settled, was carved in 1836. The Port Phillip and Moreton Bay districts were settled from Sydney, and continued to form part of New South Wales until the urgent demands of the settlers for local self-government led to the separation of Victoria in 1851 and of Queensland in 1859.

The agitations in the southern and northern portions of New South Wales for separation only proved successful owing to the importance of the settlements in which Melbourne and Brisbane formed commercial centres, and the difficulty then experienced of securing effective representation of local wants at a distant seat of government. Notwithstanding, however, the vastly increased means of internal and external communication now available, a proposal for Victoria to re-enter partnership with New South Wales—made in 1894 by Sir George Dibbs in a letter to the late Sir James Patterson—had but little support in either Colony, as the great majority of their peoples, although favourable to a federation of the various State Governments, are not prepared for amalgamation or unification under one Government.

Probably the subdivision of the Australian Colonies has not yet reached its limit. There is at present an agitation for separation in Central and Northern Queensland; the Northern Territory of South Australia is obviously destined to form a separate Colony; and the great size of Western Australia makes further subdivision probable. But the multiplication of states need not interfere with the question of federation, and may even make some of its problems easier to solve.

From the very beginning, however, of the separation epoch statesmen, both in England and Australia, whilst recognising the need for subdivision, foresaw the need of partial union for purposes of common concern, and especially for the establishment of a common tariff. In 1849 a Committee of the Privy Council had, at the instance of Earl Grey, the Secretary of State for the Colonies, inquired into the government of the Australian Colonies, and had recommended that Victoria should be erected into a separate Colony with a separate legislature; but that to provide for certain common purposes there should also be a central authority consisting of a Governor-General of Australia and a General Assembly to legislate on specified subjects of intercolonial interest. These recommendations were embodied in a Bill introduced into the Imperial Parliament in 1850; but the clauses relating to the establishment of a Federal Legislature, though actually carried in both Houses, caused so much opposition that they were

abandoned by the Government as premature, and the Act as passed provided for the complete separation of Victoria, postponing the question of partial re-union for further consideration.

Again, prior to Responsible Government being granted in 1856 to New South Wales and Victoria, statesmen in both Colonies unsuccessfully advocated that provision should be made for the establishment of a General Assembly to legislate on matters of common Australian concern. The reports of the committees appointed in New South Wales and Victoria respectively in 1853 to draw up Constitutions for those Colonies dwelt on the necessity of some such General Assembly; but the Constitution Acts were eventually passed by the Imperial Parliament without any provision of the kind, the Home Government being of opinion (to quote Lord Russell's despatch) that "the present is not a proper opportunity for such an enactment, although they will give the fullest consideration to any propositions on the subject which may emanate in concurrence from the respective Legislatures."

During the next few years the question of federal union was kept before the legislatures of the several Colonies by means of select committees, royal commissions, and reports. The leading spirits seem to have been Sir E. Deas-Thomson in New South Wales and Sir Charles Gavan Duffy in Victoria; but the movement was confined to a few far-sighted politicians, and produced no general effect. Their efforts, however, helped to leaven the parliamentary mind, and the result was a period of intercolonial conferences, dating from 1863 onwards, which were prolific in resolutions in favour of some form of union, but ed to no definite scheme and no direct result. At this time we find Deniehy—an Australian disciple of the philosophic De Quincey—lamenting, in an eloquent plea for the federation of the Colonies, the difficulty of weaning many of the politicians of that day from the sole advocacy of local wants.

At last a conference of all the Australasian Colonies, including Fiji, which was held in 1883 to consider the question of French claims in the New Hebrides, led to an Imperial statute being passed for the creation of a Federal Council of Australasia, with power to legislate on a narrow list of matters, neither of Imperial nor purely local interest, such as fisheries, intercolonial legal process, and the influx of criminals. This Act actually provided a kind of federal legislature for such of the Australian Colonies as cared to join, and has since 1885 formed a loose bond of union for legislative purposes between Victoria, Queensland, Western Australia, and Tasmania. South Australia also joined for a time, but afterwards withdrew. The Federal Council has no executive, and no judicial powers, and consists only of two delegates from each colony represented; so that it effects not a true federation, but only a loose confederation like that of the American states of 1771, "which had no judiciary to enforce its Acts, and no executive head to represent and administer its authority." On these grounds New South Wales has persistently refused to join the Federal Council, which, partly for this reason, and partly owing to its want of popular initiative and its imperfectly representative basis, has not achieved any important work.

At a conference of Australasian delegates held in London in 1887 a scheme of Australasian naval defence was approved, and a consequent Imperial statute provides for the maintenance—partly at the expense

of the Colonies—during a period of ten years on the Australian station of seven men-of-war ships, four of which are to be kept permanently in commission, the other three being held in reserve in Australasian ports. In 1889 the report of an Imperial commissioner, Major-General Edwards, on Australian land defences, gave great impetus to the federal movement. Sir Henry Parkes took the matter up, and another intercolonial conference was held in Melbourne in 1890, presided over by Mr. Duncan Gillies, and attended by Sir Henry Parkes and Mr. William McMillan as delegates from the New South Wales Government. The result of this conference was the assembling of the Sydney Convention of 1891, which for the first time crystallised the federal movement into a definite shape by preparing a draft Constitution to be recommended for the proposed Commonwealth of Australia. This Convention was the most important conference of Australian statesmen ever brought together. There were forty-four delegates present from the seven Colonies of Australasia. Sir Henry Parkes was elected as President; in addition to whom the following gentlemen were members of the New South Wales Delegation:—Mr. William McMillan, Sir J. P. Abbott, Sir George Dibbs, Mr. W. H. Suttor, Mr. Edmund Barton, and Sir Patrick Jennings.

The draft Commonwealth Bill, as adopted by the National Convention of 1891, provides for a complete scheme for federal government—legislative, executive, and judiciary. It aims at a federation of the modern type, but differs from the Canadian Constitution in many respects, as the earlier federal systems of the United States and Switzerland were conceived to be more suited to the circumstances of Australia, especially with regard to the maintenance of state rights. The Commonwealth Bill is admitted to have been drafted in an admirable manner, although there had been much difference of opinion expressed by the delegates in the discussions which took place with regard to the delimitation of central and provincial powers and the right of the Federal Senate to amend money bills. The necessity for the exact relation of the states to the general government being properly defined is illustrated by the fact that when the Constitution of the United States was being made, both Hamilton and Madison left the power to deal with the institution of African slavery open to doubtful construction, which compromise afterwards led to the terrible Civil War between the North and the South.

The Commonwealth Bill provides for a Federal Legislature of two chambers; a House of Representatives (corresponding to that of the United States) composed of elected representatives from each colony in proportion to population; and a Senate (also comparable to that of the United States) elected by the State Legislatures on a basis of equality—the smallest State sending as many senators as the largest. This fundamental compromise of the federal system—giving the preponderance in the one chamber to the majority of individual citizens, in the other to the majority of States—is recognised in the Constitutions of the United States and of Switzerland, and receives a partial application in the Dominion of Canada, and in the Federal Empire of Germany. It safeguards alike the interests of the smaller states who would otherwise shrink from joining in the union, and the interests of the nation, which is supreme in the national chamber of the

Legislature. The form of Executive proposed is, as in Canada, the British system of a ministry nominally appointed by the Crown (that is the Governor-General) but in reality responsible to and dependent on the confidence of the House of Representatives. A Federal Supreme Court is also provided as a general court of appeal for all Australia, and with an original jurisdiction in intercolonial matters. With regard to the relation of the Federal Parliament to the State Parliaments, the bill adopts the principle established in the United States, where the federal powers conferred by the Constitution are strictly delegated powers, and the states retain all rights not expressly and exclusively conferred on the Union.

It was intended at the time that this draft bill should be discussed in detail in all the Australian Legislatures, then referred to a second convention to harmonise such amendments as might have been suggested, and finally submitted in some way for the acceptance or rejection of the people of each Colony. This process, however, broke down. The different Parliaments could not spare time in the pressure of provincial and party politics to discuss the Federal Constitution in detail, and for a time the question of federal union dropped into neglect, and the impetus of the Sydney Convention seemed lost. At this stage the movement assumed a new phase by spreading from the parliament to the people. The Commonwealth Bill had been an immense educational influence, had given definite shape to the national aspirations, and aroused the interest and the criticism of a large proportion of the general public. At the same time a financial panic and severe commercial depression made prominent the weakness of isolation, and suggested practical arguments in favour of a speedy national union. The movement neglected by the politicians began to be taken up by the citizens. Foremost in this new movement was the Australian Natives' Association, who, taking advantage of their established organisation had already held a conference of delegates from all its branches in the five Colonies on the continent at the Melbourne Town Hall, on the 25th and 26th January, 1890, under the presidency of the late Sir John Bray, when resolutions were passed containing a proposed basis for a federal constitution.

Moreover, federation leagues to assist in the movement were formed in metropolitan, suburban, and country centres, especially along the Victorian border. It has been the policy of the various branches of the Australasian Federation League to assist every Government in power in its endeavours to carry measures for securing the union of the Colonies at the earliest possible date. Central federation leagues were also inaugurated in Melbourne in July, 1894 (under the Presidency of Sir John Madden, Chief Justice), and in Adelaide, in August, 1895 (under the Presidency of Mr. J. H. Simon, Q.C.).

A motion in favour of Australian federation, proposed by Sir Henry Parkes, in the Legislative Assembly, on 30th November, 1894, was supported by the Reid Government, and carried by fifty-five votes to ten. A federal party was subsequently formed under the presidency of Sir Henry Parkes, which at the time of the last general election, and for some time afterwards, carried on its operations and held public meetings in the city, suburbs, and country towns.

The cause of Australian union has been removed from the academic to a practical stage by the action of Mr. G. H. Reid, the present leader of the movement, in convening a meeting of the Premiers at Hobart, in January, 1895, and in subsequently preparing and carrying through the New South Wales Parliament a Federal Enabling Bill "broad-based upon the people's will." The South Australian, Victorian, and Tasmanian Legislatures have also passed that bill by large majorities; so that when the Queensland Parliament has had an opportunity to deal with it ten representatives to the statutory Convention, as provided for in the Enabling Act, can be elected in each of the Colonies. The fact that the Premier was triumphantly returned at the last general election shows—although Australian federation was not the chief question submitted to the electors by the Government—that the great bulk of the electors were not opposed to the proposals carried at the Hobart conference for a popular initiative to the national work of moulding a federal constitution.

Amongst the best advocates for the federation of the Colonies have been representative ministers of religion, who in many addresses have eloquently pleaded, away from provincial and party ties, for a political unity of spirit. Cardinal Moran, of Sydney, the Rev. Dr. Bevan, of Melbourne, and the Rev. Dr. Jefferis, of Adelaide, have from time to time delivered special and important lectures on Australian federation in several of the Colonies.

One of the most encouraging signs in connection with the federation movement was an understanding entered into by leading politicians that it would be something little short of wickedness to make Australian unity a party question; and they have accordingly on many occasions advocated its claims from the same platform, whilst in open opposition to each other on other political subjects.

It was when Sir Hercules Robinson occupied the position of Governor of New South Wales that the question of the necessity for the unity of the Australasian Colonies was ably revived by him, in an address delivered at Albury in 1876, and many of Her Majesty's representatives in the various Colonies, appointed since that time, have also expressed themselves willing, as far as they constitutionally could, to further that desired end.

A late Governor of the Colony, the Earl of Jersey, in his report to the Marquis of Ripon on the Colonial Conference at Ottawa in 1893, as representative of the Imperial Government, says:—"The visits of the Australian delegates to Canada impressed them forcibly with the advantages which accrue from the federation of neighbouring provinces." History affords many examples of terrible feuds between adjoining colonies owing to there being no basis of unity between them; and the present Governor of New South Wales, Lord Hampden, has but recently remarked with regard to reprisals between Victoria and New South Wales:—"It seems a strange thing to me—an unaccountably strange thing—to find on arriving on these shores that there is a wall of menacing tariffs and a hostile railway gauge between friends and neighbours, residents in the same country, subjects of the Crown, and divided only by an imaginary boundary line."

Amongst the best workers in the federation movement are many leading representatives of the various Trades' Halls, who perceive the

benefits to the working class which will accrue from the union of the Colonies on a democratic basis, and also the evils that would attend white labour through a large introduction of the coloured races. The representative sent by the London *Times* (Miss Shaw), after visiting Northern Queensland, has reported "that the maintenance and extension of the coloured labour system must lead to the division of Australia into two sections—tropical Australia and temperate Australia." The labour leaders therefore advocate that it is most desirable that the Australian Continent should not be divided into antagonistic northern and southern states, with coloured labourers as a standing menace to the working of free institutions like the African negroes are found to be in America; but that the Federal Parliament should control the admission, into any of the states, of undesirable colonists who may otherwise, before the end of the century, materially interfere with the social conditions of the whole of Australasia.

The proximity of China, Japan, and India to Australia renders the latter easily accessible to hundreds of millions of the Asiatic races, and in this nearness to these Eastern human hives is seen one of the great dangers to the preservation of the present homogeneity of the Anglo-Saxon race on the southern continent. Notwithstanding the edict against Chinese coming to the United States, it is officially reported that numbers find their way over the Pacific to British Columbia, who after payment of a poll-tax of £10 to the Canadian Government cross a boundary extending thousands of miles in length into the United States; and it is feared that as there are only similar imaginary border lines in Australia a like condition of affairs is commencing on the mainland, especially as no poll-tax is levied on servile labour coming into the Northern Territory. The question of the permanent settlement of coloured races in Australia may shortly become a matter of international complication, as it is stated that the Colonies as they are have no international rights; but with a united government their claims to recognition would not be so readily denied. An intercolonial conference is about being held in Sydney to consider the desirability or not of these Colonies giving due notice that they are prepared to make the treaty concluded between Japan and Great Britain applicable to Australasia; and the results of this meeting of representatives from the various Colonial Governments are looked forward to with much interest by colonists, who, in view of 25,000 Japanese demanding the franchise in the Hawaiian group, are not in favour of a large influx into the continent of even this intelligent, ambitious, and warlike race from their now overcrowded island home, as they would be far more dangerous as citizens than the comparatively inoffensive Kanakas from the South Seas.

Financiers and capitalists also acknowledge the good that would accrue from colonial union, and Mr. Reginald J. Black has recently asserted that, under a federal executive, a great saving could be effected in the money expended for defences, and that even the cost of a federal government might be recouped from savings made on many overlapping services carried on by the several Colonies. He has also shown that if one hundred millions of the public debts of the Australasian Colonies were taken over and consolidated by a Federal Government, Australian federal bonds would be regarded with equal

favour to Canadian Dominion bonds, so that there would probably be a saving in interest of about £1,000,000 sterling, to be rateably shared by the Colonies concerned. This calculation is borne out by a statement made by Sir Mackenzie Bowell, Premier of Canada, when in Sydney in 1892, that after federation the Dominion advanced so rapidly that money was lent in the London market, most readily, at three per cent., or about half the interest paid previously by the provinces. For the information of the Committee on Finance and Taxation of the National Convention, an estimate was made by Mr. William McMillan, M.P., that the outlay for the proposed Federal Government would amount to £2,226,000, or about 11s. 5d. per inhabitant, being only one-twelfth of the expenditures of the several Colonies in 1889. This approximate estimate, after revision by that Finance Committee shows the following items of expenditure:—Civil government, £639,000; collection of revenue, £270,000; defence, £750,000; to recoup loss on services, £200,000; and for interest on works taken over by the Federal Government from the various Colonies, £367,000.

The advocates for the early union of the Colonies have often urged the undesirability of federating them when the enemy is at the gate, or during a war panic; as the important task of constitution making should not be begun under pressure from without, but in a calm and deliberate manner befitting the importance of the work. It has been also urged that the task of defending Australia from attack by sea is very great, as there are 8,850 miles of coastline around this island continent; and more especially so as a naval authority like Lord Brassey has recently stated that "Australians should not look to the Imperial navy for defence of harbours, for effective defence could only be given by the action of a combined fleet and land force."

Intercolonial freetrade and a common tariff would be the result of a complete federal system, and the hostile Custom-houses now existing in Australian border towns could be entirely abolished, as in the States of the American Union and in the Provinces of the Canadian Dominion, in both which countries the traveller can pass across the continent from province to province on railway lines over 3,000 miles in length without interference of any kind by the various state governments. At the present time all the Australasian Parliaments levy taxes on protective principles, except that of New South Wales, which has under the recent financial proposals successfully carried by Mr. G. H. Reid, as Minister for Finance, adopted a freetrade tariff; and by direct taxation imposed income and land taxes so as to make up the deficiency of revenue from the Customs. The present Parliament of New South Wales displayed a generous spirit during the last session by removing at once many restrictions to commerce between her and the neighbouring Colonies, without requiring any reciprocity or waiting until the Federal Legislature had dealt with the fiscal question. This great concession should lead to the daughter Colonies emulating the good example of the mother state, by voting that the federal seat of government should be carved out of her territory, somewhat as she has been dismembered for them in times past. The selection of the national capital at Washington was due to a compromise entered into between Hamilton and Jefferson, and a similar equitable arrangement might lead to the Federal City of Australia

being built on the wide peninsula bounded on each side by the Parramatta River, the north shore of Port Jackson, and the Hawkesbury River, called "Walumatta" by the Natives, which for suitableness and beauty of situation would bear favourable comparison with and resemblance to similar positions either on the Potomac River or the Ottawa River, alongside whose waters the capital of the United States or the capital of Canada has been placed.

Much of the opposition to the federation movement of late years has arisen from advocates for dealing forthwith with local legislation; who, however, forget that if the various Parliaments were relieved of much of their present work they would be more likely to consider domestic and social questions than at present. Other opponents of federation object to surrender the control of the Customs, post and telegraphs, the defences, the influx of aliens and paupers, the regulation of the currency, banking, navigation, shipping, and other administrative arrangements of a federal nature; although it has been well pointed out by Mr. Edmund Barton that this control is only a transfer by the provincial parliaments and governments to the Australian Parliament and Government, at the dictation of the citizens, who will gain far more as Australians than they give as provincialists.

It is generally admitted that the federal union must necessarily be of a character not easily to be changed; so that it is highly desirable no colonial federation should be entered into without knowing its nature, nor any national constitution adopted without a full conception of its responsibilities. The discussions which have taken place, the addresses which have been delivered, and the articles which have been printed on the federation question, have done much to disarm many avowed opponents in various sections of the community; and especially to remove misconceptions of some working men as to the purport of the movement, as it was shown to be truly "one of the people, by the people, and for the people."

One of the principal objections urged against the proposed federation of the Australasian Colonies is that they are not yet ripe or important enough for union. But it will be seen by the following comparison made between them and the Dominion of Canada—the only country under the British Crown with a similar union—that these Colonies are in many respects greater than even the magnificent British provinces on the North American continent. The figures given also show the great material wealth contained within the borders of Australasia, which often hitherto has not been fairly contrasted by the figures published solely for New South Wales or some other settlement of the Australian group being compared with total figures of federated countries such as Canada, containing as they do the total statistics for nearly all the North American provinces; so that strangers, unacquainted with the geography of the Australasian Colonies, sometimes gain a wrong impression of their collective progress and resources through no recognised political union existing between them.

As the other Colonies of the Australasian group are mainly off-shoots from New South Wales it is only reasonable their progress should be noted in connection with that of the parent settlement. The Colonies of New South Wales, Tasmania, Western Australia, South Australia,

New Zealand, Victoria, and Queensland occupy an area of 3,161,457 square miles, and are nearly equal in extent to the territory possessed by the Dominion of Canada. The population of the Australasian Colonies at the end of 1894 numbered 4,153,766, being much more than that of the residents of the United States at the time when the independence of that country was gained. The trade of the Australasian Colonies is, however, twenty times greater than that of the American States when they declared their independence, and shows the much greater commercial intercourse between nations during the present century principally obtained by the extensive use of large steamships instead of small sailing vessels. In 1894 the trade of the Australasian Colonies with the United Kingdom was £50,544,660, or more than double that of Canada, although parts of the latter have been settled by Europeans three times as long, her cities are much nearer the great centres of trading operations, and she has nearly 1,000,000 more inhabitants. The prosperity of the Australasian Colonies is greatly due to the large extent of excellent pastoral and agricultural land, accumulated wealth, invested capital, home manufactures, and foreign trade, which have made the average wealth of the Australian to be greater than that of the inhabitant of any other country. The revenues of the several governments for the year 1894–5 was £27,978,675, being three times as great as that for Canada, notwithstanding her much larger population. The exports of Australian produce increased from £20,000,000 in 1861 to £51,000,000 in 1894, and consist principally of the produce of the pastoral, mining, and agricultural industries, such as wool, tallow, hides, gold, silver, copper, tin, coal, wheat, meat, butter, wine, fruit, timber, &c.

The foregoing figures exhibit the wonderful progress that has been made by the Australasian Colonies during the last fifty years, which will be found far greater than the development of the Canadian Provinces during the same period; but, it is believed, that under a similar confederation to that of the Dominion of Canada the progress of Australasia would have been much more than the totals given. The trade of the Australasian Colonies in yearly value amounts to £112,000,000, and the exports and imports reach a grand total seawards of 17,350,000 tons. Australasia has constructed 13,788 miles of substantial railways, connecting all the chief cities, and 17,558 miles of telegraphs on poles conveying messages to all parts of the Australian Continent. Her pastures feed 121,161,000 sheep, 13,315,000 horned cattle, 1,891,000 horses, and 1,191,000 swine; and the increase to the crops during the last half-century is much greater than what has been reaped in the Canadian Dominion.

Many years ago the question was raised as to the policy of obtaining freedom and independence for the golden lands of Australia, but it is evident that the time for departure from under the ægis of the greatest empire in history has not arrived. Dismemberment of the British Empire is now deprecated by English and Australian statesmen, and under the present liberal colonial policy of the Imperial Government—which has allowed the full enjoyment of free institutions—many years must elapse before the great majority of Australians would desire to see their country an independent state. The present century is remarkable for the achievement of Federation

in Germany amidst turmoil and bloodshed, but it is believed that the foundations of the Australian Commonwealth will in a few years be well and truly laid in perfect peace.

The Eastern home of the original inhabitants of the British Isles is said to have been in the cities of the Medes, whence tribes of them migrated westward along the shores of the Mediterranean until they arrived in Britain; and in the same manner their descendants afterwards crossed the Atlantic to America. As the tide of civilization still rolls westward, continuous waves of immigration must hereafter flow, not only out of the countries of Europe but also from the large populations in North America, to the Australian continent and to the adjacent islands in Oceana, especially when the Nicaragua Canal has been opened from the Atlantic to the Pacific shores. The island-continent of Australia from its unique geographical position should, therefore, hereafter become the connecting link between the civilizations of the East and West, and consequently the centre of that Greater Britain which will doubtless form one member of a pact between the English speaking races, who in another century, judging from their present progress, should number 1,000,000,000 persons, and be the controlling powers in every quarter of the globe.

APPENDICES.

APPENDIX A.

HISTORICAL DATA.

By F. M. Bladen, Barrister-at-Law.

1770.

19 April ..... Eastern coasts of New Holland sighted by Captain Cook.
28 ,, ... Cook enters Botany Bay.
6 May ..... Port Jackson named by Cook.
10 June ..... The Endeavour strikes a reef.
21 August ..... Possession taken of the Eastern Coast of Australia.

1783.

23 August ..... Settlement of New South Wales proposed by J. M. Matra.

1786.

18 August ..... Lord Sydney authorizes the equipment of the First Fleet.
12 October ..... Captain Arthur Phillip appointed Governor of New South Wales.

1787.

13 May ..... The First Fleet sails from England.
5 August ..... First Fleet puts in at Rio de Janeiro.
13 October ..... First Fleet arrives at Cape of Good Hope.

1788.

18 January ..... Phillip enters Botany Bay.
26 ,, ... The First Fleet moored in Sydney Cove, and formal possession of the colony taken.
14 February ... Philip Gidley King despatched to form a settlement on Norfolk Island.
17 ,, ... Lord Howe Island discovered.
2–9 March ..... Broken Bay examined by Governor Phillip.
2 November... Settlement established at Rose Hill (Parramatta) by Governor Phillip.

1789.

— April ..... Small-pox amongst the natives of Port Jackson.
4 June ..... First theatrical performance.
28 ,, ... Hawkesbury River explored and named.
— ,, ... Captain Tench discovers the Nepean River.
5 October ..... First boat built in Colony launched. ("The Rose Hill Packet.")
23 December ... H.M.S. Guardian wrecked on an iceberg.

1790.

19 March ..... H.M.S. Sirius wrecked at Norfolk Island.
— June ..... Arrival of the Second Fleet at Sydney.
7 September... Governor Phillip speared by a native.

1791.

4 June .... Native name "Parramatta" adopted by Governor Phillip.
— August ..... Expirees settled at Prospect Hill and the Ponds.
21 September... Great Seal of the Colony arrived in H.M.S. Gorgon.
July to October. ... Arrival of the Third Fleet (ten vessels).
13 December ... Corps of Marines embark for England and are relieved by New South Wales Corps.

1792.
— February ... Settlement at the Field of Mars founded by eight privates from the Corps of Marines.
14 ,, ... Major Grose arrived.
— July ..... Toongabbie settled.
11 December ... Governor Phillip sails for England and leaves Lieutenant-Governor Grose in charge.
11 ,, ... Lieutenant-Governor Grose substitutes military for civil rule.

1793.
— February ... Free settlers located at Liberty Plains.
— August ..... First church completed.
— September... Captain Paterson discovers and names the Grose River.

1794.
— January ..... Settlement established on the banks of the Hawkesbury.
26 October ..... Scotch martyrs landed at Sydney.
17 December ... Lieutenant-Governor Grose sails for England. Lieutenant-Governor Paterson assumes command.

1795.
— January..... First flood in Hawkesbury River after settlement.
7 September... Arrival of Governor Hunter.
— November... First printing press erected.
,, ... Lost cattle discovered in the Cowpastures district.

1796.
16 January..... First theatre opened at Sydney.
— June ..... Bass attempts unsuccessfully to cross the Blue Mountains.
4 September... Temporary church opened at Parramatta.

1797.
— January ..... Governor Hunter explores George's River.
— April ..... Tuggerah Lake discovered.
12 May ... . Coal discovered at Coal Cliff.
3 December ... Bass sailed from Sydney in a whale boat, and discovered the strait which bears his name.

1798.
— February ... Hunter sends out an exploring party which penetrates over 100 miles in a S.W. direction.
— October .. .. Foundation stone of St. Phillip's Church laid.
7 ,, ... Flinders and Bass embark on a voyage of discovery to Bass Strait and Van Diemen's Land.
3 November... Port Dalrymple discovered by Flinders.

1799.
16 August ..... Flinders enters Moreton Bay, and discovers Brisbane River.

1800.
28 September... Governor Hunter embarks for England, and is succeeded by Captain Philip Gidley King, R.N.

1801.
— June ..... Coal-mines at Hunter River worked by convicts.
18 July ..... Flinders sails in the Investigator to explore the coasts of New Holland.

1802.
15 February ... Lieutenant John Murray enters Port Phillip in the Lady Nelson.

1803.
20 January..... Lieutenant Charles Robbins and Acting-Surveyor Charles Grimes enter Port Phillip in the colonial schooner Cumberland.
5 March ... .. The first newspaper, the *Sydney Gazette*, printed.
10 April ..... St. John's Church, Parramatta, opened.
7 September... Lieutenant John Bowen lands at Risden Cove, Derwent River, and forms a settlement.

1804.

19 February ... Colonel Collins, having abandoned Port Phillip, lands at the Derwent, and forms the settlement of Hobart Town.
4 March ..... Revolt of convicts at Castle Hill. Insurgents dispersed by Major Johnston.
30 ,, ... Lieutenant C. A. F. N. Menzies lands at Newcastle and forms a settlement.
15 October..... Lieutenant Governor Paterson sails from Sydney to establish a colony at Port Dalrymple.

1806.

— March ..... Great flood in the Hawkesbury River.
13 August ..... Governor King gives up the Government to Governor Bligh.

1808.

26 January..... Governor Bligh arrested by Colonel Johnston, who assumes the Government.
28 July ..... Lieutenant-Governor Colonel Joseph Foveaux relieves Colonel Johnston.

1809.

1 January..... Colonel Paterson arrives at Sydney from Port Dalrymple, and takes upon himself the command in the place of Colonel Foveaux.
6 August ..... Disastrous flood in the Hawkesbury River.

1810.

1 January..... Major-General Lachlan Macquarie (who had arrived with a battalion of the 73rd Foot on the previous day), assumes the Governorship. Bligh and the New South Wales Corps returning to England.

1811.

7 May ..... Lieutenant-Colonel George Johnston court-martialled for the arrest of Governor Bligh. He was found guilty and sentenced to be cashiered.

1813.

1 May to 13 June. The Blue Mountains crossed by Messrs. Gregory Blaxland, William Charles Wentworth, and William Lawson.

1814.

30 November... G. W. Evans discovers the Macquarie River.
11 February ... Arrived Lieutenant-Colonel George Molle commanding the 46th Regiment.
27 July .... Jeofrey Hart Bent, first judge of the Supreme Court, arrived at Sydney.
12 August ..... The charter establishing the Supreme Court of New South Wales promulgated at Sydney.

1815.

21 January..... Road from Sydney over the Blue Mountains completed.
1 May ..... First sitting of the Supreme Court.
4 ,, ... Governor Macquarie visits Bathurst.
— ,, ... G. W. Evans discovers the Lachlan River.

1816.

12 April ..... Jeofrey Hart Bent recalled by the Secretary of State.
— June ..... Disastrous flood in the Hawkesbury.
11 July ..... Foundation of the Macquarie Lighthouse, South Head, laid.
12 September... Brig Trial seized by convicts in Sydney Harbour.
5 October..... Judge-Advocate Wylde arrives at Sydney.
20 December ... Allan Cunningham, botanist, arrived.

1817.

24 February ... Barron Field, Judge of the Supreme Court, arrived.
26 ,, ... Flood in the Hawkesbury River.
14 March ..... Lieutenant-Governor Sorell arrived.
— ,, ... Meehan and Hume discovered Lakes George and Bathurst, and the Goulburn Plains.
8 April ..... Bank of New South Wales opened.
3 August .... . 48th Regiment, Lieutenant-Colonel Erskine, arrived.
22 December to 29 July, 1818 Captain P. P. King surveys the western coast in the Mermaid.

1819.

25 April to 8 May. Charles Throsby's journey from the Cowpastures to Bathurst.
11 May to 21 May. Port Macquarie surveyed by John Oxley.
17 July ..... Savings Bank opened at Sydney.
21 August ..... County of Westmoreland named.
26 September... Commissioner Bigge arrived.

1820.

27 January..... Old burial ground (present site of Town Hall) closed.
5 February ... Obelisk in Macquarie-place erected.
20 March ..... The Georgian School-house founded.
19 June ..... Sir Joseph Banks died.
29 November... Foundation stone of St. Mary's Cathedral laid.
1 December ... The site of Campbelltown marked off for township.
31 ,, ... Frederick Goulburn, Colonial Secretary, arrived at Sydney.

1821.

14 February ... Commissioner Bigge left colony.
21 March ..... Captain Allman despatched to form a settlement at Port Macquarie.
11 May ..... George Howe died.
1 July ..... Wesleyan Chapel, Macquarie-street, opened.
7 November... Sir Thomas Brisbane arrived; took oaths as Governor 1st December.

1822.

6 January..... St. James's Church opened.
12 February ... Major-General Macquarie embarked for England.
20 March ..... A brass tablet, in honor of Captain Cook and Sir Joseph Banks, fixed on a rock at South Head, Botany Bay, by Governor Brisbane, president of the Philosophical Society.
19 June ..... Commissioner Bigge's report laid before the British Parliament.
5 July ..... The Agricultural Society of New South Wales formed.
Lawson and Scott discover the Goulburn River.

1823.

11 May ..... Reverend Dr. Lang arrived at Sydney.
1 June ..... Captain M. J. Currie, R.N., and Brigadier-Major Ovens discover the Murrumbidgee River.
2 December... Brisbane River discovered by Oxley.

1824.

5 April..... Mr. William Balcombe, first Colonial Treasurer of New South Wales.
5 ,, ... Mr. Saxe Bannister, first Attorney-General, arrived at Sydney.
17 May ..... Charter of Justice establishing Supreme Court under 4 Geo. IV, c. 96, promulgated at Sydney, with Mr. Francis Forbes as first Chief Justice.
— ,, ... Arrival of Lieutenant-Governor Arthur.
21 June ..... The Australian Agricultural Company incorporated by act of Parliament.
25 August ..... Members of the first Governor's Council sworn in.
12 September... Moreton Bay penal settlement founded, Lieutenant Miller, of the 40th Regiment, commandant.
14 October..... Government censorship over press removed, and the *Australian* newspaper established by W. C. Wentworth and Dr. Wardell.
22 October to 3 December. Hume and Hovell cross the Murrumbidgee, and discover the Murray and many of its tributaries, arriving on the lastnamed date at Port Phillip.
1 November... The first civil jury empannelled.

1825.

7 June ..... Chamber of Commerce established.
1 August ..... First Solicitor-General (Mr. John Stephens) arrived.
1 December ... Governor Brisbane recalled.
19 ,, ... Governor Darling arrived. Government administered by Colonel Stewart in the interim.

1826.

10 January..... First Land Board appointed.
7 March ..... The Australian Subscription Library (afterwards Free Public Library) established.
—'April ..... Name Cockle Bay changed to Darling Harbour.
18 July ..... Settlement formed at Illawarra by Captain Bishop.

1827.

A year of drought and financial distress.
26 January..... Popular agitation for legislative and judicial reforms commenced.
8 March ..... Postal communication first established in New South Wales. Charges, 3d. to 1s.; newspapers, 1d.
April-July ... Allan Cunningham discovered the Gwydir, Dumaresq, and Condamine Rivers, and the Darling Downs.
— September... The tunnel to convey water from the Botany swamps to Sydney commenced under direction of Mr. James Busby.

1828.

— August .. ... Richmond and Clarence Rivers discovered and named by the Hon. Captain Rous.
10 November... Captain Sturt starts on his first expedition, and discovers and names the River Darling, 2 February, 1829.

1829.

1 June ..... Foundation of the Colony of Western Australia.
4 August ..... First Circuit Court held (at Campbelltown).
21 ,, ... Warrant appointing new Legislative Council proclaimed.
12 October..... Great drought of 1827-8-9 broke up.
3 November... Captain Sturt starts on his second expedition and traces the river Murray to the sea.

1830.

26 January..... Foundation stone of the Sydney College (afterwards the Sydney Grammar School) laid.

1831.

16 May ..... First steamship (the Sophia Jane, 256 tons), arrived from England.
2 August ..... Disposal of Crown lands by grant discontinued.
22 October..... Governor Darling embarks for England.
2 December ... Governor Bourke arrives; Colonel Lindsay, C.B., acting in the interim.

1832.

6 April ..... Flood in the Hunter. Maitland under water.

1833.

22 March ..... Mechanics School of Arts established at Sydney.
25 May ..... Major Mitchell erected a stockade and called it Fort Bourke, on the River Darling.
14 August ..... Appellate jurisdiction of the Privy Council extended to the colonies.

1834.

13 August ..... Settlement formed at Twofold Bay.
19 November... Edward Henty landed and formed a settlement at Portland Bay.

1835.

6 June ... . Batman's treaty with Port Phillip natives for the possession of about 600,000 acres signed. Here Batman settled, and Melbourne was subsequently built.

1836.

9 March ..... Major Mitchell starts on the expedition in which he discovered the country called by him "Australia Felix."
29 September .. Captain Lonsdale took possession of the territory of Port Phillip (now Victoria).
28 December ... Foundation of the Colony of South Australia.

1837.

— March .... Governor Bourke visits Port Phillip and directs a township to be laid out on the banks of the Yarra Yarra, giving it the name of "Melbourne."
— June ..... Busby's tunnel, conveying water from Botany Bay to Sydney, completed.
5 December ... Governor Bourke sails for England.

1838.

24 February ... Sir George Gipps assumes the government, Lieutenant-Colonel Snodgrass having acted in the interim.
30 April ..... Botanic Gardens, Sydney, opened to the public.
1 November... Prepayment of postage by stamped covers introduced at Sydney.

1839.
30 April ..... Mr. (afterwards Sir Alfred) Stephen appointed Judge of the Supreme Court of New South Wales.
30 September... Mr. Charles Joseph Latrobe arrived at Melbourne.
31 October..... System of military juries ceased.

1840.
29 January..... Foundation of the Colony of New Zealand. Captain John Hobson appointed first Governor, 20th November.
1 August ..... Transportation to New South Wales practically ceased.

1841.
31 January to 8 July. } E. J. Eyre journeys from Adelaide to King George's Sound.
15 May ..... Captain (afterwards Sir George) Grey appointed Governor of South Australia.

1842.
10 February ... Moreton Bay district declared a free settlement.
20 July ..... Town of Sydney incorporated. John Hosking, first mayor.
11 August .... . Town of Melbourne incorporated. Henry Condell, first mayor.

1843.
23 February ... Final meeting of the Legislature as constituted in 1823.
1 August ..... First meeting of the partly elective and partly nominee Legislative Council held. Mr. Alexander Macleay, Speaker.

1844.
29 September... Norfolk Island separated from New South Wales, and annexed to the Government of Van Diemen's Land.
1 October..... Leichhardt leaves the Darling Downs on his first expedition to Port Essington, discovering the Dawson, Mackenzie, Burdekin, Suttor, and other rivers.

1845.
17 November... Sir Thomas Mitchell starts on his expedition to the N.W., in which he discovered the Fitzroy Downs, and the Culgoa, Warrego, and Barcoo rivers.

1846.
29 January..... Public meeting held at Sydney to advocate railway construction.
11 July Sir George Gipps departs; Sir Maurice O'Connell acting in the interim.
3 August Governor FitzRoy assumes the Government.

1847.
— January..... Flood in the Hunter River.
— November... Leichhardt left Moreton Bay on his last expedition.

1848.
5 January..... Denominational School Board appointed.

1849.
8 January .. .. Cessation of transportation. Last convict vessel arrived at Sydney.

1850.
3 July ..... First sod of railway Sydney to Goulburn turned.
5 August ... .. Australian Colonies Bill (Imperial) assented to.

1851.
5 February ... Black Thursday. Extensive bush fires and great destruction of property and loss of life in Victoria.
— April .... Gold discovered near Bathurst and handed to Government by Mr. E. H. Hargraves.
1 July .... Victoria separated from New South Wales.
25 August ..... Gold discovered at Ballarat.
5 December ... First electric telegraphic message sent in New South Wales.

1852.
25 June ..... Disastrous flood in the Murrumbidgee and other rivers. The town of Gundagai swept away and nearly 100 lives lost.
3 August ..... The first P. and O. mail steamer, the Chusan, arrived.
1 October..... The Sydney University inaugurated.

1853.

24 July ..... The Australian Museum incorporated, the foundation stone having been laid in 1836.
11 October..... Sydney Corporation dissolved and commission appointed.
21 ,, ... Constitution Bill passed.

1854.

2 May ..... Sir Henry (then Mr.) Parkes elected to the Legislative Council.
8 June ..... Establishment of the Colonial Office, London, as distinct from the War Office.
4 August ..... First Volunteer Act passed. Enrolment commenced 30 August.
3 December ... Riots on Ballarat gold-fields. Attack on Eureka Stockade.
17 ,, ... First Exhibition in Australian colonies opened at Melbourne.

1855.

20 January ..... Sir William Denison succeeds Governor FitzRoy.
20 September... Railway from Sydney to Parramatta opened.
19 December ... Governor Denison re-appointed and re-sworn under the new Constitution.

1856.

1 January..... Name Tasmania adopted in place of Van Diemen's Land.
22 May ..... First Parliament under constitutional Government met at Sydney.
24 June ..... Orders-in-Council separating Norfolk Island from Tasmania and creating it a separate settlement under the jurisdiction of the Governor of New South Wales. The Pitcairn islanders transferred shortly afterwards to Norfolk Island.

1857.

18 March ..... Corporation of Sydney re-establishment.
20 August ..... The Dunbar wrecked.
— ,, ... Great flood in the Hunter River.
30 December .. Sydney Exchange opened.

1858.

12 May ..... The Rev. Samuel Marsden died.
19 July ..... Telegraphic communication established between Sydney and Melbourne and Adelaide.
24 November... Manhood suffrage introduced in New South Wales.

1859.

10 December ... Queensland separated from New South Wales. Sir George Bowen first Governor.

1860.

3 August ..... Maori war. Troops landed from Australia.
20 ,, ... Burke and Wills leave Melbourne.

1861.

22 January ... Governor Denison relinquishes the Government.
13 May ..... Messrs. Parkes and Dalley appointed Emigration Commissioners, and lecturers in Great Britain.
16 ,, ... Governor Young assumed office, Lieutenant-Colonel Kempt having acted in the interim.
24 June ..... Appointments to the Legislative Assembly made for life instead of five years.

1862.

1 January... .. New Land Act. Free selection before survey came into force.
7 November... The Real Property Act (Torrens) passed.

1863.

— June ..... Great flood in Hunter River.
6 July .. .. Northern Territory separated from New South Wales and annexed to South Australia.

1865.

20 June ..... Stamp duties first imposed.

1866.

12 July ..... The Cawarra wrecked.
15 November... Garden Island dedicated to Imperial Government.
22 December ... The Education Act, establishing the Council of Education, passed.

1867.
4–20 March ... Federation Conference held at Melbourne.
23 December ... The Municipalities Act passed.
24 ,, ... Governor Young relinquished governorship.

1868.
8 January..... Earl Belmore succeeds Sir John Young, Sir Trevor Chute having acted in the interim.
10 June ..... Transportation to Western Australia ceases.

1869.
27 April ..... Cable communication between Australia and Tasmania established.
27 May ..... Railway : Sydney to Goulburn opened.
30 September... Free Public Library opened to the public.

1870.
June–July ..... Federal Conference at Melbourne.
20 August..... Imperial military forces withdrawn from Colony.

1872.
22 February ... Earl Belmore retires.
30 March ..... W. C. Wentworth died.
3 June ..... Sir Hercules Robinson assumes office, Sir Alfred Stephen having acted in the interim.
22 October..... First through cable message received from England.

1873.
6 May ..... W. C. Wentworth accorded a public funeral.
20 December ... San Francisco mail service established.

1874.
April to September — Forrest travels across the great western desert from the west coast to the overland telegraph line.

1875.
— May .. .. Giles and party journey from Adelaide to Perth.

1876.
20 February ... Australia and New Zealand cable communication established.
4 April ..... Railway opened to Bathurst.

1877.
19 April ..... Railway Sydney to Orange opened.
13 August ..... Railway Newcastle to Quirindi opened.
1 December ... Telegraphic communication between Adelaide and Perth established.

1878.
26 March ..... Free Public Library and Museum opened to public on Sunday.
6 July ..... Railway opened to Junee.
3 September... Railway opened to Wagga Wagga.
15 October ..... Railway opened to Tamworth.

1879.
25 February ... Statue of Captain Cook unveiled in Hyde Park.
19 March ..... Governor Robinson leaves for England.
4 August ..... Governor Loftus assumed office ; Sir Alfred Stephen, Lieutenant-Governor, acting in interim.
17 September... International Exhibition (Garden Palace) opened.
25 ,, ... Postal cards introduced.

1880.
6 February ... Fortnightly mail service with United Kingdom established.
21 April ..... Public Instruction Act passed, dissolving Council of Education, and transferring power to Minister.
1 June ..... Railway Sydney to Wellington opened.
12 July ..... Electoral Act passed.
— August ..... Sydney streets wood-paved.

1882.

22 September... Garden Palace destroyed by fire.

1883.

2 January..... Tolls on Government roads and bridges abolished.
14 June ..... Railway communication between Sydney and Melbourne completed.
13 November .. Foundation-stone of great hall Sydney Town Hall laid.

1884.

10 April..... Duty on colonially-manufactured tobacco imposed.
17 October..... New Land Act passed, dividing colony into eastern, central and western districts, and establishing local land boards and Land Appeal Court.
31 ,, ... Civil Service Act passed.
6 November... British protectorate over southern part of New Guinea proclaimed.

1885.

3 March ..... The Australian Contingent sailed for the Soudan. Returned 24 June.
10 November... Lord Loftus relinquishes Government.
12 December ... Governor Carrington arrived ; Lieutenant-Governor Sir Alfred Stephen acting in interim.

1886.

25 January..... First meeting of the Federal Council at Hobart.
30 May ..... Ly-ee-Moon wrecked.
7 July ..... Anglo-Australian parcels post established.
19 October..... Railway opened to Tenterfield.

1887.

23 March ..... Explosion at Bulli colliery ; eighty-one lives lost.
May .... Large exportation of oranges for London market.

1888.

16 January..... Railway Sydney to Brisbane completed.
30 ,, ... Foundation-stone of new Parliament Houses laid.
12 February ... Railway Murrumburrah to Blayney opened.
13 ,, ... Sir J. B. Thurston, Governor of Fiji, appointed British Consul-General of the Western Pacific.
4 September... New Guinea Protectorate of 1884 changed to British sovereignty.
22 October..... Railway commissioners appointed.
9 November .. First town lit by electricity (Tamworth).

1889.

1 May ..... Railway bridge over Hawkesbury River opened.
21 September... Payment of members inaugurated.
— October..... Federation—Sir Henry Parkes advocates the assembling of an Australian Convention and the formation of a Federal Dominion.

1890.

19 September... Strike disturbances at Sydney. The Riot Act read.
1 November... Lord Carrington left Sydney. Sir Alfred Stephen, Lieutenant-Governor.

1891.

5 January..... Governor Jersey landed.
2 March .. ... National Australasian Convention assembled ; closed 9 April.
8 May ... . Sir John Robertson died.
26 November... Lieutenant-Governor Sir Alfred Stephen succeeded by Sir Frederick Darley.

1892.

20 January..... Sir John Hay died.
11 February ... Run on Savings Bank at Sydney.
3 October..... Railway, Corowa to Culcairn opened.

1893.

19 February ... Grafton flooded.
,, ... Disastrous floods in Queensland.
1 March ..... Departure of Lord Jersey.
April ..... Several banks in Sydney suspend payment.
29 May ..... Governor Duff arrived ; Lieutenant-Governor Darley acting in the interim.
1 September... Railway opened to Forbes.

1894

17 July ..... General elections.
3 August ..... The Reid Ministry accept office.
15 October ..... Sir Alfred Stephen died.
30 ,, ... Railway disaster at Redfern Station.
1 November... Wairarapa wrecked.

1895.

15 March ..... Sir Robert Duff died.
24 July ..... General elections held.
7 August ..... S.S. Catterthun wrecked on Seal Rocks.
21 November... Governor Hampden arrived.
22 December ... Land and Income Tax Act passed.
23 ,, ... Public Service Act assented to.
23 ,, .. Federation Enabling Act passed.

APPENDIX B.

FROM EUROPE TO SYDNEY, AND HOW TO LIVE THERE.

By W. G. Rendall.

Those who are about to migrate from the old world to the new will naturally be anxious to gain some definite idea as to the cost of the process and the prospects which their intended surroundings afford. In this short resumé of fares, routes, and cost of living in New South Wales, it is only possible to take a most superficial glance at the circumstances attending such a change; but one which, it is trusted, will be of some little service to those who are seeking fortune, pleasure, or change, amid scenes which have much to recommend them, and which furnish many of the elements of happiness and comfort to those who are provided with the necessary equipment of ordinary talent, education, perseverance, and a little money.

Although the general condition of things in the Eastern Colonies of Australia may be said to be similar, New South Wales presents advantages to those who are inclined to try their fortunes in fresh fields and pastures new which should not be overlooked. The geographical position of the port of Sydney at once gives the Colony a premier position with regard to commerce upon which hangs her industrial and social welfare. Then there is a vast extent of territory, taking in every range of climate suited to the wants of diversified tastes and constitutions. That of Sydney proper is admittedly "delightful," the city being in close proximity to both the sea and mountains, which, combined with our beautiful harbour and inland scenery, leaves nothing to be desired in this respect. Nearly every department of labour and industry is fully represented, and the labourer, whether in the mechanical branches of trade, in the arts or sciences, or other walks of life, receives fair remuneration for his work, while living is comparatively cheap alike as regards food, clothing, or house rent, added to which the possibilities are always in favour of colonists who are in the van of progress, and who take an active interest in the well-being of the community. There is no place in Australia for the idle or intemperate, and all such invariably find a common level of destitution and wretchedness. Our skies are bright and sunny, our surroundings each and all in harmony with light and warmth. Our people are genial and sympathetic, and those who come to us in the same spirit speedily find friends and companions, who aid in relieving the irksomeness of new surroundings. The present purpose, however, is not to describe our social condition, or to dilate on our modern achievements in the way of public or private conveniences, which invariably call orth the admiration and surprise of much-travelled tourists, who discover that there is something to be seen in Australia, and that modern progress in science and invention, and the art of living well, find ample illustration in Sydney and her pretty suburbs, filled with a busy population of about 400,000 souls.

Turning to the subjects under present consideration, the first one worthy of note is that of

Routes and Fares.

The traveller from Europe to Australia has a variety of routes at his disposal, and as to which to select, it is simply a matter of paying one's money and taking one's choice.

The leading companies, each and all, provide such a splendid service that one can hardly make invidious distinctions. The prevailing rates from London to Sydney are as follows :—

Company.	Single Tickets. First Class.	Second Class.	Third Class. With kit.	Third Class. Without kit.	Return Tickets. First Class.	Return Tickets. Second Class.
	£	£	£ s.	£ s.	£ s.	£
P. and O. Co.	58	35	..	..	100 0	65
Orient Line	58	35	15 15	14 14	100 0	65
Shaw, Savill, and Albion Co.	62	37	16 16	15 15	110 0	70
New Zealand S. Co.	62	37	16 16	15 15	110 0	70
North-German Lloyd's	57	32	14 14	13 13	95 0	55
British India Queensland Line	55	34	15 15	14 14	95 0	60
George Thompson & Co.	50	Servants to passengers. 30	14 14	13 13	87 10	..
W. Milburn & Co.	40	30	14 14	13 13	75 0	..
W. Lund	40	30	14 14	13 13	75 0	..
Gulf Line	40	30	14 14	13 13	75 0	..
British and Colonial Line, Turnbull, Martin, & Co., and Tyser Line.	40	30	14 14	13 13	75 0	..

Children between 3 and 12 years of age, half price ; one child under 3, free ; for more than one under 3, quarter fare each, exclusive of one taken free. An abatement of 20 per cent. off return journey for passengers taking single tickets returning by same line within six months of landing, and 10 per cent. if within twelve months. An abatement of 10 per cent. off first and second class single fares to families equal to three adults, and 15 per cent. to families of equal to four adults and upwards. No abatement is made on return tickets or third-class fares. Missionaries, cricketing teams, and theatrical parties, can obtain an abatement of 20 per cent. off first and second class single fares. This schedule is at present in force, subject to three months' notice to be given by either of the companies mentioned in writing.

In addition to these steamers should be mentioned the splendid line controlled by the Messageries Maritimes Company, whose steamers run between Sydney and Marseilles. The company also provide special facilities for passengers crossing the Continent *en route* to Paris or London. The fares by this company are about the same as those of the P. and O. and Orient lines. Then there is the American route, giving the tourist an illimitable range of scenery and the choice of deviating paths in the great western world. The Canadian-Australian line takes the traveller through Canada or the States, whither he will, as well as to the Hawaiian and Fiji Islands in the Pacific, and thence to Sydney. The Australian-American line carries the traveller across the United States, thence to New Zealand, and on to Sydney. This route is also full of the most striking features of interest. These routes vary in cost, according to the direction taken overland, and the manner in which it is travelled. The hand books published by the various companies are so complete in every detail that to go into particulars is superfluous. The American route, as well as the British India line, carries passengers direct to Sydney without touching Albany, Adelaide, or Melbourne. By the others, however, passengers can land at the places last mentioned, and proceed to Sydney by rail if they wish, paying, of course, the increased fare overland. The whole of the steamers find their destination at Sydney, to which all through fares are calculated.

Wages Paid in Various Trades.

In providing a list of the various trades and occupations, and the wages paid, the amounts set forth can only be taken as approximate, as during the past two or three years retrenchment has been largely resorted to, and employés have been compelled to accept low rates of wages in order to retain their posts. More recently the prevalence of droughts has curtailed the demand for labour in the interior, which has caused a large influx of persons seeking employment to the more thickly-populated centres, and for similar reasons, as well as owing to the effects of the recent depression in the industries of

Victoria, a large number of unemployed have been attracted to this Colony. With a combination of such circumstances, persons in search of employment have been compelled to accept smaller wages to enable them to bridge the season of depression. New South Wales has been made a place of refuge during the interval of financial distress by reason of the more advantageous position the Colony has occupied, so that the item of work and wages has suffered more on account of the support which has been given outside of its own legitimate labour market than had the task of remodelling pay sheets been between local employers and employés only. This has been especially the case in Sydney, while the same remark may be equally applied to the principal provincial centres. Such a state of things has necessarily disorganised the local labour market, and the various unions and trade organisations, which had their growth in more prosperous times, have become powerless in dictating rates of wages and other matters in the labour market, as in nearly every department of trade men and women are willing to work for what they can get. Low wages, or its attendant privations, however, must not be taken as synonymous with the labour market of New South Wales, but rather as an exception, almost without precedent, so far as the thrifty and industrious are concerned, and there is every reason to believe that the worst has been passed, as during the last year a large number of firms and institutions have raised the salaries of employés who had been reduced during the interval of financial depression, so that the return to a liberal standard of remuneration may confidently be looked for, and with the rapid recovery which has been experienced by this Colony, there seems every prospect of labourers becoming worthy of their hire in all the ordinary branches of trade.

Wages in all private establishments are paid weekly, and the usual rate is forty-eight hours, or eight hours per day. In some cases piecework is taken instead of daily wages —an alternative which has led to a good deal of "sweating" in the manufacture of ready-made clothing. The general rule, however, is to calculate earnings on a weekly basis, which, in a general way, may be enumerated as follows :—

RATES OF WAGES PAID FOR ENGAGEMENTS THROUGH THE VARIOUS LABOUR OFFICES.

Male Labour.

Occupation.	Stations.		Hotels.		Private Families.		Businesses.	
	From	To	From	To	From	To	From	To
*Married couples	£70		£60		£50	£60	.....	
Cooks	15s.	20s.	25s.	35s.	15s.	17s. 6d.	.....	
Gardeners	15s.	17s. 6d.	.....		15s.	17s. 6d.	.....	
Hotel barmen	.....		20s.	30s.	.....		.....	
Boots and useful	.....		10s.	15s.	.....		.....	
Groom and coachman	.....		.....		15s.	20s.	.....	
Butlers	15s.		.....		17s.	22s. 6d.	.....	
*Overseers	£60	£80	.....		.....		.....	
*Book and store keepers	£52	£70	.....		.....			
Bullock drivers	20s.		.....		.....		.....	
Stockmen	20s.		.....		.....			
Butchers	15s.	16s.	.....		.....		20s.	30s.
Boundary riders	12s. 6d.	15s.	.....		.....			
Ploughmen	15s.	20s.	.....		.....		.....	
Carpenters	20s.	25s.	.....		.....		12s.	
Blacksmiths	20s.	30s.	.....		.....		18s.	
Butchers and milkmen	15s.	17s. 6d.	.....		.....		.....	
Drapers	.....		.....		.....		35s.	40s.
*Tutors	£40	£50	.....		.....		.....	

*Rate per annum. Other wages are at per week. The rates of wages paid on farms are similar to those enumerated under the heading "Stations." With the exception of "Businesses," the whole of the above include board and lodging.

Female Labour.

Occupation.	Stations		Hotels.		Private Families.		Coffee Palaces.	
	From	To	From	To	From	To	From	To
Cooks	16s.	20s.	15s.	20s.	15s.	16s.	.....	
Cooks and Laundresses	14s.	15s.	15s.	16s.	12s.	15s.	.....	
General Servants	12s.	15s.	12s.	14s.	10s.	14s.	.....	
Housemaids and waitresses	.....		12s.	13s.	.....		10s.	12s.
Waitresses	.....		11s.	13s.	.....		13s.	14s.
House and parlormaids	10s.	12s.	10s.	12s.	10s.	13s.	12s.	13s.
Housemaids	.....		10s.	13s.	.....		10s.	11s.
Housekeepers	12s.	15s.	16s.	20s.	.....		18s.	
Nurse and needle women	10s.	12s.	10s.	11s.	9s.	11s.	.....	
*Mother and daughter	£50	£65	.....		.....		.....	
*Mother and son	£60	£70	.....		.....		.....	
Laundry and housemaids	14s.	16s.	13s.	15s.	12s.	14s.	.....	
Laundresses	16s.	18s.	20s.		17s.	18s.	.....	
Barmaids	.....		20s.	25s.	.....		.....	
*Governesses	£26	£50	£30	£35	£25	£40	.....	
*Lady helps	£26		£26		£20	£26	.....	
Kitchen maids	.....		10s.	12s.	10s.		10s.	
Pantry maids	.....		10s.	11s.	9s.	10s.	10s.	11s.
Nursemaids	6s.	8s.	6s.	9s.	5s.	7s.	5s.	

* Rate per annum. All other wages enumerated are at per week, the whole of which include board and lodging with the exception of waitresses in coffee palaces and restaurants, some of whom sleep off the premises.

Shearers.—Outside districts have been paying 20s. per 100; central and eastern districts a reduction to 17s.; small stations, 15s. Rouseabouts, 20s. to 25s. per week; in some cases 30s. per week, according to experience. Other hands, including wool-pressers and overseers, engine machinists, range from £2 to £5 per week, according to arrangement. Shearers' cooks, 3s. to 4s. per week from each man on one board; shearers' rouseabouts, 2s. 6d. to 3s. 6d. per week from each man on the board. General station hands engaged for boundary riding, &c., all the year round from 15s. to 20s. per week. Shepherds are now being replaced with boundary riders as the country becomes fenced.

Shop Assistants.—Counter hands in the ironmongery, drapery, grocery, and similar trades receive from £2 10s. to £3 per week for foremen and seniors, ordinary assistants from £1 10s. to £2, and juniors from 10s. to 20s. per week; office and errand boys from 5s. to 10s. per week.

Bakers.—Foremen and first-class hands receive from £2 10s. to £3 per week, and second-class from £1 to £2 per week.

Brass-finishers and Coppersmiths.—Wages range from 8s. to 12s. per day. A large number of youths and apprentices are employed in the mechanical branches. The manufacture of brass foundry is very considerable.

Building Trades.—Wages are paid at per day, owing to the loss of time that happens through inclement weather or other causes. Trade has been extremely dull for the past two or three years; but latterly the demand for labour has increased, and there has been a little more activity in the building trade generally. Wages are somewhat unsettled, therefore the rates given can only be taken as approximate. Masons receive from 10s. to 12s.; bricklayers, 8s. to 10s.; carpenters and joiners, 7s. to 10s.; plasterers, slaters, galvanized iron workers and plumbers about the same; labourers, pick and shovel men, and unskilled labour generally are in over supply, and men are glad to get work at as low as 5s. per day.

Butchers.—Shopmen get from 20s. to 50s; boys, 10s. to 20s.; slaughtermen, 30s. to 50s.; and small goodsmen from £2 to £3 per week. In many cases a slightly lower rate of wages is accepted when board and lodging is provided. In the city very few butchers make their own small goods, supplies being obtained from those whose special business is to manufacture and deliver, as well as to take waste from the shops.

Coach builders.—Smith and wheelers' wages are from 30s. to 50s. per week; bodymakers, painters, and trimmers are paid at about similar rates; and viceroen from 30s. to 35s. per week. There is a good deal of work done in this trade throughout the Colony, and large

quantities of manufactured stock are imported from America. While there is a large demand for the more useful kinds of vehicles, a good deal of very superior and highly-finished work is turned out.

Bootmakers.—This is a very large industry; the manufacture of boots and shoes in this Colony exceeds 3,000,000 pairs per annum. Nearly the whole of the work is done on piece, and the rates paid vary very much. Earnings are at about the following rates. Foremen, 50s. to 70s.; machine-operators, from 25s. to 60s.; clickers, 30s. to 50s.; cutters and pressmen, 30s. to 55s.; makers, 30s. to 60s.; blockers, 30s. to 40s.; finishers, 30s. to 55s.; female machinists, 15s. to 25s.; apprentices (boys and girls), 5s. to 15s. per week.

Clothing Trades.—A large proportion of the tailoring work is done on piece work, or at employés' own homes. When it is stated that a good business suit can be purchased retail at £1 10s. to £2 2s., it goes without saying that very little is paid for the labour which produces these goods. The same remark may be applied to women's clothing; "ready-made costumes" can be bought from 4s. 6d. each upwards, and other lines of ready-made clothing are on the same scale. In the clothing trade the following are the rates paid per week:—Cutters, 50s. to 70s.; foremen, 60s. to 100s.; coat hands, 30s. to 60s.; females, 15s. to 32s. 6d.; trouser hands (males), 50s. to 60s.; vest hands (males), 40s. to 45s.; females, 15s. to 20s.; machinists, 15s. to 30s.; machiners, 50s. to 70s.; trimmers, 40s. to 60s.; buttonhole finishers, 20s. to 25s.; boys and assistants, 5s. to 20s. Dress-making: A great deal of work is taken privately, and the rates for this class of work vary considerably, according to style, cut, and finish. Articles are generally paid for at per garment, for which no fixed rates can be given. In large establishments, where weekly wages are paid, the following are about the approximate rates: Forewomen at the heads of large houses are sometimes paid as much as £4 or £5 per week, but more often the amount is considerably less. Tailoresses, from 20s. to 30s.; bodice hands, from 12s. 6d. to 30s.; while machinists and general dressmakers receive about similar amounts. Wages for beginners and apprentices range down to 2s. 6d. per week. Millinery forewomen are paid £2 or £3 per week; milliners, 15s. to 30s.; improvers, 5s. to 10s.; and saleswomen from 15s. or £1, up to £2 or £3 per week, according to age and experience. Shirt making is generally done by employés at their own homes on piece, and the results are about the same as those quoted in the departments noted above.

Metal Working Trades.—In this important constructive branch the remuneration given in the various trades differs considerably. Classed as a whole, skilled labour commands from 50s. to 60s. per week, although mechanics and engineers engaged in requiring more than ordinary skill receive higher wages. Second-class labour may be rated from 30s. to 40s.; junior apprentices and boys from 5s. to 20s. per week. Persons engaged in ship-building and repairs are paid rather better wages.

Miscellaneous.—In the departments of joinery, wood-carving, and turning, pottery, brick-making, marble-working, saw mills, and the like, wages vary according to the nature of the work. In constructive works it frequently happens that contracts are accepted by tender at very low rates, which necessitates employers cutting wages to the smallest possible level to enable them to finish their contracts satisfactorily. It is almost always the rule to let work on piece if it will admit of it, and competition frequently reduces wages to a limit which employers are not anxious to follow. The current rate of wages for journeymen is from £2 to £3 per week.

A good tradesman in almost any ordinary branch of trade, no matter whether a carpenter and joiner, cabinet-maker, saddle and harness maker, tinsmith, builder, watch-maker, plumber, printer, lithographer, book-binder, potter, tanner, biscuit-maker, or any similar fixed occupation, may regard his labour as worth 50s. to 60s. per week. If he has more than ordinary ability, and shows a capacity for assisting the business with which he is assisted, he will probably earn more, while he may be pretty sure of gaining less if he is not up to the general average.

Unskilled labour is worth about 6s. per day. On the wharves and similar places, where the hours of labour vary, overtime is allowed for at the rate of 1s. per hour.

Mining labour forms a considerable item in the total of those employed in the Colony: but it is entirely beyond the scope and purpose of this work to give the smallest indication of the different rates paid by the different mines. Those actually engaged in the

work of mining coal earn from 2s. to 3s. per ton, or from 8s. to 11s. per day. A large number of persons are employed in mining at various occupations at rates ranging from a few shillings per day; on the other hand, foremen, overseers, paymasters, overmen, engineers, and others receive better wages. On the gold-fields a large proportion of the work is done on tribute—that is, the miners take a certain proportion of the gold won as their share, in payment for work and labour done. In this way (say) 20, 30, or 50 per cent. of the gold is paid to those employed in finding it, according to the richness of the field. The rates paid on the silver mines are about on a par with those current for coal-mining.

House Rent.

This important item in the cost of living may be estimated at about one-fourth or one-fifth of the ordinary earnings of artizans and mechanics with families. Rates vary greatly, according to position and the distance from the city. The same style of house even in the same street frequently commands a difference of several shillings a week, simply on account of its position. Rents are generally paid weekly for the smaller class of tenements, and fortnightly, monthly, or by arrangement, for the larger ones. Briefly stated, house rents in the city and suburbs are as follows:—Workmen's houses, in the suburbs, of about 3 or 4 rooms, 7s. to 10s.; houses of 5 or 6 rooms, 15s. to 20s.; and 6 or 7 rooms, 20s. to 25s. per week. These are chiefly terrace houses, and, as a rule, include kitchen, with all conveniences and offices. Detached houses of 7 or 8 rooms are somewhat difficult to find unless at high rents; those within easy access by tram, train, or ferry command from £65 to £100 per annum, and for gentlemen's residences, with grounds, in the suburbs, some little distance from town, £100 to £250 per annum is demanded. In the provincial towns rates are much lower, and, as a rule, more land is given to each tenement. The rates enumerated above are within the range of twopenny and threepenny fares by 'bus or tram, or one penny by ferry.

Board and Residence.

Living in apartments, with or without board, is comparatively cheap; in fact, the scale of "quality and price" is sufficiently varied to suit all degrees of tastes and means. The following gives a fair idea of the cost of living under such conditions:—Mechanics and labouring classes can obtain fairly good accommodation from 15s. to 18s. per week; ordinary board and residence in private families, or at boarding-houses, from 18s. to 25s. per week; superior accommodation, from 25s. to 30s. per week. Hotels charge 8s. to 10s. per day. Weekly rates in first-class hotels vary from 30s. to 60s. per week. Coffee palaces charge from 6d. to 1s. for single meals, and 2s. 6d. to 4s. for single beds. Charges in the country are about on the same scale, perhaps a little less. A large number of persons rent single furnished rooms at 4s. to 6s. per week, and obtain their meals at restaurants.

The Price of Food.

The necessaries of life in the way of food, fuel, light, &c., are procurable in this colony as cheaply as in any part of the world. There is an abundance of meat, fruit, and all kinds of farm produce which is at the command of all classes at prices varying somewhat according to the consumer's proximity to the locality where his requirements are distributed or produced in large quantities. In the city or suburbs the ruling rates for provisions vary according to the season of the year, but may be approximately set out as follows:—

Meat.—Retail prices for prime joints in the city and suburbs are—for mutton: fore quarters, 1½d. per lb.; hinds, 2d. per lb.; chops, 2d. to 3d. per lb.; lamb: fore-quarters, 1s. 6d. each; hinds, 2s. to 2s. 6d. each; ribs of roasting beef, 2d. to 4d. per lb.: sirloin, 4d. to 5d. per lb.; rump steak, 6d. per lb.; plain, 2½d. to 3d. per lb.; corned beef, 2d. to 3d. per lb.; pork: loins, 5d. to 6d. per lb.; legs, 5d. per lb.; sausages: beef, 2d. to 3d. per lb.; pork, 5d. to 6d. per lb.; veal: fillet, 5d. per lb.; loin, 4d. per lb.; breast and shoulder, 3d. per lb. Poultry commands high prices at Christmas and Easter. Ordinary retail prices for live poultry range as follows:—Fowls, 3s. to 4s. per pair; ducks, 3s. 6d. to 4s. 6d. per pair; geese, 5s. to 6s. per pair; turkeys: hens, 5s. to 6s.

per pair; cocks, 6s. to 12s. per pair. Dressed poultry commands about double these prices. Wild ducks in season, 2s. to 3s. per pair; teal, 1s. 6d. to 2s. 6d., per pair; rabbits, 1s. per pair.

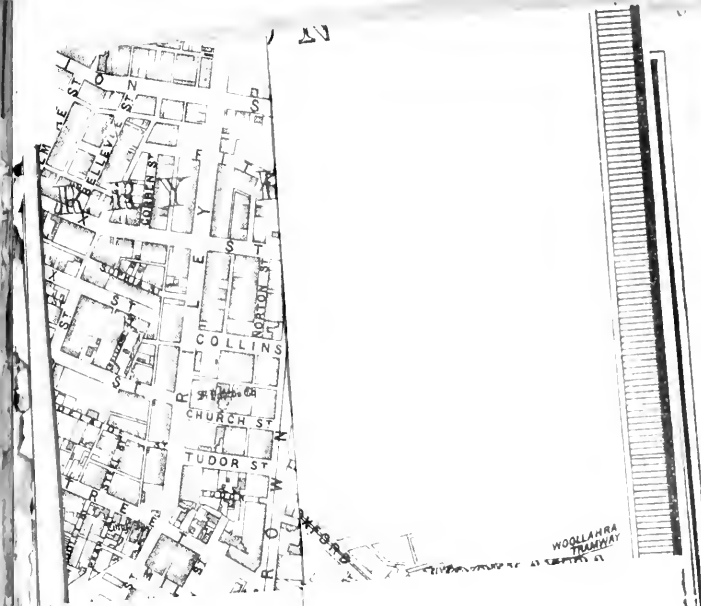
Dairy Produce.—Butter: 1s. to 1s. 6d. per lb. for best factory or creamery, dairy from 6d. to 1s. per lb.; cheese, 6d. to 9d. per lb.; bacon, 6d. to 9d. per lb.; hams, 1s. per lb.; eggs, 1s. to 1s. 6d. per dozen.

Groceries and Oilstores.—Arrowroot, 5d. per lb.; baking powder, 1s. 2d. per lb.; candles, 5d. to 7d. per lb.; cocoa, from 1s. 6d. to 2s. per ½ lb. tin or packet; coffee, 1s. to 1s. 6d. per lb.; corn flour, 3½d. per lb.; canned and bottled fruits, 9d. to 1s.; evaporated apples, 9d. per lb.; peaches and apricots, 1s. per lb.; currants, 4d. to 5d. per lb.; sultanas, 5d. to 6d. per lb.; elemes, 5½d. to 6d. per lb.; and Malaga muscatel raisins, 1s. 3d. to 1s. 6d. per lb. Best roller flour in bags of 12 lb. 1s. 7½d., 25 lb. 2s. 9d., 50 lb. 5s. 3d., and 100 lb. 10s. 3d. per bag. Sardines, 4d. and 7d.; herrings (fresh), 5d.; salmon, 7½d.; lobster, 1s.; honey, 6d. per lb.; jam from 4d. to 6d. per 1 lb. tin or 7d. to 9d. for 1 lb. glass jars; kerosene, 5s. 9d. to 6s. per tin of 4 gallons; marmalade, 5d. to 7d. per lb.; preserved Australian and imported meats, 10d. to 1s. per 2 lb. tin; oatmeal, in 7 lb. bags, 1s. 2d.; rolled oats, 1s. 1d. for 5 lb. bags and 6½d. for 2 lb. packets; imported condensed milk 6½d. per tin, local 6d., fresh 1d. per quart; rice, 1s. 3d. for 7 lb.; sago and tapioca, 9d. for 4 lb.; sugar, 2d. to 2½d. per lb.; soap, 4d. to 6d. per bar; tea, good blended household, from 1s. to 1s. 6d. per lb.

Vegetables and fruit are plentiful and cheap in season, while supplies are well maintained from the various parts of the colony all the year round.

Fuel and Light.—Coal in the city and suburbs is sold at 16s. to 18s. per ton; firewood is about the same price. In the country it is about one-third or fourth this price, according to locality. Gas consumers pay 4s. 3d. per 1,000 feet in the city and about 5s. in the suburbs.

Sydney: Charles Potter, Government Printer. 1886.


COLLINS
NORTON
CHURCH ST
TUDOR ST
WOOLLAHRA TRAMWAY

MAP OF THE
CITY OF SYDNEY
NEW SOUTH WALES.

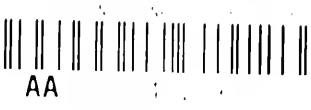
SCALE 12 Chains to an Inch

EXPLANATORY NOTES

Names of Parishes — Name thus
Boundaries of Parishes
Names of Municipalities — ST JAMES
Boundaries of Municipalities — GLEBE
Buildings
Metalled Roads

PUBLIC PARKS AND RECREATION RESERVES

Hutchinson,-
New South Wales.



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